Conduct of the Persian Gulf War

Final Report to Congress

Pursuant to
Title V of The Persian Gulf Conflict Supplemental Authorization and Personnel Benefits Act of 1991 (Public Law 102-25)

APPENDICES A - S

April 1992

PREFACE

The final report to Congress on the conduct of hostilities in the Persian Gulf (pursuant to the requirements of Title V of the Persian Gulf Supplemental and Personnel Benefits Act of 1991) is divided into three volumes. The first volume deals with the nature of Iraqi forces, Operation Desert Shield, the Maritime Interception Operations and Operation Desert Storm. The second and third volumes contain appendices dealing with specific issues.

Discussion in volume I focuses on how the threat in the Persian Gulf developed and how the United States and its Coalition partners responded to that threat at the strategic, operational, and tactical levels. The narrative is chronological to the extent possible. In this sense, it touches on issues such as logistics, intelligence, deployment, the law of armed conflict, and mobilization, among others, only as those issues have a bearing on the overall chronicle.

This is not to suggest that other issues are not important. In fact, examination of these issues is of great substantive value to future security plans and programs. To provide ready access to this information, discussions of specific issues have been structured into appendices and collected in Volumes II and III. The intent is to provide as much detail as possible about a specific issue in one location. For all intents and purposes, the appendices are independent documents and with enough background to let the reader concerned with a particular area read the appropriate appendix and forego other parts of the report. Where cross-referencing or overlapping occurs, it is to achieve that objective.

The content of all volumes of this report is the result of extensive research conducted through review of original source documents (such as orders, plans, estimates, and appraisals); information from the Office of the Secretary of Defense, Joint Staff, the United States Central Command, other unified and specified commands, component commands, and the military Services; and, in-depth interviews with many senior officers and policy makers involved in Operations Desert Shield and Desert Storm. Research to determine what lessons ought to be taken from the crisis began before the conflict ended. Throughout, officials at all levels willingly provided information. However, this conflict was exceptionally well documented compared with previous crises. Many data points remain in raw form and information on some aspects of the campaigns remains uncollated and unevaluated. The volume of available documents, perhaps in the millions of pages, will provide researchers with data for a number of years. Therefore, while the depictions, conclusions, and evaluations presented in this report are based on a thorough examination of the existing evidence, they are subject to modification as additional research makes more information available.

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APPENDIX A

UNITED STATES FATALITIES AND PRISONERS OF WAR ATTRIBUTED DIRECTLY TO OPERATIONS DESERT SHIELD AND DESERT STORM FROM 3 AUGUST 1990 TO 15 DECEMBER 1991

List of Fatalities Provided by the Uniformed Services A-3

List of Prisoners of War A-13

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LIST OF FATALITIES PROVIDED BY THE SERVICES

Adams, Thomas R., Jr., Lance Corporal, USMC
Alaniz, Andy, Specialist, USA
Allen, Frank C., Lance Corporal, USMC
Allen, Michael R., Staff Sergeant, USA
Ames, David R., Staff Sergeant, USA
Anderson, Michael F., Chief Warrant Officer Three, USA
Applegate, Tony R., Staff Sergeant, USA
Arteaga, Jorge I., Captain, USAF
Atherton, Steven E., Corporal, USA
Auger, Allen R., Corporal, USMC
Avey, Hans C. R., Private First Class, USA
Awalt, Russell F., Staff Sergeant, USA
Bartusiak, Stanley W., Specialist, USA
Bates, Donald R., Staff Sergeant, USA
Bates, Tommie W., Captain, USA
Beaudoin, Cindy M., Specialist, USA
Belas, Lee A., Sergeant, USA
Belliveau, Michael L., Aviation Electrician's Mate Third Class, USN
Benningfield, Alan H., Boiler Technician Second Class, USN
Bentzlin, Stephen E., Corporal, USMC
Benz, Kurt A., Corporal, USMC
Betz, Dennis W., Sergeant, USMC
Bianco, Scott F., Corporal, USMC
Bland, Thomas C., Jr., Captain, USAF
Blessinger, John P., Staff Sergeant, USAF
Blowe, James, Mr., Army/Contractor
Blue, Tommy A., Sergeant, USA
Bnosky, Jeffrey J., Captain, USA
Boliver, John A Jr., Specialist, USA
Bongiorni, Joseph P., III, Sergeant, USA
Bowers, Tyrone, Private First Class, USA
Bowman, Charles L., Jr., Specialist, USA
Boxler, John T., Sergeant, USA
Brace, William C., Specialist, USA
Bradt, Douglas L., Captain, USAF
Bridges, Cindy D. J., Private First Class, USA
Brilinski, Roger P., Jr., Sergeant,USA
Brogdon,Tracy D.,Sergeant, USA
Brooks, Tyrone M., Boiler Technician Fireman, USN
Brown, Christopher B., Airman Apprentice, USN
Brown, Darrell K., Airman Apprentice, USN
Brown, James R., Specialist, USA

Budzian, Steven A., Airman Apprentice, USN
Buege, Paul G., Senior Master Sergeant, USAF
Bunch, Ricky L., Staff Sergeant, USA
Burt, Paul L., Sergeant, USA
Butch, Michael R., Aviation Structural Mechanic Second Class, USN
Butler, Tommy D., Specialist, USA
Butts, William T., Sergeant First Class, USA
Caldwell, Thomas R., Captain, USAF
Calloway, Kevin L., Private First Class, USA
Campisi, John F., Staff Sergeant, USAF
Carr, Jason C., Sergeant, USA
Carranza, Hector, Jr., Lieutenant Colonel, USA
Carrington, Monray C., Seaman, USN
Cash, Clarence A., Specialist, USA
Chapman, Christopher J., Sergeant, USA
Chinburg, Michael L., Captain, USAF
Clark, Barry M., Sergeant, USAF
Clark, Beverly S., Specialist, USA
Clark, Larry M., Airman, USN
Clark, Otto F., Master Sergeant, USA
Clark, Steven D., Specialist, USA
Clemente, Samuel J., Mr,Army/Contractor
Codispodo, Edward M., Lance Corporal, USMC
Cohen, Gerald A., Private First Class, USA
Collins, Melford R., Private First Class, USA
Connelly, Mark A., Major, USA
Conner, Michael R., Sr., Staff Sergeant, USMC
Connor, Patrick K., Lieutenant, USN
Cooke, Barry T., Lieutenant Commander, USN
Cooke, Michael D., Corporal, USMC
Cooper, Ardon B., Private First Class, USA
Cooper, Charles W., Captain, USA
Cormier, Dale T., Captain, USAF
Costen, William T., Lieutenant, USN
Cotto, Ismael, Corporal, USMC
Crask, Gary W., Specialist, USA
Craver, Alan B., Sergeant, USA
Crockford, James F., Aviation Structural Mechanic Third Class, USN
Cronin, William D., Jr., Captain, USMC
Cronquist, Mark R., Specialist, USA
Cross, Shirley M., Aerographer's Mate First Class, USN
Crumby, David R., Jr., Sergeant, USA
Cruz, George, Mr., Navy/Contractor
Cunningham, James B., Lance Corporal, USMC
Curtin, John J., Chief Warrant Officer Three, USA
Dailey, Michael C., Jr., Private First Class, USA
Damian, Roy T., Jr., Specialist, USA
Daniel, Candace M., Private First Class, USA

Daniels, Michael D., Specialist, USA
Danielson, Donald C., Sergeant, USA
Daugherty, Robert L., Jr., Private First Class, USA
Davila, Manuel M., Specialist, USA
Davis, Marty R., Private First Class, USA
Dees, Tatiana, Staff Sergeant, USA
Delagneau, Rolando A., Specialist, USA
Delgado, Delwin, Signalman Third Class, USN
Delgado, Luis R., Sergeant, USA
Dierking, Ross A., Sergeant, USA
Diffenbaugh, Thomas M., Warrant Officer One, USMC
Dillon, Gary S., Captain, USMC
Dillon, Young M., Sergeant, USA
Dolvin, Kevin R., Captain, USMC
Donaldson, Patrick A., Chief Warrant Officer Two, USA
Dougherty, Joseph D., III, Lance Corporal, USMC
Douthit, David A., Lieutenant Colonel, USA
Douthit, David Q., Staff Sergeant, USA
Durrell, Robert L., Sergeant, USA
Dwyer, Robert J., Lieutenant, USN
Edwards, Jonathan R., Captain, USMC
Eichenlaub, Paul R., II, Captain, USAF
Fails, Dorothy L., Private, USA
Fajardo, Mario, Captain, USA
Farnen, Steven P., Specialist, USA
Felix, Eliseo C., Lance Corporal, USMC
Fielder, Douglas L., Sergeant, USA
Finneral, George S., Aviation Machinist's Mate Third Class, USN
Fitz, Michael L., Private First Class, USA
Fleming, Anthony J., Aviation Ordnanceman Third Class, USN
Fleming, Joshua J., Private (E-2), USA
Fontaine, Gilbert A., Aviation Storekeeper Airman, USN
Foreman, Ira L., Sergeant, USA
Fowler, John C., Specialist, USA
Galvan, Arthur, Captain, USAF
Garrett, Mike A., Staff Sergeant, USA
Garvey, Philip H., Chief Warrant Officer Four, USA
Garza, Arthur O., Lance Corporal, USMC
Gay, Pamela Y., Private First Class, USA
Gentry, Kenneth B., Staff Sergeant, USA
Gillespie, John H., Major, USA
Gilliland, David A., Boiler Technician Third Class, USN
Godfrey, Robert G., Chief Warrant Officer Three, USA
Gologram, Mark J., Sergeant, USA
Graybeal, Daniel E., Captain, USA
Gregory, Troy L., Lance Corporal, USMC
Grimm, Walter D., Captain, USAF
Guerrero, Jorge L., Airman, USN

Haddad, Albert G., Jr., Corporal, USMC
Haggerty, Thomas J., First Lieutenant, USA
Hailey, Garland V., Staff Sergeant, USA
Hampton, Tracy, Sergeant, USA
Hancock, Joe H., Jr., Lieutenant Colonel, USA
Hansen, Steven M., Staff Sergeant, USA
Harris, Michael A., Jr., Staff Sergeant, USA
Harrison, Timothy R., Staff Sergeant, USAF
Hart, Adrian J., Specialist, USA
Hatcher, Raymond E., Jr., Staff Sergeant, USA
Haws, Jimmy D., Staff Sergeant, USA
Hawthorne, James D., Sergeant, USMC
Hector, Wade E., Specialist, USA
Hedeen, Eric D., First Lieutenant, USAF
Hein, Kerry P., Chief Warrant Officer Two, USA
Hein, Leroy E., Jr., Sergeant, USAF
Henderson, Barry K., Major, USAF
Henry-Garay, Luis A., Specialist, USA
Herr, David R., Jr., Captain, USMC
Heyden, James P., Specialist, USA
Heyman, David L., Specialist, USA
Hill, Timothy E., Specialist, USA
Hills, Kevin J., Aviation Electrician's Mate Airman, USN
Hoage, Adam T., Lance Corporal, USMC
Hodges, Robert K., Technical Sergeant, USAF
Hogan, Larry G., Sergeant, USMC
Holland, Donnie R., Lieutenant Colonel, USAF
Hollen, Duane W., Jr., Specialist, USA
Hollenbeck, David C., Specialist, USA
Holt, William A., Aviation Electronics Technician Third Class, USN
Holyfield, Ron R, Damage Controlman Third Class, USN
Hook, Peter S., Major, USAF
Hopson, Trezzvant, Jr., Mr., Navy/Contractor
Horwath, Raymond L., Jr., Corporal, USMC
Howard, Aaron W., Private First Class, USA
Hughes, Robert J., Chief Warrant Officer Three, USA
Hurley, Patrick R., Sergeant Major, USA
Hurley, William J., Captain, USMC
Hutchison, Mark E., Boiler Technician Second Class, USN
Hutto, John W., Private First Class, USA
Huyghue, Wilton L., Fireman, USN
Jackson, Arthur, , Staff Sergeant, USA
Jackson, Kenneth J., Private First Class, USA
Jackson, Mark D., Lieutenant, USN
Jackson, Timothy J., Fire Control Technician Third Class, USN
James, Jimmy W., Specialist, USA
Jarrell, Thomas R., Specialist, USA
Jenkins, Thomas A., Lance Corporal, USMC

Jock, Dale W., Machinist's Mate Fireman, USN
Joel, Daniel D., Corporal, USMC
Jones, Alexander, Airman Apprentice, USN
Jones, Daniel M., Electrician's Mate Third Class, USN
Jones, Glen D., Specialist, USA
Jones, Phillip J., Corporal, USMC
Kamm, Jonathan H., Staff Sergeant, USA
Kanuha, Damon V., Staff Sergeant, USAF
Keller, Kenneth T., Jr., Sergeant, USMC
Kelly, Shannon P., Second Lieutenant, USA
Kemp, Nathaniel H., Mess Management Specialist Seaman App., USN
Keough, Frank S., Specialist, USA
Kidd, Anthony W., Specialist, USA
Kilkus, John R., Staff Sergeant, USMC
Kimbell, Allen, Mr., Army/Contractor
Kime, Joseph G., III, Captain, USA
King, Jerry L., Private First Class, USA
Kirk, Reuben G., III, Private First Class, USA
Koritz, Thomas F., Major, USAF
Kramer, David W., Private First Class, USA
Kutz, Edwin B., Sergeant, USA
LaMoureux, Dustin C., Private First Class, USA
Lake, Victor T., Jr., Corporal, USMC
Lane, Brianz L., Lance Corporal, USMC
Lang, James M., Lance Corporal, USMC
Larson, Thomas S., Lieutenant, USN
Lawton, Lorraine K., Second Lieutenant, USA
Lee, Richard R., Chief Warrant Officer Three, USA
Linderman, Michael E., Jr., Lance Corporal, USMC
Lindsey, J. Scott, , Sergeant, USA
Long, William E., Major, USA
Lumpkins, James H., Lance Corporal, USMC
Lupatsky, Daniel, Electrician's Mate Second Class, USN
Madison, Anthony E., Specialist, USA
Mahan, Gary W., Specialist, USA
Maks, Joseph D., First Lieutenant, USA
Malak, George N., Warrant Officer, USA
Manns, Michael N., Jr., Fireman, USN
Martin, Christopher A., Warrant Officer, USA
Mason, Steven G., Specialist, USA
Matthews, Kelly, L., Sergeant, USA
May, James B., II, Senior Master Sergeant, USAF
Mayes, Christine L., Specialist, USA
McCarthy, Eugene T., Major, USMC
McCoy, James R., Sergeant, USA
McCreight, Brent A., Airman, USN
McDougle, Melvin D., Sergeant, USA
McKinsey, Daniel C., Boiler Technician Fireman Apprentice, USN

McKnight, Bobby L., Specialist, USA
Middleton, Jeffrey T., Sergeant, USA
Miller, James R., Jr., Specialist, USA
Miller, Mark A., Private First Class, USA
Mills, Michael W., Specialist, USA
Mills, Randall C., Sergeant, USA
Mitchell, Adrienne L., Private, USA
Mitchem, Earnest F., Jr., Sergeant First Class, USA
Mobley, Phillip D., Specialist, USA
Moller, Nels A., Sergeant, USA
Mongrella, Garett A., Sergeant, USMC
Monroe, Michael N., First Lieutenant, USMC
Monsen, Lance M., Staff Sergeant, USMC
Montalvo, Candelario, Jr., Sergeant, USMC
Moran, Thomas J., Staff Sergeant, USMC
Morgan, Donald W., Staff Sergeant, USA
Morgan, John K., Warrant Officer, USA
Mullin, Jeffrey E., Staff Sergeant, USA
Murphy, Donald T., Sergeant First Class, USA
Murphy, Joe, First Sergeant, USA
Murray, James C., Jr., Specialist, USA
Myers, Donald R., Specialist, USA
Neberman, James F., Mr., Army/Contractor
Neel, Randy L., Airman Apprentice, USN
Nelson, Rocky J., Airman First Class, USAF
Noble, Shawnacee L., Private First Class, USA
Noline, Michael A., Private First Class, USMC
Noonan, Robert A., Specialist, USA
O'Brien, Cheryl L., Sergeant, USA
Oelschlager, John L., Technical Sergeant, USAF
Oliver, Arthur D., Lance Corporal, USMC
Olson, Jeffery J., Captain, USAF
Olson, Patrick B., Captain, USAF
Ortiz, Patbouvier E., Staff Sergeant, USA
Pack, Aaron A., Sergeant, USMC
Paddock, John M., Chief Warrant Officer Four, USN
Palmer, William F., Specialist, USA
Parker, Fred R., Jr., Boiler Technician Second Class, USN
Patterson, Anthony T., Private, USA
Paulson, Dale L., Specialist, USA
Perry, Kenneth J., Specialist, USA
Phillips, Kelly D., Specialist, USA
Phillis, Stephen R., Captain, USAF
Plasch, David G., Warrant Officer, USA
Plummer, Marvin J., Aviation Boatswain's Mate Second Class, USN
Plunk, Terry L., First Lieutenant, USA
Poole, Ramono L., Senior Airman, USAF
Poremba, Kip A., Lance Corporal, USMC

Porter, Christian J., Lance Corporal, USMC
Poulet, James B., Captain, USAF
Powell, Dodge R., Sergeant, USA
Rainwater, Norman R., Jr., Private First Class, USA
Randazzo, Ronald M., Sergeant, USA
Reel, Jeffrey D., Private First Class, USA
Reichle, Hal H., Chief Warrant Officer Two, USA
Reid, Fredrick A., Captain, USAF
Rennison, Ronald D., Specialist, USA
Ritch, Todd C., Private First Class, USA
Rivera, Manuel, Jr., Captain, USMC
Rivers, Ernest, , Sergeant, USMC
Robinette, Stephen R., Sergeant, USA
Robson, Michael R., Staff Sergeant, USA
Rodriguez, Eloy A., Jr., Master Sergeant, USA
Rollins, Jeffrey A., Sergeant, USA
Romei, Timothy W., Corporal, USMC
Rossi, Marie T., Major, USA
Rush, Scott A., Private First Class, USA
Russ, Leonard A., Sergeant, USA
San Juan, Archimedes P., Lance Corporal, USMC
Sanders, Henry J., Jr., First Sergeant, USA
Sapien, Manuel B., Jr., Specialist, USA
Satchell, Baldwin L., Sergeant, USA
Schiedler, Matthew J., Data Systems Technician Third Class, USN
Schmauss, Mark J., Staff Sergeant, USAF
Schmidt, Paul L., Mr., Navy/Contractor
Scholand, Thomas J., Lance Corporal, USMC
Schramm, Stephen G., Lieutenant Colonel, USAF
Schroeder, Scott A., Lance Corporal, USMC
Scott, Brian P., Sergeant, USA
Seay, Timothy B., Disbursing Clerk Third Class, USN
Settimi, Jeffrey A., Mess Management Specialist Seaman App., USN
Shaw, David A., Staff Sergeant, USMC
Shaw, Timothy A., Private First Class, USA
Sherry, Kathleen M., Second Lieutenant, USA
Shukers, Jeffrey W., Fire Control Technician Chief, USN
Siko, Stephen J., Specialist, USA
Simpson, Brian K., Specialist, USA
Smith, James A., Jr., Machinist's Mate Third Class, USN
Smith, James M., Jr., Staff Sergeant, USA
Smith, Michael S., Sergeant, USA
Smith, Russell G., Jr., Sergeant First Class, USA
Snyder, David T., Lance Corporal, USMC
Snyder, John M., Lieutenant, USN
Speicher, Jeffrey W., Private First Class, USA
Speicher, Michael S., Lieutenant Commander, USN
Spellacy, David M., Captain, USMC

Squires, Otha B., Jr., Specialist, USA
Stephens, Christopher H., Staff Sergeant, USA
Stephens, John B., Specialist, USA
Stephenson, Dion J., Lance Corporal, USMC
Stewart, Anthony D., Lance Corporal, USMC
Stewart, Roderick T., Radioman Seaman, USN
Stokes, Adrian L., Private First Class, USA
Stone, Thomas G., Specialist, USA
Streeter, Gary E., Sergeant First Class, USA
Strehlow, William A., Sergeant, USA
Stribling, Earl K., Major, USA
Sumerall, Roy J., Staff Sergeant, USA
Swano, Peter L., Jr., Specialist, USA
Swartzendruber, George R., Chief Warrant Officer Two, USA
Sylvia, James H., Jr., Corporal, USMC
Talley, Robert D., Private, USA
Tapley, David L., Sergeant First Class, USA
Tatum, James D., Specialist, USA
Thomas, Phillip J., Aviation Structural Mechanic Second Class, USN
Thorp, James K., Captain, USMC
Tillar, Donaldson P., III, First Lieutenant, USA
Tormanen, Thomas R., Lance Corporal, USMC
Trautman, Steven R., Specialist, USA
Turner, Charles J., Lieutenant, USN
Underwood, Reginald C., Captain, USMC
Valentine, Craig E., Lieutenant (junior grade), USN
Valentine, Roger E., Private First Class, USA
Vega Velazquez, Mario, Sergeant, USA
Vigrass, Scott N., Private, USA
Viquez, Carlos A., Lieutenant Colonel, USA
Volden, Robert L., Boiler Technician First Class, USN
Wade, Robert C., Private First Class, USA
Waldron, James F., Lance Corporal, USMC
Walker, Charles S., Private First Class, USA
Walker, Daniel B., Lance Corporal, USMC
Wallington, Michael C., Lieutenant Colonel, USA
Walls, Frank J., Specialist, USA
Walrath, Thomas E., Specialist, USA
Walters, Dixon L., Jr., Captain, USAF
Wanke, Patrick A., Private First Class, USA
Ware, Bobby, M., Specialist, USA
Weaver, Brian P., Aviation Electrican Second Class, USN
Weaver, Paul J., Major, USAF
Wedgwood, Troy, M., Specialist, USA
Welch, Lawrence N., Sergeant, USA
West, John D., Aviation Structural Mechanic Airman, USN
Whittenburg, Scotty L., Sergeant, USA
Wieczorek, David M., Private First Class, USA

Wilbourn, James N., III, Captain, USMC
Wilcher, James, , Sergeant, USA
Wilkinson, Philip L., Mess Management Specialist Second Class, USN
Williams, Jonathan M., Corporal, USA
Winkle, Corey L., Private First Class, USA
Winkley, Bernard S., Chief Warrant Officer Two, USMC
Witzke, Harold P., III, Sergeant First Class, USA
Wolverton, Richard V., Specialist, USA
Worthy, James E., Specialist, USA
Wright, Kevin E., Specialist, USA
Zabel, Carl W., Specialist, USA
Zeugner, Thomas C. M., Major, USA

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PRISONERS OF WAR DURING OPERATIONS DESERT SHIELD AND DESERT STORM

Acree, Clifford M., Lieutenant Colonel, USMC
Andrews, William F., Captain, USAF
Berryman, Michael C., Captain, USMC
Coleman, Melissa A., Specialist, USA
Cornum, Rhonda L., Major, USA
Dunlap, Troy A., Specialist, USA
Eberly, David W., Colonel, USAF
Fox, Jeffrey D., Lieutenant Colonel, USAF
Griffith, Thomas E. Jr., Major, USAF
Hunter, Guy L. Jr., Chief Warrant Officer Four, USMC
Lockett, David, Specialist, USA
Roberts, Harry M., Captain, USAF
Sanborn, Russell A. C., Captain, USMC
Slade, Lawrence R., Lieutenant, USN
Small, Joseph J. III, Major, USMC
Stamaris, Daniel J. Jr., Staff Sergeant, USA
Storr, Richard D., Captain, USAF
Sweet, Robert J., First Lieutenant, USAF
Tice, Jeffrey S., Major, USAF
Wetzel, Robert, Lieutenant, USN
Zaun, Jeffrey N., Lieutenant, USN

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APPENDIX B

UNITED NATIONS RESOLUTIONS ON IRAQ

SUMMARY OF UN SECURITY COUNCIL RESOLUTIONS ON IRAQ

Resolution 660 of 2 August, 1990

Condemned invasion. Demanded withdrawal. Adopted 14-0-1, Yemen abstaining.

Resolution 661 of 6 August, 1990

Imposed a trade and financial embargo. Established special sanctions committee. Called on UN members to protect Kuwaiti assets. Adopted 13-0-2, Cuba and Yemen abstaining.

Resolution 662 of 9 August, 1990

Declared Iraq's annexation of Kuwait null and void. Adopted unanimously.

Resolution 664 of 18 August, 1990

Demanded immediate release of foreigners from Kuwait and Iraq. Insisted Iraq rescind its order closing missions in Kuwait. Adopted unanimously.

Resolution 665 of 25 August, 1990

Called on UN members cooperating with Kuwait to enforce sanctions by inspecting and verifying cargoes and destinations. Adopted 13-0-2, Cuba and Yemen abstaining.

Resolution 666 of 13 September, 1990

Affirmed Iraq was responsible for safety of foreign nationals. Specified guidelines for delivery of food and medical supplies. Adopted 13-2, Cuba and Yemen against.

Resolution 667 of 16 September, 1990

Condemned Iraqi aggression against diplomats. Demanded immediate release of foreign nationals. Adopted unanimously.

Resolution 669 of 24 September, 1990

Emphasized only special sanctions committee could authorize food and aid shipments to Iraq or Kuwait. Adopted unanimously.

Resolution 670 of 25 September, 1990

Expanded embargo to include air traffic. Called on UN members to detain Iraqi ships used to break the embargo. Adopted 14-1, Cuba against.

Resolution 674 of 29 October, 1990

Demanded Iraq stop mistreating Kuwaitis and foreign nationals. Reminded Iraq it is liable for damages. Adopted 13-0-2, Cuba and Yemen abstaining.

Resolution 677 of 28 November, 1990

Condemned Iraq's attempts to change Kuwait's demographic composition and Iraq's destruction of Kuwaiti civil records. Adopted unanimously.

Resolution 678 of 29 November, 1990

Authorized UN members to use "all means necessary" to enforce previous resolutions, if Iraq does not leave Kuwait by 15 January 1991. Adopted 12-2-1, Cuba and Yemen against, China abstaining.

Resolution 686 of 2 March, 1991

Demanded Iraq cease hostile action, return all POWs and detainees, rescind annexation, accept liability, return Kuwaiti property, and disclose mine locations. Adopted 11-1-3, Cuba against, Yemen, China, and India abstaining

DETAILS OF UNITED NATIONS RESOLUTIONS ON IRAQ

Resolution 660 (2 August, 1990)

The Security Council,

Alarmed by the invasion of Kuwait on 2 August 1990 by the military forces of Iraq,

Determining that there exists a breach of international peace and security as regards the Iraqi invasion of Kuwait,

Acting under Articles 39 and 40 of the Charter of the United Nations,

1. *Condemns* the Iraqi invasion of Kuwait;

2. *Demands* that Iraq withdraw immediately and unconditionally all its forces to the positions in which they were located on 1 August 1990;

3. *Calls upon* Iraq and Kuwait to begin immediately intensive negotiations for the resolution of their differences and supports all efforts in this regard, and especially those of the League of Arab States;

4. *Decides* to meet again as necessary to consider further steps to ensure compliance with the present resolution.

VOTE: 14 for, 0 against, 1 abstention (Yemen)

Resolution 661 (6 August, 1990)

The Security Council,

Reaffirming its resolution 660 (1990) of 2 August 1990,

Deeply concerned that resolution has not been implemented and that the invasion by Iraq of Kuwait continues with further loss of human life and material destruction,

Determined to bring the invasion and occupation of Kuwait by Iraq to an end and to restore the sovereignty, independence and territorial integrity of Kuwait,

Noting that the legitimate Government of Kuwait has expressed its readiness to comply with resolution 660 (1990),

Mindful of its responsibilities under the Charter of the United Nations for the maintenance of international peace and security,

Affirming the inherent right of individual or collective self-defence, in response to the armed attack by Iraq against Kuwait, in accordance with Article 51 of the Charter

Acting under Chapter VII of the Charter of the United Nations,

1. *Determines* that Iraq so far has failed to comply with paragraph 2 of resolution 660 (1990) and has usurped the authority of the legitimate Government of Kuwait;

2. *Decides*, as a consequence, to take the following measures to secure compliance of Iraq with paragraph 2 of resolution 660 (1990) and to restore the authority of the legitimate Government of Kuwait;

3. *Decides* that all States shall prevent:

(a) The import into their territories of all commodities and products originating in Iraq or Kuwait exported therefrom after the date of the present resolution;

(b) Any activities by their nationals or in their territories which would promote or are calculated to promote the export or trans-shipment of any commodities or products from Iraq or Kuwait; and any dealings by their nationals or their flag vessels or in their territories in any commodities or products originating in Iraq or Kuwait and exported therefrom after the date of the presentresolution, including in particular any transfer of funds to Iraq or Kuwait for the purposes of such activities or dealings;

(c) The sale or supply by their nationals or from their territories or using their flag vessels of any commodities or products, including weapons or any other military equipment, whether or not originating in their territories but not including supplies intended strictly for medical purposes, and, in humanitarian circumstances, foodstuffs, to any person or body in Iraq or Kuwait or to any person or body for the purposes of any business carried on in or operated from Iraq or Kuwait, and any activities by their nationals or in their territories which promote or are calculated to promote such sale or supply of such commodities or products;

4. *Decides* that all States shall not make available to the Government of Iraq or to any commercial, industrial or public utility undertaking in Iraq or Kuwait, any funds or any other financial or economic resources and shall prevent their nationals and any persons within their territories from removing from their territories or otherwise making available to that Government or to any such undertaking any such funds or resources and from remitting any other funds to persons or bodies within Iraq or Kuwait, except payments exclusively for strictly medical or humanitarian purposes and, in humanitarian circumstances, foodstuffs;

5. *Calls upon* all States, including States non-members of the United Nations, to act strictly in accordance with the provisions of the present resolution notwithstanding any contract entered into or license granted before the date of the present resolution;

6. *Decides* to establish, in accordance with rule 28 of the provisional rules of procedure of the Security Council, a Committee of the Security Council consisting of all the members of the Council, to undertake the following tasks and to report on its work to the Council with its observations and recommendations:

(a) To examine the reports on the progress of the implementation of the present resolution which will be submitted by the Secretary-General;

(b) To seek from all States further information regarding the action taken by them concerning the effective implementation of the provisions laid down in the present resolution;

7. *Calls upon* all States to co-operate fully with the Committee in the fulfillment of its task, including supplying such information as may be sought by the Committee in pursuance of the present resolution;

8. *Requests* the Secretary-General to provide all necessary assistance to the Committee and to make the necessary arrangements in the Secretariat for the purpose;

9. *Decides* that, notwithstanding paragraphs 4 through 8 above, nothing in the present resolution shall prohibit assistance to the legitimate Government of Kuwait, and calls upon all States:

(a) To take appropriate measures to protect assets of the legitimate Government of Kuwait and its agencies;

(b) Not to recognize any regime set up by the occupying Power;

10. *Requests* the Secretary-General to report to the Council on the progress of the implementation of the present resolution, the first report to be submitted within thirty days;

11. *Decides* to keep this item on its agenda and to continue itsefforts to put an early end to the invasion by Iraq.

VOTE: 13 for, 0 against, 2 abstentions (Cuba and Yemen)

Resolution 662 (9 August, 1990)

The Security Council,

Recalling its resolutions 660 (1990) and 661 (1990),

Gravely alarmed by the declaration by Iraq of a comprehensive and eternal merger with Kuwait,

Demanding, once again, that Iraq withdraw immediately and unconditionally all its forces to the positions in which they were located on 1 August 1990,

Determined to bring the occupation of Kuwait by Iraq to an end and to restore the sovereignty, independence and territorial integrity of Kuwait,

Determined also to restore the authority of the legitimate Government of Kuwait,

1. *Decides* that annexation of Kuwait by Iraq under any form and whatever pretext has no legal validity, and is considered null and void;

2. *Calls upon* all States, international organizations and specialized agencies not to recognize that annexation, and to refrain from any action or dealing that might be interpreted as an indirect recognition of the annexation;

3. *Further demands* that Iraq rescind its actions purporting to annex Kuwait;

4. *Decides* to keep this item on its agenda and to continue its efforts to put an early end to the occupation.

VOTE: Unanimous (15-0)

Resolution 664 (18 August, 1990)

The Security Council,

Recalling the Iraqi invasion and purported annexation of Kuwait and resolutions 660, 661 and 662,

Deeply concerned for the safety and well being of third-state nationals in Iraq and Kuwait,

Recalling the obligations of Iraq in this regard under international law,

Welcoming the efforts of the Secretary-General to pursue urgent consultations with the Government of Iraq following the concern and anxiety expressed by the members of the Council on 17 August 1990,

Acting under Chapter VII of the United Nations Charter:

1. *Demands* that Iraq permit and facilitate the immediate departure from Kuwait and Iraq of the nationals of third countries and grant immediate and continuing access of consular officials to such nationals;

2. *Further demands* that Iraq take no action to jeopardize the safety, security or health of such nationals;

3. *Reaffirms* its decision in resolution 662 (1990) that annexation of Kuwait by Iraq is null and void, and therefore, demands that the Government of Iraq rescind its orders for the closure of diplomatic and consular missions in Kuwait and the withdrawal of the immunity of their personnel, and refrain from any such actions in the future;

4. *Requests* the Secretary-General to report to the Council on compliance with this resolution at the earliest possible time.

VOTE: Unanimous (15-0)

Resolution 665 (25 August, 1990)

The Security Council,

Recalling its resolutions 660 (1990), 661 (1990), 662 (1990) and 664 (1990) and demanding their full and immediate implementation,

Having decided in resolution 661 (1990) to impose economic sanctions under Chapter VII of the Charter of the United Nations,

Determined to bring an end to the occupation of Kuwait by Iraq which imperils the existence of a Member State and to restore the legitimate authority, the sovereignty, independence and territorial integrity of Kuwait which requires the speedy implementation of the above resolutions,

Deploring the loss of innocent life stemming from the Iraqi invasion of Kuwait and determined to prevent further such losses,

Gravely alarmed that Iraq continues to refuse to comply with resolutions 660 (1990), 661 (1990), and 664 (1990) and in particular at the conduct of the Government of Iraq in using Iraqi flag vessels to export oil,

1. *Calling upon* those Member States cooperating with the Government of Kuwait which are deploying maritime forces to the area to use such measures commensurate to the specific circumstance as may be necessary under the authority of the Security Council to halt all inward and outward maritime shipping in order to inspect and verify their cargoes and destinations and to ensure strict implementation of the provisions related to such shipping laid down in resolution 661 (1990);

2. *Invites* Member States accordingly to co-operate as may be necessary to ensure compliance with the provisions of resolution 661 (1990) with maximum use of political and diplomatic measures, in accordance with paragraph I above;

3. *Requests* all States to provide in accordance with the Charter such assistance as may be required by the States referred to in paragraph 1 of this resolution;

4. *Further requests* the States concerned to co-ordinate their actions in pursuit of the above paragraphs of this resolution using as appropriate mechanisms of the Military Staff Committee and after consultation with the Secretary-General to submit reports to the Security Council and its Committee established under resolution 661 (1990) to facilitate the monitoring of the implementation of this resolution;

5. *Decides* to remain actively seized of the matter.

VOTE: 13 for, 0 against, 2 abstentions (Cuba and Yemen)

Resolution 666 (13 September, 1990)

The Security Council,

Recalling its resolution 661 (1990), paragraphs 3 (c) and 4 of which apply, except in humanitarian circumstances, to foodstuffs,

Recognizing that circumstances may arise in which it will be necessary for foodstuffs to be supplied to the civilian population in Iraq or Kuwait in order to relieve human suffering,

Noting that in this respect the Committee established under paragraph 6 of that resolution has received communications from several Member States,

Emphasizing that it is for the Security Council, alone or acting through the Committee, to determine whether humanitarian circumstances have arisen,

Deeply concerned that Iraq has failed to comply with its obligations under Security Council resolution 664 (1990) in respect of the safety and well-being of third State nationals, and reaffirming that Iraq retains full responsibility in this regard under international humanitarian law including, where applicable, the Fourth Geneva Convention,

Acting under Chapter VII of the Charter of the United Nations,

1. *Decides* that in order to make the necessary determination whether or not for the purposes of paragraph 3 (c) and paragraph 4 of resolution 661 (1990) humanitarian circumstances have arisen, the Committee shall keep the situation regarding foodstuffs in Iraq and Kuwait under constant review;

2. *Expects* Iraq to comply with its obligations under Security Council resolution 664 (1990) in respect of third State nationals and reaffirms that Iraq remains fully responsible for their safety and well-being in accordance with international humanitarian law including, where applicable, the Fourth Geneva Convention;

3. *Requests*, for the purposes of paragraphs 1 and 2 of this resolution, that the Secretary-General seek urgently, and on a continuing basis, information from relevant United Nations and other appropriate humanitarian agencies and all other sources on the availability of food in Iraq and Kuwait, such information to be communicated by the Secretary-General to the Committee regularly;

4. *Requests* further that in seeking and supplying such information particular attention will be paid to such categories of persons who might suffer specially, such as children under 15 years of age, expectant mothers, maternity cases, the sick and the elderly;

5. *Decides* that if the Committee, after receiving the reports from the Secretary-General, determines that circumstances have arisen in which there is an urgent humanitarian need to supply foodstuffs to Iraq or Kuwait in order to relieve human suffering, it will report promptly to the Council its decision as to how such need should be met;

6. *Directs* the Committee that in formulating its decisions it should bear in mind that foodstuffs should be provided through the United Nations in co-operation with the International Committee of the Red Cross or other appropriate humanitarian agencies and distributed by them or under their supervision in order to ensure that they reach the intended beneficiaries;

7. *Requests* the Secretary-General to use his good offices to facilitate the delivery and distribution of foodstuffs to Kuwait and Iraq in accordance with the provisions of this and other relevant resolutions;

8. *Recalls* that resolution 661 (1990) does not apply to supplies intended strictly for medical purposes, but in this connection recommends that medical supplies should be exported under the strict supervision of the Government of the exporting State or by appropriate humanitarian agencies.

VOTE: 13 for, 0 against, 2 abstentions (Cuba and Yemen)

Resolution 667 (16 September, 1990)

The Security Council,

Reaffirming its resolutions 660 (1990), 661 (1990), 662 (1990), 664 (1990), 665 (1990) and 666 (1990),

Recalling the Vienna Conventions of 18 April 1961 on diplomatic relations and of 24 April 1963 on consular relations, to both of which Iraq is a party,

Considering that the decision of Iraq to order the closure of diplomatic and consular missions in Kuwait and to withdraw the immunity and privileges of these missions and their personnel is contrary to the decisions of the Security Council, the international Conventions mentioned above and international law,

Deeply concerned that Iraq, notwithstanding the decisions of the Security Council and the provisions of the Conventions mentioned above, has committed acts of violence against diplomatic missions and their personnel in Kuwait,

Outraged at recent violations by Iraq of diplomatic premises in Kuwait and at the abduction of personnel enjoying diplomatic immunity and foreign nationals who were present in these premises,

Considering that the above actions by Iraq constitute aggressive acts and a flagrant violation of its international obligations which strike at the root of the conduct of international relations in accordance with the Charter of the United Nations,

Recalling that Iraq is fully responsible for any use of violence against foreign nationals or against any diplomatic or consular mission in Kuwait or its personnel,

Determined to ensure respect for its decisions and for Article 25 of the Charter of the United Nations,

Further considering that the grave nature of Iraq's actions, which constitute a new escalation of its violations of international law, obliges the Council not only to express its immediate reaction but also to consult urgently to take further concrete measures to ensure Iraq's compliance with the Council's resolutions,

Acting under Chapter VII of the Charter of the United Nations,

1. *Strongly condemns* aggressive acts perpetrated by Iraq against diplomatic premises and personnel in Kuwait, including the abduction of foreign nationals who were present in those premises;

2. *Demands* the immediate release of those foreign nationals as well as all nationals mentioned in resolution 664 (1990);

3. *Further demands* that Iraq immediately and fully comply with its international obligations under resolutions 660 (1990), 662 (1990) and 664 (1990) of the Security Council, the Vienna Conventions on diplomatic and consular relations and international law;

4. *Further demands* that Iraq immediately protect the safety and well-being of diplomatic and consular personnel and premises in Kuwait and in Iraq and take no action to hinder the diplomatic and consular missions in the performance of their functions, including access to their nationals and the protection of their person and interests;

5. *Reminds* all States that they are obliged to observe strictly resolutions 661 (1990), 662 (1990), 664 (1990), 665 (1990) and 666 (1990);

6. *Decides* to consult urgently to take further concrete measures as soon as possible, under Chapter VII of the Charter, in response to Iraq's continued violation of the Charter, of resolutions of the Council and of international law.

VOTE: Unanimous (15-0)

Resolution 669 (24 September, 1990)

The Security Council,

Recalling its resolution 661 (1990) of 6 August 1990,

Recalling also Article 50 of the Charter of the United Nations,

Conscious of the fact that an increasing number of requests for assistance have been received under the provisions of Article 50 of the Charter of the United Nations,

Entrusts the Committee established under resolution 661 (1990) concerning the situation between Iraq and Kuwait with the task of examining requests for assistance under the provisions of Article 50 of the Charter of the United Nations and making recommendations to the President of the Security Council for appropriate action.

VOTE: Unanimous (15-0)

Resolution 670 (25 September, 1990)

The Security Council,

Reaffirming its resolutions 660 (1990), 661 (1990), 662 (1990), 664 (1990), 665 (1990), 666 (1990), and 667 (1990);

Condemning Iraq's continued occupation of Kuwait, its failure to rescind its actions and end its purported annexation and its holding of third State nationals against their will, in flagrant violation of resolutions 660 (1990), 662 (1990), 664 (1990) and 667 (1990) and of international humanitarian law;

Condemning further the treatment by Iraqi forces of Kuwaiti nationals, including measures to force them to leave their own country and mistreatment of persons and property in Kuwait in violation of international law;

Noting with grave concern the persistent attempts to evade the measures laid down in resolution 661 (1990);

Further noting that a number of States have limited the number of Iraqi diplomatic and consular officials in their countries and that others are planning to do so;

Determined to ensure by all necessary means the strict and complete application of the measures laid down in resolution 661 (1990);

Determined to ensure respect for its decisions and the provisions of Articles 25 and 48 of the Charter of the United Nations;

Affirming that any acts of the Government of Iraq which are contrary to the above-mentioned resolutions or to Articles 25 or 48 of the Charter of the United Nations, such as Decree No. 377 of the Revolution Command Council of Iraq of 16 September 1990, are null and void;

Reaffirming its determination to ensure compliance with Security Council resolutions by maximum use of political and diplomatic means;

Welcoming the Secretary-General's use of his good offices to advance a peaceful solution based on the relevant Security Council resolutions and noting with appreciation his continuing efforts to this end;

Underlining to the Government of Iraq that its continued failure to comply with the terms of resolutions 660 (1990), 661 (1990), 662 (1990), 664 (1990), 666 (1990) and 667 (1990) could lead to further serious action by the Council under the Charter of the United Nations, including under Chapter VII;

Recalling the provisions of Article 103 of the Charter of the United Nations;

Acting under Chapter VII of the Charter of the United Nations:

1. *Calls upon* all States to carry out their obligations to ensure strict and complete compliance with resolution 661 (1990) and in particular paragraphs 3, 4 and 5 thereof;

2. *Confirms* that resolution 661 (1990) applies to all means of transport, including aircraft;

3. *Decides* that all States, notwithstanding the existence of any rights or obligations conferred or imposed by any international agreement or any contract entered into or any license or permit granted before the date of the present resolution, shall deny permission to any aircraft to take off from their territory if the aircraft would carry any cargo to or from Iraq or Kuwait other than food in humanitarian circumstances, subject to authorization by the Council or the Committee established by resolution 661 (1990) and in accordance with resolution 666 (1990), or supplies intended strictly for medical purposes or solely for UNIIMOG;

4. *Decides further* that all States shall deny permission to any aircraft destined to land in Iraq or Kuwait, whatever its State of registration, to overfly its territory unless:

(a) The aircraft lands at an airfield designated by that State outside Iraq or Kuwait in order to permit its inspection to ensure that there is no cargo on board in violation of resolution 661 (1990) or the present resolution, and for this purpose the aircraft may be detained for as long as necessary; or

(b) The particular flight has been approved by the Committee established by resolution 661 (1990); or

(c) The flight is certified by the United Nations as solely for the purposes of UNIIMOG;

5. *Decides* that each State shall take all necessary measures to ensure that any aircraft registered in its territory or operated by an operator who has his principal place of business or permanent residence in its territory complies with the provisions of resolution 661 (1990) and the present resolution;

6. *Decides further* that all States shall notify in a timely fashion the Committee established by resolution 661 (1990) of any flight between its territory and Iraq or Kuwait to which the requirement to land in paragraph 4 above does not apply, and the purpose for such a flight;

7. *Calls upon* all States to co-operate in taking such measures as may be necessary, consistent with international law, including the Chicago Convention, to ensure the effective implementation of the provisions of resolution 661 (1990) or the present resolution;

8. *Calls upon* all States to detain any ships of Iraqi registry which enter their ports and which are being or have been used in violation of resolution 661 (1990), or to deny such ships entrance to their ports except in circumstances recognized under international law as necessary to safeguard human life;

9. *Reminds* all States of their obligations under resolution 661 (1990) with regard to the freezing of Iraqi assets, and the protection of the assets of the legitimate Government of Kuwait and its agencies, located within their territory and to report to the Committee established under resolution 661 (1990) regarding those assets;

10. *Calls upon* all States to provide to the Committee established by resolution 661 (1990) information regarding the action taken by them to implement the provisions laid down in the present resolution;

11. *Affirms* that the United Nations Organization, the specialized agencies and other international organizations in the United Nations system are required to take such measures as may be necessary to give effect to the terms of resolution 661 (1990) and this resolution;

12. *Decides* to consider, in the event of evasion of the provisions of resolution 661 (1990) or of the present resolution by a State or its nationals or through its territory, measures directed at the State in question to prevent such evasion;

13. *Reaffirms* that the Fourth Geneva Convention applies to Kuwait and that as a High Contracting Party to the Convention Iraq is bound to comply fully with all its

terms and in particular is liable under the Convention in respect of the grave breaches committed by it, as are individuals who commit or order the commission of grave breaches.

VOTE: 14 for, 1 against (Cuba)

Resolution 674 (29 October, 1990)

The Security Council,

Recalling its resolutions 660 (1990), 661 (1990), 662 (1990), 664 (1990), 665 (1990), 666 (1990), 667 (1990) and 670 (1990),

Stressing the urgent need for the immediate and unconditional withdrawal of all Iraqi forces from Kuwait, for the restoration of Kuwait's sovereignty, independence and territorial integrity, and of the authority of its legitimate government,

Condemning the actions by the Iraqi authorities and occupying forces to take third State nationals hostage and to mistreat and oppress Kuwaiti and third State nationals, and the other actions reported to the Council such as the destruction of Kuwaiti demographic records, forced departure of Kuwaitis, and relocation of population in Kuwait and the unlawful destruction and seizure of public and private property in Kuwait including hospital supplies and equipment, in violation of the decisions of this Council, the Charter of the United Nations, the Fourth Geneva Convention, the Vienna Conventions on Diplomatic and Consular Relations and international law,

Expressing grave alarm over the situation of nationals of third States in Kuwait and Iraq, including the personnel of the diplomatic and consular missions of such States,

Reaffirming that the Fourth Geneva Convention applies to Kuwait and that as a High Contracting Party to the Convention Iraq is bound to comply fully with all its terms and in particular is liable under the Convention in respect of the grave breaches committed by it, as are individuals who commit or order the commission of grave breaches,

Recalling the efforts of the Secretary-General concerning the safety and well-being of third State nationals in Iraq and Kuwait,

Deeply concerned at the economic cost, and at the loss and suffering caused to individuals in Kuwait and Iraq as a result of the invasion and occupation of Kuwait by Iraq,

Acting under Chapter VII of the United Nations Charter,

Reaffirming the goal of the international community of maintaining international peace and security by seeking to resolve international disputes and conflicts through peaceful means,

Recalling also the important role that the United Nations and its Secretary-General have played in the peaceful solution of disputes and conflicts in conformity with the provisions of the United Nations Charter,

Alarmed by the dangers of the present crisis caused by the Iraqi invasion and occupation of Kuwait, directly threatening international peace and security, and seeking to avoid any further worsening of the situation,

Calling upon Iraq to comply with the relevant resolutions of the Security Council, in particular resolutions 660 (1990), 662 (1990) and 664 (1990),

Reaffirming its determination to ensure compliance by Iraq with the Security Council resolutions by maximum use of political and diplomatic means.

A

1. *Demands* that the Iraqi authorities and occupying forces immediately cease and desist from taking third State nationals hostage, and mistreating and oppressing Kuwaiti and third State nationals, and from any other actions such as those reported to the Council and described above, violating the decisions of this Council, the Charter of the United Nations, the Fourth Geneva Convention, the Vienna Conventions on Diplomatic and Consular Relations and international law;

2. *Invites* States to collate substantiated information in their possession or submitted to them on the grave breaches by Iraq as per paragraph 1 above and to make this information available to the Council;

3. *Reaffirms* its demand that Iraq immediately fulfill its obligations to third State nationals in Kuwait and Iraq, including the personnel of diplomatic and consular missions, under the Charter, the Fourth Geneva Convention, the Vienna Conventions on Diplomatic and Consular relations, general principles of international law and the relevant resolutions of the Council;

4. *Reaffirms further* its demand that Iraq permit and facilitate the immediate departure from Kuwait and Iraq of those third State nationals, including diplomatic and consular personnel, who wish to leave;

5. *Demands* that Iraq ensure the immediate access to food, water and basic services necessary to the protection and well-being of Kuwaiti nationals and of nationals of third States in Kuwait and Iraq, including the personnel of diplomatic and consular missions in Kuwait;

6. *Reaffirms* its demand that Iraq immediately protect the safety and well-being of diplomatic and consular personnel and premises in Kuwait and in Iraq, take no

action to hinder these diplomatic and consular missions in the performance of their functions, including access to their nationals and the protection of their person and interests and rescind its orders for the closure of diplomatic and consular missions in Kuwait and the withdrawal of the immunity of their personnel;

7. *Requests* the Secretary-General, in the context of the continued exercise of his good offices concerning the safety and well-being of third State nationals in Iraq and Kuwait, to seek to achieve theobjectives of paragraphs 4, 5 and 6 and in particular the provision of food, water and basic services to Kuwaiti nationals and to the diplomatic and consular missions in Kuwait and the evacuation of third State nationals;

8. *Reminds* Iraq that under international law it is liable for any loss, damage or injury arising in regard to Kuwait and third States, and their nationals and corporations, as a result of the invasion and illegal occupation of Kuwait by Iraq;

9. *Invites* States to collect relevant information regarding their claims, and those of their nationals and corporations, for restitution or financial compensation by Iraq with a view to such arrangements as may be established in accordance with international law;

10. *Requires* that Iraq comply with the provisions of the present resolution and its previous resolutions, failing which the Council will need to take further measures under the Charter;

11. *Decides* to remain actively and permanently seized of the matter until Kuwait has regained its independence and peace has been restored in conformity with the relevant resolutions of the Security Council.

B

12. *Reposes* its trust in the Secretary-General to make available his good offices and, as he considers appropriate, to pursue them and undertake diplomatic efforts in order to reach a peaceful solution to the crisis caused by the Iraqi invasion and occupation of Kuwait on the basis of Security Council resolutions 660 (1990), 662 (1990) and 664 (1990), and calls on all States, both those in the region and others, to pursue on this basis their efforts to this end, in conformity with the Charter, in order to improve the situation and restore peace, security and stability;

13. *Requests* the Secretary-General to report to the Security Council on the results of his good offices and diplomatic efforts.

VOTE: 13 for, 0 against, 2 abstentions (Cuba and Yemen)

Resolution 677 (28 November, 1990)

The Security Council,

Recalling its resolutions 660 (1990) of 2 August 1990, 662 (1990) of 9 August 1990 and 674 (1990) of 29 October 1990,

Reiterating its concern for the suffering caused to individuals in Kuwait as a result of the invasion and occupation of Kuwait by Iraq,

Gravely concerned at the ongoing attempt by Iraq to alter the demographic composition of the population of Kuwait and to destroy the civil records maintained by the legitimate Government of Kuwait;

Acting under Chapter VII of the Charter of the United Nations,

1. *Condemns* the attempts by Iraq to alter the demographic composition of the population of Kuwait and to destroy the civil records maintained by the legitimate Government of Kuwait;

2. *Mandates* the Secretary-General to take custody of a copy of the population register of Kuwait, the authenticity of which has been certified by the legitimate Government of Kuwait and which covers the registration of population up to 1 August 1990;

3. *Requests* the Secretary-General to establish, in co-operation with the legitimate Government of Kuwait, an Order of Rules and Regulations governing access to and use of the said copy of the population register.

VOTE: Unanimous (15-0)

Resolution 678 (29 November, 1990)

The Security Council,

Recalling and reaffirming its resolutions 660 (1990), 661 (1990), 662 (1990), 664 (1990), 665 (1990), 666 (1990), 667 (1990), 669 (1990), 670 (1990) and 674 (1990),

Noting that, despite all efforts by the United Nations, Iraq refuses to comply with its obligation to implement resolution 660 (1990) and the above subsequent relevant resolutions, in flagrant contempt of the Council,

Mindful of its duties and responsibilities under the Charter of the United Nations for the maintenance and preservation of international peace and security,

Determined to secure full compliance with its decisions,

Acting under Chapter VII of the Charter of the United Nations,

1. *Demands* that Iraq comply fully with resolution 660 (1990) and all subsequent relevant resolutions and decides, while maintaining all its decisions, to allow Iraq one final opportunity, as a pause of goodwill, to do so;

2. *Authorizes* Member States co-operating with the Government of Kuwait, unless Iraq on or before 15 January 1991 fully implements, as set forth in paragraph 1 above, the foregoing resolutions, to use all necessary means to uphold and implement Security Council resolution 660 (1990) and all subsequent relevant resolutions and to restore international peace and security in the area;

3. *Requests* all States to provide appropriate support for the actions undertaken in pursuance of paragraph 2 of this resolution;

4. *Requests* the States concerned to keep the Council regularly informed on the progress of actions undertaken pursuant to paragraphs 2 and 3 of this resolution;

5. *Decides* to remain seized of the matter.

VOTE: 12 for, 2 against (Cuba and Yemen); 1 abstention (China)

Resolution 686 (2 March, 1991)

The Security Council,

Recalling and *reaffirming* its resolutions 660 (1990), 661 (1990), 662 (1990), 664 (1990), 665 (1990), 666 (1990), 667 (1990), 669 (1990), 670 (1990), 674 (1990), 677 (1990), and 678 (1990),

Recalling the obligations of Member States under Article 25 of the Charter,

Recalling paragraph 9 of resolution 661 (1990) regarding assistance to the Government of Kuwait and paragraph 3(c) of that resolution regarding supplies strictly for medical purposes and, in humanitarian circumstances, foodstuffs,

Taking note of the letters of the Foreign Minister of Iraq confirming Iraq's agreement to comply fully with all of the resolutions noted above (S/22275), and stating it's intention to release prisoners of war immediately (S/22273),

Taking note of the suspension of offensive combat operations by the forces of Kuwait and the Member States cooperating with Kuwait pursuant to resolution 678 (1990),

Bearing in mind the need to be assured of Iraq's peaceful intentions, and the objective in resolution 678 (1990) of restoring international peace and security in the region,

Underlining the importance of Iraq taking the necessary measures which would permit a definitive end to the hostilities,

Affirming the commitment of all Member States to the independence, sovereignty and territorial integrity of Iraq and Kuwait, and noting the intention expressed by the Member States cooperating under paragraph 2 of Security Council resolution 678 (1990) to bring their military presence in Iraq to an end as soon as possible consistent with achieving the objectives of the resolution,

Acting under Chapter VII of the Charter,

1. *Affirms* that all twelve resolutions noted above continue to have full force and effect;

2. *Demands* that Iraq implement its acceptance of all twelve resolutions noted above and in particular that Iraq:

(a) Rescind immediately its actions purporting to annex Kuwait;

(b) Accept in principle its liability under international law for any loss, damage, or injury arising in regard to Kuwait and third States, and their nationals and corporations, as a result of the invasion and illegal occupation of Kuwait by Iraq;

(c) Immediately release under the auspices of the International Committee of the Red Cross, Red Cross Societies, or Red Crescent Societies, all Kuwaiti and third country nationals detained by Iraq and return the remains of any deceased Kuwaiti and third country nationals so detained; and

(d) Immediately begin to return all Kuwaiti property seized by Iraq, to be completed in the shortest possible period;

3. *Further demands* that Iraq:

(a) Cease hostile or provocative actions by its forces against all Member States, including missile attacks and flights of combat aircraft;

(b) Designate military commanders to meet with counterparts from the forces of Kuwait and the Member States cooperating with Kuwait pursuant to resolution 678 (1990) to arrange for the military aspects of a cessation of hostilities at the earliest possible time;

(c) Arrange for immediate access to and release of all prisoners of war under the auspices of the International Committee of the Red Cross, Red Cross Societies, or Red Crescent Societies, and return the remains of any deceased personnel of the forces of Kuwait and the Member States cooperating with Kuwait pursuant to resolution 678 (1990); and

(d) Provide all information and assistance in identifying Iraqi mines, booby traps and other explosives as well as any chemical and biological weapons and material in Kuwait, in areas of Iraq where forces of Member States cooperating with Kuwait pursuant to resolution 678 (1990) are present temporarily, and in the adjacent waters;

4. *Recognizes* that during the period required for Iraq to comply with paragraphs 2 and 3 above, the provisions of paragraph 2 of resolution 678 (1990) remain valid.

5. *Welcomes* the decision of Kuwait and the Member States cooperating with Kuwait pursuant to resolution 678 (1990) to provide access and to commence immediately the release of Iraqi prisoners of war as required by the terms of the Third Geneva Convention of 1949, under the auspices of the International Committee of the Red Cross;

6. *Requests* all Member States, as well as the United Nations, the specialized agencies and other international organizations in the United Nations system, to take all appropriate action to cooperate with the Government and people of Kuwait in the reconstruction of their country;

7. *Decides* that Iraq shall notify the Secretary-General and the Security Council when it has taken the actions set out above;

8. *Decides* that in order to secure the rapid establishment of a definitive end to the hostilities, the Security Council remains actively seized of the matter.

VOTE: 11 for, 1 against (Cuba), 3 abstentions (China, India, Yemen).

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APPENDIX C

INTELLIGENCE

"No combat commander has ever had as full and complete a view of his adversary as did our field commander. Intelligence support to Operations Desert Shield and Desert Storm was a success story."

General Colin Powell, USA
Chairman
Joint Chiefs of Staff

"The great military victory we achieved in Desert Storm and the minimal losses sustained by US and Coalition forces can be directly attributed to the excellent intelligence picture we had on the Iraqis."

General H. Norman Schwarzkopf, USA
Commander-in-Chief
Central Command

"At the strategic level, [intelligence] was fine. But we did not get enough tactical intelligence – front-line battle intelligence."

Lieutenant General William M. Keys, USMC
Commanding General
2nd Marine Division during
Operation Desert Storm*

The contributions and problems of intelligence support to Operations Desert Shield and Desert Storm have received widespread attention in reports, studies, testimonies and hearings. Assessing the successes and failures is difficult because of the magnitude of the effort; the diversity of intelligence requirements, functions, and systems; the size of the area of operations; and unique aspects of the Gulf crisis. Intelligence support, overall, was better than in past conflicts, as evidenced by the conduct and outcome of the war. Although some details of intelligence operations in the Gulf war are presented here, much of the information, of necessity, remains classified.

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PROLOGUE

The Intelligence Community had been concerned about Iraq for years before the Gulf conflict. However, Iraqi regimes under the Ba'ath Party have been aggressive in security and counterintelligence operations, complicating the intelligence collection environment. Iraqi citizens are barred from contact with foreigners, even to the extent that the use of international mail and telephone circuits require permission from the Interior Ministry. Iraqi security services are pervasive in their surveillance and scrutiny of Iraqi citizens and foreigners alike. The difficult collection environment resulted in shortfalls in US knowledge of the extent and exact disposition of Iraqi nuclear research and chemical and biological weapons facilities. Although US intelligence agencies were aware of Iraqi military capabilities, they lacked access to information on the Iraqi leadership's intentions.

In late 1989, Central Command (CENTCOM) began reassessing its operational plans in the context of a declining Soviet threat and concerns about increased regional proliferation of weapons of mass destruction and advanced delivery systems. (Iraqi military programs and capabilities are detailed in Chapter I.) Battlefields during the Iran-Iraq war had witnessed use of chemical weapons and ballistic missiles, large-scale armor engagements, and substantial loss of life. As Iraqi demands for US withdrawal from the Gulf grew more strident and details of Saddam Hussein's[1] aggressive military research and development programs became better known, CENTCOM's Directorate of Intelligence (J-2) focused on Iraq as a potential threat to US interests in its area of responsibility.

Although relations between Iraq and Kuwait had, in the past, been affected by the unresolved border issue and the question of ownership of Warbah and Bubiyan islands, Kuwaiti leaders nevertheless were surprised at the antagonism of Saddam's 17 July speech commemorating the 22nd anniversary of the 1968 Iraqi revolution. (See Chapter I for details of the Kuwaiti-Iraqi disputes.) In his speech, Saddam accused Kuwait and the United Arab Emirates of complicity with the United States and Israel in a plot to cheat Iraq out of billions of dollars of oil revenue. The ferocity of the speech caused concern among the Intelligence Community, as did detection of movements of Republican Guard Forces Command (RGFC) units from the Baghdad area towards the Kuwaiti border.

CENTCOM, the Defense Intelligence Agency (DIA), the Central Intelligence Agency (CIA), and the National Intelligence Officer for Warning all were monitoring events closely and reporting on their significance. On 23 July, DIA began twice-daily production of Defense Special Assessments on the developing situation. All US intelligence agencies provided detailed reporting on the continuing Iraqi military

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1 Although the Arabic letters Hah (dammah)-Sin (fathah)-Yah-Nun are best rendered as HUSAYN, this document reflects the more commonly used HUSSEIN.

buildup, and issued warnings of possible Iraqi military action against Kuwait. By 1 August, Iraqi forces between Al-Basrah and the Kuwaiti border included eight Republican Guard (RGFC) divisions supported by at least 10 artillery battalions. This force consisted of almost 150,000 troops, with by more than 1,000 tanks, and required support forces. That same day, CIA, DIA, and CENTCOM issued warnings that an Iraqi invasion of Kuwait was likely, if not imminent.

On 2 August, at 0100 (Kuwait time), the three heavy divisions and a special operations division of the Iraqi RGFC launched a coordinated, multi-axis assault on Kuwait. (See Chapter I for a discussion of the invasion.) CENTCOM and DIA analysts evaluated the Iraqi force in or near Kuwait as more than sufficient to conduct a successful follow-on attack into Saudi Arabia's oil-rich Eastern Province.

On 4 August, the DIA Deputy Director for Joint Chiefs of Staff (JCS) Support accompanied the Secretary of Defense, the Chairman of the Joint Chiefs of Staff, and the Commander-in-Chief, Central Command (CINCCENT) to Camp David, MD, to brief President Bush on the situation in Kuwait and the potential threat to Saudi Arabia. On 5 August, the President sent the Secretary of Defense to Saudi Arabia to brief King Fahd on US perceptions and to offer American forces to help defend the Kingdom. The next day, King Fahd invited US forces to Saudi Arabia, marking the start of Operation Desert Shield.

Thus began one of the larger efforts in the history of the US Intelligence Community. The subsequent effort reflected the investment of billions of dollars in technology and training, and the contributions of thousands of intelligence professionals, both military and civilian, from a variety of agencies and staffs. These quality people were often the key. When systems or procedures proved inadequate or too cumbersome, the problems were remedied by innovative solutions and hard work.

NATIONAL INTELLIGENCE

Coinciding with the release of DIA, CIA, and CENTCOM warnings of possible Iraqi military action against Kuwait, DIA activated an Intelligence Task Force (ITF) in the National Military Intelligence Center (NMIC) at the Pentagon, and augmented the Operational Intelligence Crisis Center (OICC) at the Defense Intelligence Analysis Center on Bolling Air Force Base, DC. The ITF mission was to provide direct support to the JCS operations and planning staffs, and to serve as a clearinghouse for the flood of requests for information (RFI) pouring into the NMIC from commands worldwide. The OICC was augmented to coordinate and manage all DIA research and analytical efforts to provide responses to RFI, and to produce specialized targeting packages.

Concurrent with CENTCOM's initial force deployments on 7 August, DIA deployed a National Military Intelligence Support Team (NMIST) to Riyadh. NMIST

have self-contained satellite communications equipment providing direct connectivity to DIA for the submission of RFI and the direct dissemination of intelligence information and imagery to the theater. Eleven NMIST eventually were deployed to support forces involved in Operations Desert Shield and Desert Storm. The NMIST network was to prove crucial to the CENTCOM J-2 since it eventually would be the sole dedicated intelligence communications capability between the CENTCOM J-2, the component and subunified command intelligence staffs, and the national intelligence community. These teams were vital sources of timely information, to include imagery, especially when the existing communications circuits between the United States and the theater became saturated with operational message traffic.

The National Security Agency (NSA) increased operations to support deployed military forces as well as national-level decision makers. CIA established 24-hour task forces in its Operations and Intelligence directorates. All national and Service intelligence organizations eventually deployed intelligence operations specialists, area specialists, and analysts to the theater to provide direct support, or to augment CENTCOM or component intelligence staffs.

The Intelligence Community initially was not prepared to cope with the volume of intelligence requirements to support the large scale of Operations Desert Shield and Desert Storm. During the initial period of Operation Desert Shield, various agencies and staffs produced a very high level of duplicative, even contradictory, intelligence to support deploying and deployed forces. Both JCS and CENTCOM recognized a need for some order in the Department of Defense (DOD) intelligence community, consisting of more than 30 producers. DIA assumed a new wartime role of production guidance – addressing order of battle, targeting, imagery exploitation, estimates, and battle damage assessment (BDA).

Under DIA guidance, Service intelligence staffs and organizations refocused ongoing production to complement the national agencies' efforts. The Army Intelligence and Threat Analysis Center (ITAC) produced detailed analyses on Iraqi doctrine and tactics, drawing on the lessons of the Iran-Iraq war. ITAC, in cooperation with DIA, produced thousands of copies of an unclassified "How They Fight" booklet for distribution to deploying US forces. This booklet contained Iraqi equipment descriptions, Iraqi tactics, and drawings of typical Iraqi defensive positions. ITAC also produced map overlays of actual defensive positions of Iraqi divisions in the Kuwait Theater of Operations (KTO). These templates were valuable tools for unit-level intelligence officers during the ground campaign. Often, these products were of greater detail and accuracy than captured Iraqi overlays of the same positions. Templates were distributed to all Coalition forces involved in the ground campaign.

The Navy Operational Intelligence Center (NOIC) supported the maritime campaign by providing merchant shipping analyses directly to maritime interdiction forces. This was supported by a major Intelligence Community, including CIA, effort to provide information about ship movements to assist in the maritime interdiction operations. NOIC's Crisis Action Team, working with the Marine Corps Intelligence

Center, developed special support projects for amphibious warfare planning in the I Marine Expeditionary Force (MEF) area. The Navy Technical Intelligence Center produced two versions of a "Persian Gulf Fact Book" on the characteristics of Iraqi and Iranian naval systems, and provided quick reaction exploitation of Iraqi mines encountered in the Persian Gulf.

The Air Force Assistant Chief of Staff for Intelligence produced an "Iraqi Threat Reference Guide", and the Air Force Foreign Technology Division provided in-depth studies on the characteristics, capabilities and weaknesses of top line Iraqi fighter aircraft, such as the MiG-29 and F-1. The Air Force Intelligence Agency and Air Staff intelligence specialists directly supported the Air Staff's Checkmate operational planning group. (See Chapter VI for details on Checkmate.)

The Military Intelligence Board (MIB) – an advisory and decision-making body chaired by the Director, DIA, and made up of Service intelligence chiefs and the Director, NSA – supported the CENTCOM intelligence mission. (For support to Operations Desert Shield and Desert Storm, the MIB also included nonvoting representatives of the Joint Staff Directorate of Command, Control and Communications; and the Defense Support Program Office.) The MIB addressed theater shortfalls as identified by the CENTCOM Directorate of Intelligence (J-2) and coordinated the deployment of needed personnel, equipment, and systems to support operations in the Gulf.

In Washington, the DOD Joint Intelligence Center (DOD-JIC) was established in the NMIC on 2 September to provide a single, integrated DOD intelligence position to national decision makers and the theater commander. The DOD-JIC was a landmark effort; for the first time, analysts from DIA, NSA, and all Service intelligence commands were organized in one location in one chain-of-command and focused on one DOD, all-source intelligence position. CIA provided some staffing to the DOD-JIC.

During the early months of Operation Desert Shield and throughout Operation Desert Storm, CENTCOM and DIA collection managers, working in close coordination with other Intelligence Community elements, optimized US national collection systems against CENTCOM intelligence requirements. The State Department Bureau of Intelligence and Research adjusted its coverage from other issues to become the primary agency for compilation of UN economic sanctions violations.

Mapping, charting, and geodesy (MC&G) products were key to the targeting, planning, and operations efforts of Operations Desert Shield and Desert Storm. Imagery also was acquired from US, foreign, and commercial sources to support MC&G requirements. Initially, the airlift priority for MC&G items was too low to support deploying forces adequately . CENTCOM resolved the problem by raising MC&G to the same priority as medical supplies. Ninety million maps were transported to theater.

During Operations Desert Shield and Desert Storm, the national intelligence agencies produced numerous reports and special national intelligence estimates. Field commanders have criticized some of these products as being overly caveated and footnoted, too broad, and non-predictive. The national-level intelligence structure, including the National Intelligence Council, DIA, and CIA, adhered to the peacetime concept of competing analysis, which gives intelligence consumers the benefit of alternative views and predictions. This is appropriate for high-level policymakers; however, to a combat commander, this reporting method often presents too broad a picture and too wide a range of options to affect combat force posturing or employment.

THEATER INTELLIGENCE

Central Command

The primary focus of intelligence operations, particularly during Operation Desert Shield, was to provide the theater and component commanders with an accurate picture of Iraqi capabilities and intentions. To do so, the theater-level intelligence structure made extensive use of national capabilities as well as a wide array of deployed Service and component capabilities. In some cases, collection platforms and systems organic to tactical units were tasked for missions that did not directly support their parent organizations. Although some shortfalls surfaced, theater-level intelligence efforts met the requirements of CINCCENT and his component commanders.

Before Operation Desert Shield, the CENTCOM intelligence staff did not have the resources, equipment, or organizational structure needed to deploy and support operations of the level and scope of Operation Desert Storm. Nor did it have the types or numbers of trained personnel needed to execute the wartime mission, and had to be augmented with personnel with the required specialized skills. The CENTCOM J-2 identified these shortfalls and conveyed them to DIA and the MIB. The J-2 directed the drafting of an architecture plan to augment the organization with the numbers and types of personnel the mission required. In response to a CENTCOM Director of Intelligence request, the MIB deployed a joint-service team to theater in November to help develop a wartime intelligence staff. The MIB was instrumental in identifying and/or providing qualified Service personnel to fill the manpower gaps.

The CENTCOM Joint Intelligence Center (JIC) was created and operated as the senior intelligence organization in theater, maintaining contact with the Directors of Intelligence at the components and subunified command headquarters. Analytic tasks were shared, with each component providing analysis of its geographic area of operations and in its functional area of expertise. The JIC acted as the clearinghouse for intelligence requirements and as the collection manager for theater assets.

Theater and component collection managers met daily at CENTCOM. RFI that could not be answered using theater assets were validated, prioritized, and referred to the DOD-JIC. The CENTCOM JIC used scarce theater assets effectively by eliminating duplicative efforts, and ensured component and subunified command intelligence requirements were addressed by national elements.

Wartime intelligence organizations and functions, nonexistent or seldom used and exercised in peacetime, were created within the CENTCOM JIC. The Combat Assessment Center included the Combat Assessment Cell, which provided an assessment of enemy intentions 24 to 96 hours into the future – an effort not only previously nonexistent at CENTCOM, but also nonexistent at the national level throughout Operations Desert Shield and Desert Storm – and the BDA cell, created to evaluate achievement of mission objectives and provide targeting recommendations.

Reconnaissance and airborne intelligence collection efforts in theater were managed by the Joint Reconnaissance Center (JRC), a standard function in most unified and specified commands. The notable difference is that the CENTCOM JRC was an integral part of the CENTCOM JIC rather than part of the Directorate of Operations (J-3) staff. This allowed direct and effective contact between the reconnaissance and intelligence platform managers, collection managers, and the theater-level intelligence analysts who needed timely information to respond to CINCCENT's requirements. The JRC also controlled some corps-level reconnaissance and intelligence collection assets, effectively harmonizing their capabilities and areas of coverage in response to overall theater intelligence requirements. The placement of the JRC within the intelligence domain ensured the timely acquisition and dissemination of needed information. To coordinate and deconflict airborne intelligence collection and surveillance operations between CENTCOM components and other Coalition nations, CENTCOM conducted a Daily Aerial Reconnaissance and Surveillance (DARS) conference. Representatives of the United States, United Kingdom, France and Saudi Arabia were standing members of the DARS committee.

Many national and tactical systems were operated at the theater level throughout Operations Desert Shield and Desert Storm. The distinction between their strategic and tactical roles blurred during preparation for combat and during combat operations. The Air Force-Army Joint Surveillance Target Attack Radar System (JSTARS), still in project development and testing, provided all-weather, near-real-time targeting information in coordination with other tactical and theater systems, such as the Army OV-1D. (A detailed description of JSTARS is in Appendix T.) The OV-1D normally is a corps asset, but its operations were routinely tasked by the CENTCOM JRC during Operation Desert Storm.

Although CENTCOM JRC tasking of corps-level assets may have been frustrating to the corps commanders, CINCCENT needed these platforms' capabilities to meet theater-unique requirements. The mobile Scud threat was a case in point. The CINCCENT requirement to suppress Iraq's ability to launch Scuds at Israel – a threat to the cohesiveness of the Coalition – required use of the JSTARS in a Scud-hunting role (particularly in western Iraq, from where the missiles were launched at

JSTARS

The Joint Surveillance Target Attack Radar System (JSTARS) provided useful information concerning Iraqi forces during the 29 January Iraqi attack on Al-Khafji. Iraqi follow-on forces were tracked by JSTARS and destroyed by Coalition air power – north of the Saudi border. Information such as this was provided to ground and air commanders in near-real-time via the Army's JSTARS Interim Ground Station Modules (IGSMs). IGSMs were deployed with Army Component, Central Command (ARCENT) headquarters, ARCENT Forward Command Post, ARCENT Main Command Post, I Marine Expeditionary Force headquarters, VII Corps, XVIII Airborne Corps, and the Air Force Component, Central Command Tactical Air Control Center.

Just before the Offensive Ground Campaign began, JSTARS confirmed that Iraqi forces remained in their defensive positions against which the attack had been planned. During the attack itself, JSTARS detected the positioning of Iraqi operational reserve heavy divisions into blocking positions in response to the VII Corps advance.

Israel) and use of the OV-1D to fill resulting gaps in coverage. This need superseded the corps' requirements for use of the OV-1D.

Imagery was vital to Coalition operations, especially to support targeting development for precision guided munitions and Tomahawk Land Attack Missile attacks, and for BDA. Operations Desert Shield and Desert Storm placed great demands on national, theater and tactical imagery reconnaissance systems. The insatiable appetite for imagery and imagery-derived products could not be met.

The SR-71, phased out in 1989, was evaluated for possible reactivation to alleviate the imagery shortfall. The SR-71 could have been useful during Operation Desert Shield if overflight of Iraq had been permitted. In that case, the system would have provided broad area coverage of a large number of Iraqi units. However, since overflight of Iraq was not allowed, it would have provided no more coverage than available platforms. During Operation Desert Storm air operations, the SR-71 would have been of value for BDA and determining Iraqi force dispositions. During Operation Desert Storm ground operations, the SR-71 would not have made greater contributions than other platforms, given the speed of the advance. Unique aircraft requirements also would have limited potential SR-71 operating locations.

Although national and theater imagery reconnaissance platforms could collect substantial amounts of imagery, getting it to the tactical commander proved difficult. Components deployed with numerous incompatible secondary imagery

dissemination systems (SIDS) – each bringing the systems procured by its parent Service. While national imagery was available at CENTCOM and the components, dissemination below that level required workarounds, often at the expense of precious communications circuits. At times, couriers had to be used to ensure delivery.

Through an *ad hoc* communications architecture involving both national and theater intelligence systems, Army Patriot batteries deployed to Saudi Arabia, Israel, and Turkey were able to receive warnings of Iraqi-modified Scud missile launches, which proved key to early target detection and acquisition.

From the beginning of the crisis through the end of Operation Desert Storm, there was a theater-wide shortage of trained, proficient Arabic linguists. This shortage, coupled with a lack of linguists familiar with the Iraqi dialect, reduced the ability to collect and produce intelligence, as well as operate effectively within a Coalition that included nine Arabic-speaking countries. This situation was alleviated somewhat by an Army initiative to recruit, train, and deploy some 600 Kuwaiti volunteers as interpreters and interrogators in Army and Marine Corps units.

CENTCOM Components/Subunified Command

CENTCOM's components and subunified command were supported by organic and/or augmented intelligence organizations. The Army Component, Central Command (ARCENT) was supported by the 513th Military Intelligence (MI) Brigade, which conducted all-source intelligence operations in support of ARCENT echelons above corps. The brigade was headquartered in Riyadh, with elements operating with ARCENT Forward at Hafr Al-Batin and other locations throughout the theater. The Air Force Component, Central Command (CENTAF) was supported by the 9th Tactical Intelligence Squadron, the 6975th Electronic Security Squadron, and a detachment of the Air Force Special Activities Center, all in Riyadh. The Navy Component, Central Command (NAVCENT) was supported by the intelligence staff resident on the Seventh Fleet flagship, the *USS Blue Ridge* (LCC 19). The Marine Corps Component, Central Command (MARCENT) was supported by the 1st Surveillance, Reconnaissance, and Intelligence Group (SRIG), a task-organized intelligence command that also supported I MEF and its subordinate units. The Special Operations Commmand, Central Command was supported by a heavily augmented intelligence staff. Intelligence personnel from all four components formed the Joint Air Intelligence Cell in Riyadh to support the CENTAF Commander in his role as Joint Force Air Component Commander (JFACC).

Coalition Intelligence

Coalition intelligence efforts worked well during the crisis. Intelligence officers from the United Kingdom, Canada and Australia were integrated fully into the CENTCOM JIC. The Royal Air Force operated its GR-1 photoreconnaissance variant aircraft to collect against theater requirements. Saudi aerial reconnaissance capability was made available to CENTCOM intelligence collection managers. Royal Saudi Air Force (RSAF) RF-5C photoreconnaissance aircraft conducted border surveillance missions along Saudi Arabia's border with Kuwait and Iraq, as well as over Iraqi territory during Operation Desert Storm. Marine Corps and RSAF intelligence personnel in Riyadh interpreted RF-5C photography. Other Coalition nations provided intelligence collected by their fielded systems.

Arabic-speaking US intelligence officers were on duty 24 hours a day in the Coalition Coordination, Communication, and Integration Center to provide intelligence support to Coalition forces, and receive intelligence information. Coalition commanders acknowledged the United States provided most of their intelligence. The liberal provision of American intelligence during Operations Desert Shield and Desert Storm likely will cause pressure for continued access to sensitive information, possibly straining the ability to protect sources and methods.

Operation Proven Force

European Command (EUCOM) and its component commands produced intelligence to support US combat operations from Turkey. EUCOM assumed intelligence responsibilities for northern Iraq to support US forces operating from bases in Turkey as part of Joint Task Force Proven Force.

TACTICAL INTELLIGENCE

Perhaps in no other conflict in American history have tactical commanders – corps-level and below – been able to call on as capable an intelligence system as in the Gulf War. Yet, despite the impressive capabilities of collection systems at the national, theater, and tactical levels, many division, brigade, and wing commanders expressed frustration and dissatisfaction with the intelligence support they received. The detail desired in some cases, was, and will continue to be, beyond the capabilities of the intelligence system. Additionally, many of the more capable tactical intelligence collection systems were restricted in their use because of operational security considerations before Operation Desert Storm. Others were controlled or tasked at the theater (CENTCOM or component) level. Wing, division and brigade commanders' intelligence needs that could not be met with organic

assets had to be validated and prioritized at higher echelons; many times their requirements, although validated, fell too low on the list to be satisfied by heavily tasked theater and national resources.

I MEF

I MEF deployed to the theater, having recently reorganized its tactical intelligence structure. Marines ashore depended on the recently created 1st SRIG, a regimental sized unit that meshed all ground intelligence collection assets, covering all intelligence disciplines. Additionally, each Marine division had a ground reconnaissance battalion of Marines specially trained in patrolling, and a light armored infantry battalion, capable of mechanized cavalry and reconnaissance operations using light armored vehicles. Many of these assets were attached to assault units to provide direct support during the ground attack.

A serious shortfall the Marines faced was the absence of a tactical aerial reconnaissance platform able to provide imagery responsive to ground commanders' requirements. The RF-4B, recently taken out of service, had not yet been replaced by the reconnaissance pods programmed for the F/A-18D.

ARCENT Corps

The tactical intelligence capability initially deployed with Army units was midway through a modernization effort, resulting in mobility, targeting, communications, and processing problems. Consequently, the Army had to custom design a battlefield intelligence system. An MI brigade supported each of the two corps, and each division had a full MI battalion organic to it. Communications paths to disseminate intelligence, targeting data, and imagery from producers to corps and division commanders in near-real-time did not exist, or had insufficient capacity. Many collection systems, such as JSTARS and the Pioneer unmanned aerial vehicle (UAV) were prototypes. Through urgent fielding of such prototypes and off-the-shelf systems, the Army fielded an all-discipline battlefield intelligence capability that met the most immediate needs of commanders and provided them with necessary targeting and intelligence data.

CENTAF Units

The unique nature of Operation Desert Storm air operations tended to blur the distinction between tactical and theater level intelligence. Air tasking and

targeting was centralized at the JFACC level, with intelligence requirements originating at the theater level and results pushed downward, in contrast to the decentralized nature of ground-combat intelligence. Because of this, many theater systems provided direct support to air planners. Squadrons, groups, and wings have limited organic intelligence sources other than aircrew debriefings and assigned collection platforms. However, the Airborne Warning and Control System , Airborne Battlefield Command and Control Center , Tactical Information Broadcast System , and Tactical Receive Equipment and Related Applications gave aircrews timely intelligence-derived warning of pending threats.

NAVCENT Units

Naval operations also tend to blur the distinction between theater and tactical assets. At sea, P-3C patrol aircraft and E-2 airborne early warning aircraft were able to meet the requirement for immediate threat identification. Navy battle groups and amphibious groups were manned with complete intelligence staffs and capabilities to support their operations.

Intelligence Collection and Dissemination

VII Corps, I MEF, and NAVCENT ships operated the Pioneer UAV to provide real-time imagery intelligence and targeting data. Pioneer was deployed in late August as part of the 7th Marine Expeditionary Brigade. I MEF incorporated UAV missions into its battlefield preparation, often using them to locate targets and adjust artillery fire and close air support. Navy battleships used Pioneer to refine naval gunfire support accuracy during operations off Kuwait in late January and February. The VII Corps' system became operational on 1 February. Pioneer proved excellent at providing an immediately responsive intelligence collection capability. VII Corps flew 43 UAV missions during February, providing situation development and targeting support. During one mission, a Pioneer located three Iraqi artillery battalions, three free-rocket-over-ground launch sites, and an antitank battalion. Since the system still was in the test and evaluation stage of development, it had inadequate communications and down-link capabilities to be completely effective and widely available. (See Appendix T for a description of the Pioneer system.)

One additional UAV system, Pointer, was used by the 82nd Airborne Division and the 2nd Marine Division. An experimental, hand-launched, very short-range UAV designed for direct support of small units, Pointer was operated from the front lines, but was of limited use in the open desert because of its fragility and range.

A variety of tactical signals intelligence systems was deployed to the theater to support tactical commanders. Although hindered somewhat by the shortage of

Arabic linguists, operators were able to provide timely and useful intelligence throughout Operations Desert Shield and Desert Storm.

Human source intelligence proved its value to tactical commanders during Operation Desert Storm. For units at the brigade and lower levels, it often was the primary source of intelligence on enemy capabilities and intentions. ARCENT, NAVCENT, MARCENT and CENTAF attached interrogators to front-line units to extract perishable information of immediate tactical significance, some of which was used immediately to target enemy forces. Once the ground offensive began and American units began capturing large numbers of Iraqi enemy prisoners of war, US interrogators had access to a variety of Iraqi military personnel. Iraqi officers and soldiers proved quite willing to divulge details of tactical dispositions and plans. The large numbers of prisoners quickly overburdened intelligence unit interrogators.

As in past conflicts, combat operations in the Persian Gulf again demonstrated the value of the individual soldier, sailor, airman, and Marine in conducting reconnaissance and surveillance. Aircrew debriefings provided valuable data on Iraq air defense tactics and weapons capabilities, as well as continually updating BDA and data on the ground situation. Through Operation Desert Shield and in the weeks leading to the ground offensive, Special Operations Forces and Marine Corps units established observation posts along the Kuwait border. Later, as Army units closed on southern Iraq, XVIII Airborne Corps and VII Corps established similar posts in their areas of operations. During the final days before the ground attack, Marine Corps reconnaissance patrols crossed the Kuwaiti border to determine exact locations and composition of enemy obstacles and minefields. Army scouts performed similar missions to the west, some penetrating several miles into Iraq. All these ground reconnaissance units, along with operational reports from units in contact with the enemy, provided tactical commanders with valuable information on enemy capabilities.

Because much of the intelligence gathered originated at corps and higher levels, tactical commanders found intelligence provided to them was too broad. Frequently, tactical units were sent finished estimates and summaries produced for senior commanders rather than the detailed, tailored intelligence needed to plan tactical operations, with the notable exception of targeting templates. Tactical units, restricted in the use of their own intelligence and surveillance assets and reliant on a tenuous dissemination process, often found themselves trying to piece together an intelligence picture of the enemy in their sectors using the limited information they could draw from intelligence being produced at higher levels.

Operation Desert Storm validated again the requirement for timely dissemination of intelligence to the tactical level. However, system capabilities, coupled with the lack of communications capacity or systems, did not meet tactical commanders' expectations – either in quality or quantity. Component commanders generally lacked the organic imagery collection assets to satisfy their own requirements, let alone those of their subordinate units.

Tactical imagery dissemination also was slowed by the geographic separation of collection platforms from the intelligence production facilities in theater. Film from the U-2R had to be flown from the aircraft operating base at At-Taif to Riyadh for exploitation. Likewise, RF-4C imagery had to be flown to Riyadh from the operating base at Shaikh Isa, Bahrain.

Overall, intelligence support for tactical commanders was good, better than that commanders had experienced in the past. Because of the unique situation faced in the Gulf, particularly for ground commanders before the ground offensive, many deployed tactical intelligence systems could not be exploited fully. National and theater systems often were used in an attempt to fill the gap, with mixed success. Tactical commanders remained frustrated, because their demands exceeded their organic intelligence systems' capabilities, and because they were forced to rely on higher echelons to provide them intelligence. Particular areas requiring improvement include tactical imagery reconnaissance, intelligence dissemination, and intelligence analysis responsive to the tactical commanders' needs. DIA and the Services are examining these issues.

BATTLE DAMAGE ASSESSMENT

BDA is a wartime function necessary to determine if desired effects are being achieved by the application of force. BDA serves decision makers and commanders at all levels. At the national level, BDA is used to determine which national or theater options are to be pursued. At the operational level (the component command in this instance), BDA is necessary to determine if the required level of damage has been done to a target or target set, or if objectives have been sufficiently achieved to permit progression to the next phase of attack. At the tactical level – aircrews, ground combat units, and naval combatants – BDA is used to validate tactics and weapons performance. However, BDA is not a precise science.

BDA in the Gulf War, as a whole, has been criticized as too slow and inadequate. It is quite possible that assessments of Iraqi losses at various times overestimated or underestimated actual results. These criticisms, however, are not entirely accurate, given the nature of the war and the unprecedented BDA requirements it generated. In terms of traditional analysis, assessments were timely and accurate. Strike evaluators were able to ascertain the effectiveness of missions directed against targets such as bridges, building complexes, and storage sites. Damage to these facilities was readily apparent, and analysis posed few problems. In essence, analysts applied the same techniques used during past wars, although most data was provided by state-of-the-art imagery reconnaissance systems.

However, the revolutionary changes in the way American forces conducted combat operations during Operation Desert Storm outstripped the abilities of the BDA system. Analysts were unable to meet the requirements for timely data on a variety of new types of targets or targets struck in new ways. For example, the

precise targeting and striking of sections of buildings or hardened shelters complicated the assessment process. In many cases, all that was visible to imagery analysts was a relatively small entry hole on the surface of a structure with no indication as to the extent of internal damage. Another example involves damage to individual tanks or vehicles, such as mobile missile launchers. Unless the destruction was catastrophic, a destroyed tank might still appear operational. Even if secondary explosions accompanied the destruction of a suspected missile launcher, it was not possible to conclude with a high degree of certainty that a Scud had been destroyed.

In short, the BDA system was called upon to produce results it had not been asked for in the past. Even though there was enough general information to enable CINCCENT to prosecute the war, some targets that had been destroyed may have been struck again and some that had not been destroyed may have been neglected. Targeting at the theater and tactical levels was less effective in the absence of more precise damage assessment. While there will never be enough information to satisfy all levels of command, improvements are clearly needed to ensure that BDA capability keeps up with the ability to strike targets with precision and penetrating weapons. DOD will continue to examine this requirement.

CENTCOM J-2 developed a BDA methodology for Operation Desert Storm to incorporate all available sources. CENTCOM BDA coupled information from national systems, mission reports, deserter reports, and gun camera film with subjective analysis and sound military judgment to determine to what degree an objective had been achieved. While CENTCOM BDA support to CINCCENT was relatively successful, there still is no DOD-wide, formalized BDA training or needed organizational structure, doctrine, methodology, or procedures. Lastly, there is no existing automated data processing software available to handle the massive volume of information which must be collated by BDA analysts. While the BDA process evolved to the point where it provided sound military assessments at the strategic and operational levels, institutionalization of an effective process remains to be done.

As part of the CENTCOM BDA methodology, the component intelligence staffs provided BDA analysis to the theater BDA cell, based on their individual areas of expertise. The CENTAF Director of Intelligence provided his analysis of all BDA on targets struck by air during the air campaign. NAVCENT did BDA of naval facilities and vessels. Likewise, assessment of combat effectiveness of Iraqi ground forces in the KTO with the exception of MARCENT's area was an ARCENT responsibility. MARCENT was responsible for BDA in its area of responsibility.

CENTCOM J-2 analysts displayed each target set with an indicator of actual observable damage and an assessment of the degree to which CINCCENT's objectives had been met. On a single map, Iraqi Army divisions were color coded to portray current estimated combat effectiveness. This map was used by CINCCENT for force posturing and employment. Major CINCCENT operational decisions depended on BDA. These included determining: the effectiveness of air operations; when to shift from the Strategic Air Campaign to preparation of the battlefield; emphasis during

ARCENT COMBAT EFFECTIVENESS METHODOLOGY

The Army Component, Central Command (ARCENT) computed combat effectiveness for each Iraqi division in the Kuwait Theater of Operations (KTO). Combat effectiveness was defined as "the ability of a unit to conduct sustained combat operations based on the status of personnel, equipment, and logistics." ARCENT based its assessment on reporting provided by all source intelligence, both national and in-theater assets, combined with confirmed pilot reports of destruction.

ARCENT estimates were effective in terms of providing one factor for the CINC to use in assessing residual combat effectiveness and in deciding when to begin the ground offensive.

preparation of the battlefield; when to initiate the Offensive Ground Campaign; and when and where to maneuver combat forces.

CENTCOM, by fusing intelligence information derived from both national and theater systems as well as inputs from its component commanders, met BDA requirements of both national decision makers and the theater commander. However, BDA for tactical commanders, who wanted more specific detail, was more difficult. At the tactical level, it often was impossible to get the information to commanders fast enough to affect decision making. Additionally, CIA and DIA BDA estimates using information available solely from national intelligence sources conflicted greatly with those produced in theater. Independent CIA reporting of this conflicting BDA to the White House sometimes caused confusion between national decision makers and the theater commander. Because of the availability of additional data in theater, CENTCOM-produced BDA was more accurate and useful to CINCCENT.

Other factors were crucial in addressing BDA issues. The combat tempo of the war was greater than the ability to collect BDA data. Poor weather early in the campaign severely hampered verification of target destruction. BDA will continue to be a problem for the foreseeable future. However, many difficulties encountered in Operations Desert Shield and Desert Storm can be minimized or eliminated by developing standard BDA doctrine and procedures that meet the needs of operational and intelligence communities. The intelligence and operations communities must collaborate in this effort. BDA must also become an integral part of joint training and periodic exercises. (Additional discussion of BDA is included in Chapters VI and VIII.)

COUNTERINTELLIGENCE

Operations Desert Shield and Desert Storm provided the first opportunity to conduct theater-level counterintelligence according to doctrine developed since the Vietnam conflict, both in the United States and in theater. This allowed CINCCENT to exercise operational control of these assets through the components.

DOD counterintelligence agencies successfully detected and interdicted US military members attempting to sell classified defense information to foreign intelligence services.

Arab/Islamic countries' services also are good at internal security and counterintelligence. To coordinate operations between US and other Coalition services, Joint Counterintelligence Liaison Offices were established in Saudi Arabia.

CONCLUSION

The Coalition forces' overwhelming military victory against Iraqi armed forces was due in large part to accurate intelligence provided to decision makers, particularly at the national and theater level. The shortfalls in the intelligence support to American forces, which have been detailed in this report, are being addressed.

OBSERVATIONS

Accomplishments

- Intelligence support to national and theater decision makers was excellent.
- DOD-JIC, manned by DIA, NSA and Service intelligence staffs, provided agreed DOD intelligence positions to the theater and helped eliminate duplicative efforts.
- CENTCOM JIC provided effective intelligence and BDA to theater commander. Placement of JRC within the JIC allowed effective tasking of theater assets against theater and tactical requirements.
- JSTARS provided useful targeting and situational data on enemy ground forces throughout the war.
- The UAV demonstrated its tactical intelligence collection value.

Shortcomings

- Support to tactical commanders was sufficient, but suffered from a lack of available assets and difficulties in disseminating national and theater intelligence. This was aggravated by numerous incompatible secondary imagery dissemination systems in theater.
- There was a lack of information on the scope and exact disposition of chemical, biological, and nuclear weapons programs, and poor understanding of Iraqi intentions.
- Community-wide shortage of Arabic linguists affected intelligence, counterintelligence, and liaison efforts.
- The BDA process was difficult, especially for restrike decisions. BDA doctrine and organization must be determined. DIA, the Services, and the unified and specified commands have begun to institutionalize a BDA structure that will satisfy combat commanders' requirements.

Issues

- Tactical commanders considered intelligence support at the division, wing and lower levels insufficient, because of overreliance on national and theater

systems, lack of adequate tactical imagery systems, and limited imagery production. Although better dissemination of national and theater intelligence can meet some intelligence requirements, commanders need more and better organic assets.

- Combat commanders were concerned that national intelligence often was caveated and proved of limited value. The cornerstone of the national intelligence process is competitive analysis. When this process produces differing judgments within the Intelligence Community, the nature and supporting rationale for these different opinions must be made clear to senior leaders. Intelligence judgments must convey all the options open to an adversary, as well as the ambiguities surrounding his intent and likely future actions. At the same time, the type of intelligence product that is appropriate for senior national leaders may not be useful for a combat commander. Therefore, there is a need to examine how national estimates dealing with military contingencies are developed. An interagency task force is reviewing this process.

- Joint intelligence doctrine must be developed that addresses unified command requirements on a fast-moving battlefield. Joint Publication 2-0, Doctrine for Intelligence Support to Joint Operations, has been published in the test phase. Development has begun on a more detailed Joint Tactics, Techniques, and Procedures document for intelligence support to joint operations. A JIC concept of operations also is under development. JICs must be adequately manned, organized, and equipped to support the command mission fully.

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APPENDIX D

PREPAREDNESS OF UNITED STATES FORCES

"In just 24 months the Cold War was ended, Panama was freed, and Iraqi aggression reversed. America's military played a vital role in each of these national triumphs. These accomplishments were not achieved by accident. They are the product of 20 years of dedication, planning, training and just plain hard work. The warfighting edge of our military is the result of quality people, trained to razor sharpness, outfitted with modern equipment, led by tough competent leaders, structured into an effective mix of forces, and employed according to up-to-date doctrine."

General Gordon R. Sullivan
Chief of Staff, US Army

INTRODUCTION

Military preparedness is the ability to introduce properly equipped and trained forces quickly into a crisis situation. This ability normally cannot be generated in a short period of time. Preparation for Operations Desert Shield and Desert Storm did not begin when Iraq invaded Kuwait on 2 August. That date was preceded by years of preparation; a change in the global environment; a shift in strategy; previous defense planning; investments in people, equipment, and training; and forward presence in Europe and the Middle East, which placed US forces in a particularly favorable position to accomplish the mission. (The table at the end of this appendix highlights some of the activity that preceded this crisis.)

Few elements of preparedness can be reduced to mathematically quantifiable terms. The following sections discuss several factors that improved US armed forces' ability to react rapidly to a major crisis in Southwest Asia (SWA) only months after the Revolution of 1989 in the Soviet Union and Eastern Europe had capped a strategic shift away from four decades of deterring a global war centered in Europe. These factors include national interests, previous commitments and security agreements, planning for regional crises, training, deployment, and force modernization.

INTERESTS AND PRIOR COMMITMENTS

Military Involvement

The United States has had an enduring interest in the security and stability of the Middle East and SWA, particularly since the 1940s. In support of its objectives, the United States has maintained a presence in the region and developed programs to improve responsiveness to contingencies there.

The earliest post-World War II permanent presence in the region began in 1949 when the Commander Middle East Force (CMEF), took up station in the Persian Gulf. In 1988, CMEF became a dual-hatted position with Joint Task Force Middle East (JTFME), under Central Command (CENTCOM). Although normally less than a half dozen vessels, this task force has been a symbol of US interest in regional stability for 40 years. It has served as the base for larger US operations in the Gulf on several occasions, and it played a crucial role in the early days of this crisis. The value of this presence cannot be overstated. JTFME provided the operational expertise needed to establish patrol areas, rendezvous points, and contingency plans for responses to attacks on merchant shipping. It also made possible the rapid construction of a viable maritime interception program. The task force includes planners and staff officers from all Services and its presence is welcomed by friendly regional states.

US policy makers always have valued Saudi Arabian support for regional stability and have used several initiatives to cultivate that support. Weapons sales and infrastructure development encouraged through US Government security assistance programs were part of this strategy. For example, a large part of the Saudi infrastructure was built under Foreign Military Sales (FMS) construction programs, managed by the US Army Corps of Engineers and paid for by the government of Saudi Arabia.

After the revolution in Iran, several Presidential policies, including the Carter Doctrine, defined vital US national security interests in the region. Like their predecessors, the Reagan and Bush administrations reconfirmed the region's importance. In order to protect US interests in the Gulf, they decided to sustain a forward military presence, develop a credible capability to help regional states respond to military threats, protect freedom of navigation, and ensure the unimpeded flow of oil to global markets.

Major elements of US forward presence were JTFME and security assistance. Under US security assistance programs, training, weapons, supplies and construction assistance to develop roads and ports were provided to most countries, with the notable exception of Iraq.

An important part of the security assistance provided to regional states since World War II included training of military forces. The US provided schooling in the United States and in the region for officers and enlisted personnel through the FMS

system and the grant-aid International Military Education and Training (IMET) program. Through these diverse educational opportunities, many nations developed a familiarity with US military equipment and doctrine. Many personnel had been trained to operate equipment to the same standards expected of US service members. Many regional air forces had received some United States Air Force (USAF) training, and Saudi ground forces had been given extensive training by American military personnel. For example, the US military maintains a multi-service training mission, headed by a major general, in Saudi Arabia. Of notable importance, these training programs have fostered a mutual understanding, improved rapport, and sharpened language skills on all sides. The United Kingdom (UK) and France, both Coalition members, had provided training to regional militaries as well, as part of a long association with several regional states. Relationships which began as the by-products of training were strengthened by several US forces operations at the request of regional states.

In the aftermath of the fall of the Shah of Iran in 1979, the Department of Defense (DOD) had to reassess its ability to respond to contingencies in the region, shifting from relying on regional allies to building up our own power projection capabilities to respond to a conflict. The region had also become of greater concern because of the oil price shocks of the 1970s. A DOD study, Capabilities for Limited Contingencies in the Persian Gulf, was completed in 1979 in response to an earlier National Security Council directive requiring such a study. It and subsequent DOD reviews in 1979 resulted in program initiatives such as maritime prepositioning and improvement of facilities for enroute refueling, as well as preliminary consideration of more extensive initiatives to improve power projection. In the aftermath of the Soviet invasion of Afghanistan in December 1979, the threat of a Soviet invasion of Iran became the principal concern in the region. A host of mobility programs were initiated (Maritime Prepositioning as it now exists, procurement of SL-7s, and many others), base access was pursued with regional allies, regional exercises begun, and importantly, a new dedicated command was created -- the Rapid Deployment Force (RDF) which was given responsibility for developing operational capabilities for SWA. The Reagan administration expanded and refined the RDF initiative, transforming it into the United States Central Command (CENTCOM).

In 1980, at the request of the Kingdom of Saudi Arabia, the US deployed four Airborne Warning and Control System (AWACS) aircraft and supporting air refueling tankers to Riyadh. These aircraft provided 24-hour-a-day surveillance of the northeastern Arabian Peninsula. In addition, USAF personnel manned the Eastern Sector Command Center, working alongside Saudi counterparts. In 1988, in response to Kuwaiti requests, several Western states deployed naval forces to the region to protect shipping during the latter stages of the Iran-Iraq war. (A brief discussion of this war is contained in Chapter I.) The United States played a major role in escorting ships in the region as part of Operation Earnest Will.

Operation Earnest Will was a watershed event entailing substantial commitment of US forces under combat conditions at the request of a Gulf state. In addition to JTFME assets, the United States deployed Navy warships, a contingency Marine Air-Ground Task Force (MAGTF) embarked on amphibious ships, Army

helicopters, and Air Force aircraft to guarantee the passage of Kuwaiti ships registered under the American flag. Upon successful completion of Operation Earnest Will, the US withdrew the additional assets promptly. The trust and confidence created during this experience made it easier for friendly regional states to accept readily the US presence during Operations Desert Shield and Desert Storm. Because Operation Earnest Will was a multinational effort involving several North Atlantic Treaty Organization (NATO) partners, it set the precedent for future cooperative efforts in the region. Similarly, close collaboration of US diplomats and military officials also greatly eased the coordination of effort between US embassies in the region and DOD during the Gulf crisis.

PLANNING

Changes in the Strategic Environment

The changes in the global security environment which resulted from the Revolution of 1989 in Eastern Europe and the ongoing change in the Soviet Union caused national security planners to begin to redefine US security strategy.

During the early summer of 1990, as the dramatic events reshaped Eastern Europe and the Soviet Union, DOD had begun to incorporate the tenets of the new defense strategy President Bush announced on 2 August. Intense studies and planning had identified the chief threats to US strategic interests in the Gulf as regional rather than global. (Earlier plans for contingencies in the region were predicated on the threat of a Soviet attack through Iran. These plans envisioned such an incursion in the context of a much larger Soviet aggression that included Western Europe, in essence leading to global war.)

The new strategic framework the President articulated in August made it clear that threats from regional actors would likely be the principal challenges to peace in the rapidly changing geostrategic climate. It was understood from the beginning that such threats had to be countered decisively, and that they now could be countered without necessarily incurring the risks of a confrontation with the Soviet Union.

New Policy Assessments

In the fall of 1989, during DOD's regular planning process, the Under Secretary of Defense for Policy (USD(P)) recommended and the Secretary approved a shift in the principal US focus in the Persian Gulf. While during the 1980s DOD had focused principally on developing the power projection capabilities to counter a

Soviet invasion into Iran, the USD(P) and the Commander-in-Chief, Central Command (CINCCENT) now judged that – while still a concern worth planning against – it no longer was the most likely or worrisome challenge in the region, given the increasing turmoil and political changes in the Soviet Union and the fact that it was perceived as unlikely that Iran would ask for US assistance in a timely manner to counter such an invasion. Instead, the growing military capability and ambitions of Iraq -- with its forces toughened by its war with Iran -- and the sharp disparity between its forces and those of the wealthy oil-producing nations of the Arabian Peninsula pointed to the growing possibility of conflict between these regional powers. During deliberations for the planning process, the Secretary emphasized the continuing importance of the Persian Gulf and approved this shift in emphasis. Accordingly, the Secretary directed DOD to sharpen its ability to counter such a regional conflict on the Arabian Peninsula. In turn, the Chairman of the Joint Chiefs of Staff (CJCS) directed CINCCENT to develop war plans consistent with this shift in emphasis.

New Operations Plan

CENTCOM had long maintained a plan for the defense of the Saudi Arabian Peninsula. This plan was undergoing routine revision consistent with guidance provided by the JCS in the Joint Strategic Capabilities Plan (JSCP). The revision process was on schedule according to the agreement between the Joint Staff (JS) and CENTCOM.

In accordance with the Secretary's direction, planning for the defense of the Arabian Peninsula was elevated to the highest priority and it was accelerated with the objective of completing a comprehensive plan by July 1990 for use in a scheduled command post exercise. Significant manpower and computer resources were allocated to speed the plan.

In response to CJCS guidance and a complete mission analysis of likely contingencies, CINCCENT prepared a Concept Outline Plan (COP) early in 1990 for the defense of the Arabian Peninsula. The COP was an expansion of CINCCENT's concept of operations and was unique to CINCCENT; it is not a standard Joint Strategic Planning System (JSPS) document. The COP, based on a threat scenario developed by Defense Intelligence Agency and the CENTCOM Directorate for Intelligence (J-2), included an estimate of forces needed to respond to a regional threat. The COP, which the CJCS approved in April, provided the basis for the operations plan (OPLAN) developed in response to the Iraqi invasion of Kuwait.

CENTCOM developed courses of action for defending against an attack by Iraq. These courses of action were refined continually by planners and included war gaming against computer simulations of a conflict between US forces and the forces of Iraq that intelligence estimated would participate in an an attack on Kuwait and Saudi Arabia. War gaming simulations permitted planners to study different courses

of action in terms of equipment and personnel casualties projected for both sides and measured by an estimate of the territory that could be defended, lost, or recovered. The simulation included the contribution of air power to the ground campaign.

After an initial review of courses of action, CINCCENT approved the basic planning concept for the defense of the Arabian Peninsula which involved trading space for time as US forces reduced attacking Iraqi forces. This approach would permit US forces to continue their deployment into Saudi Arabia and complete their subsequent movement to defensive positions. US ground forces would fight a delay and avoid decisive engagement while tactical air and indirect fire by other forces continued to reduce attacking Iraqi forces. When US forces had sufficient combat power, they would conduct a counter offensive to regain lost territory.

CENTCOM draft OPLAN 1002-90 (Defense of the Arabian Peninsula) was prepared based upon the COP. OPLANs are detailed documents that require meticulous preparation, take considerable time to develop, and must be carefully coordinated. OPLAN 1002-90 had the highest CENTCOM planning priority in the Spring of 1990. The second draft of OPLAN 1002-90 was published in July 1990 with a third draft scheduled to be published in October 1990 in preparation for a Phase I Time Phased Force Deployment Data (TPFDD) conference in October/November 1990.

CENTCOM scheduled Exercise Internal Look 90 in late July 1990 to test the validity of operational and logistic support concepts in OPLAN 1002-90. Focused on an Iraqi incursion on the Arabian peninsula, the exercise revealed the need for a revised troop list, and an armor heavy and highly mobile force to fight a high-speed tank battle in the expanses of the Arabian desert. Furthermore, Exercise Internal Look 90 reviewed the current order of battle of potential combatants and provided the impetus to include Patriot as an antitactical missile capability and for protection and defense during the initial troop deployments.

Exercise Internal Look 90 also validated the concept of air defense for Saudi Arabia and provided insights on where to best position air defense aircraft. It exercised the joint air tasking order used for coordinating air operations. Boundary issues between component land commanders were given full visibility. The need to deploy additional mine countermeasures to counter the Iraqi mine threat was highlighted. All these results and lessons were subsequently applied during the formulation of the final plan.

The exercise identified the need to restructure NAVCENT command and control relationships and organization. As a result, early in Operation Desert Shield, the Commander, Seventh Fleet, (COMSEVENTHFLT) was assigned as Commander, Naval Component, Central Command, (NAVCENT) , the principal naval commander for the significantly enlarged naval force deployed to the Middle East. JTFME was disbanded, and its functions were retained by the Commander, Middle East Force, reporting to NAVCENT. The exercise also indicated the distance from carriers outside the Gulf to the battlefield and targets in Iraq reduced the number of Navy sorties

available to attack important targets and required substantial support of land based refueling. The Navy began a review of the feasibility of operating carriers in more restrictive waters and as a result, the decision was made to operate carriers in the Gulf. This increased significantly the number of carrier-based aircraft available for employment against targets in Kuwait and Iraq and reduced land-based refueling requirements.

Exercise Internal Look 90 was instrumental in refining concepts and plans by CINCCENT, his staff, and the component commanders used. With these insights, the basic concepts for Operations Desert Shield and Desert Storm were established before a single Iraqi soldier entered Kuwait.

Deployment Planning

CENTCOM OPLAN 1002-90 was undergoing final review in August 1990. Detailed deployment requirements depend on approved plan requirements. The JSCP apportions the major combat forces to support OPLAN and contingency plan CONPLAN taskings. The Services then select and identify the forces for each commander-in-chief (CINC). The CINC, through his concept of operations, then selects the forces to be used and identifies the flow of forces into the theater. Support requirements (supplies and support units) are then identified in the various TPFDD conferences.

TPFDD conferences, which involve representatives from all service elements, were scheduled for November 1990 and February 1991. A final deployment plan was due to be published in April 1991 and supporting plans in August 1991. The Iraqi invasion of Kuwait disrupted this timetable. Computerized systems can provide valuable help in constructing deployment schedules, assuming disruptions are minimal. However, as described in Appendix E, Deployment, the lack of a final TPFDD and the need to deploy rapidly certain types of units to the theater necessitated manual entry of the initial deployment data into the computer instead of using an existing data base.

Although OPLAN 1002-90 was not complete and specific deployment data was lacking, it provided a sound foundation. As with all plans, some modifications were made to account for circumstances unique to the crisis. Nevertheless, much of the OPLAN was not modified. Modification of other parts was done with relative ease compared with the requirements of starting operations without a base document.

Planning and Preparations for Joint Operations

The ability to conduct effective joint operations has been a primary DOD concern for years. The Goldwater-Nichols DOD Reorganization Act of 1986 (GNA) strengthened the system which provided for the formulation, promulgation, and periodic review of joint operations plans. GNA required the Secretary of Defense to issue contingency planning guidance that links national military strategies with the JSCP, streamlining the planning process. GNA also gave the USD(P) a role in reviewing contingency plans. GNA also strengthened and clarified the authority of the CINCs of unified commands such as CENTCOM. It also clearly defined the relationship between supported and supporting unified commands and clarified the relationship among these commands, the National Command Authorities and the military Services.

Progress made in joint doctrine development contributed to the preparation of the theater campaign plan. Joint Test Publication, *Doctrine for Unified and Joint Operations*, drafted by the Army as the JS agent and released for evaluation in 1990, served as a guide for development of the Operation Desert Storm theater campaign plan. However, problems remained. There are differences in interpreting joint doctrine, such as the concept of operations for the Joint Force Air Component Commander (JFACC) and the limits of JFACC authority over aircraft belonging to other component commanders. Not all intelligence systems were interoperable. Finally, much combined combat power achieved by the integrated theater campaign was the result of innovative procedures adopted on the scene. These innovations bridged the gaps between Service planning procedures in intelligence, operational and logistics systems; but some procedures require refinement to achieve maximum joint efficiency.

The US military was relatively well prepared to conduct joint operations when Iraq invaded Kuwait. Operations Desert Shield and Desert Storm demonstrated a quantum advance in joint interaction among Army, USAF, Marine (USMC), and Navy forces. Preparation for joint operations before the crisis meant a broad range of interdependent relationships between the Services could be tapped with little or no delay because of procedural matters. Many procedures and numerous points of doctrine had been agreed upon and, as discussed in the section on military preparedness in this Appendix, were implemented and validated by numerous joint exercises. Where agreements did not exist, previous experience with joint operations made expeditious innovation possible. Problem areas with logistics, intelligence, and operational interoperability have been identified and remedies are under consideration. Additional discussion of these points is contained in the appropriate sections of this report.

Planning and Preparations for Combined Operations

Combined operations involving armed forces of more than one nation, were a crucial part of Operations Desert Shield and Desert Storm and owe much success to advanced planning and experience. The United States conducted Combined Operations Bright Star with Egypt, as well as numerous exercises with those coalition partners belonging to NATO. This NATO experience was especially valuable for maritime interception operations in support of the UN imposed embargo on Iraq and for air and ground operations against Iraq.

NATO experiences provided a number of procedural agreements that made the interaction of these forces more efficient. NATO doctrine and exercises had provided for the sophisticated interoperability of land, air, and maritime forces. The NATO experience also eased logistics support as critical supplies such as ammunition were shifted among NATO allies. There is little doubt that basing and overflight rights were expedited as a result of alliance relationships.

There was less experience in operating with Islamic Coalition members. As described later in this appendix, some combined exercises had occurred with some Islamic members. Because the United States had developed some Arabic linguists, and because some Arab officers and noncommissioned officers had been educated in US Service schools, it was possible to establish effective communication among partners. Interactions between US and Arab land forces were managed by US liaison teams, whose linguistic and regional expertise allowed them to serve as bridges between very disparate national military forces. These skilled linguists also improved the effectiveness of the Command, Control, Coordination and Integration Center. A more detailed explanation of the interaction between Coalition members is in the appendices concerning Special Operations Forces (SOF), Coalition Development, Coordination, and Warfare, and Command, Control, Communications and Intelligence . (Appendices I, J, and K.)

TRAINING

Realistic Combat Training

High quality training was one of the more important contributors to the preparedness of US forces and subsequent success in the Gulf operations. Service and joint training centers provided realistic operational experiences, including live fire, against realistic threats, in a simulated wartime environment. The value and importance of modern tactical maneuver warfare centers, such as the Army National Training Center (NTC), the USAF Tactical Fighter Weapons Center, the Navy Strike Warfare Center (NSWC), and the Marine Corps Air-Ground Combat Center (MCAGCC) were demonstrated during Operations Desert Shield and Desert Storm.

The Combat Training Center (CTC) Program is central to the Army's strategy of maintaining a force able to deploy rapidly for ground conflict. Their program has made a greater contribution to improving and sustaining the professionalism and war fighting capability of the Total Army than any other single program. The CTCs encompass the NTC at Fort Irwin, CA; the Joint Readiness Training Center (JRTC) at Fort Chaffee and Little Rock Air Force Base (AFB),AR; the Combat Maneuver Training Center (CMTC) at Hohenfels, Germany; and the Battle Command Training Program (BCTP) at Fort Leavenworth, KS. These centers provided advanced unit training and training in joint operations for the full range of Active and Reserve Component (RC) units under realistic conditions, with immediate feedback to commanders. The exercises include live-fire scenarios involving the integration of artillery, armor, and infantry weapons as well as close air support. Nearly all US and European-based units and commanders that deployed to Operations Desert Shield and Desert Storm had trained at a CTC during the year before the war.

NTC scenarios concentrate on armored and integrated armored and light unit operations under mid to high -intensity conflict conditions. The NTC conducts 12 brigade level rotations a year. The NTC proved to be invaluable as the training ground for active and RC units preparing for deployment to the Persian Gulf. The JRTC, based on the NTC model, focuses on low- to mid-intensity contingency operations. This center trained airborne, air assault, light infantry, and other rapid deployment units, including SOF. The CMTC provides CTC training to Army forces deployed in Europe. Armored and mechanized units in the VII Corps trained there before Operation Desert Storm.

Substantial USAF participation in the Army CTCs further improves joint operations. For example, USAF units frequently have participated in exercises supporting the JRTC at Fort Chaffee. In addition to providing Army elements with close air support (CAS) and tactical resupply, USAF provides tactical training for Air Force elements. Military Airlift Command (MAC) and Tactical Air Command participate by providing the necessary airlift and CAS. Army units work with USAF elements to plan and execute deployment of personnel and equipment. CAS planning and execution is tested at all CTCs. The USAF typically provides 120 sorties for a JRTC exercise, using a variety of aircraft.

It is difficult to train an entire division or corps, because there are no training areas large enough to deploy such complex organizations. Thus, to simulate the battlefield and train higher level commanders and staffs properly, BCTP was developed to extend CTC training to division and corps commanders and their staffs. It is a two-phased program, consisting of a war-fighting seminar, followed by a computer-assisted battle simulation command post exercise (CPX), usually conducted at the corps or division home station. A BCTP team deployed to Saudi Arabia and, using OPLANs developed in theater, war gamed the various courses of actions in computer assisted battle simulation exercises, with corps and division commanders participating. This served to train division and corps commanders and staffs in theater and prepare them for offensive operations.

The USAF conducts numerous exercises at various training centers. One is Green Flag, an electronic combat exercise conducted several times each year on the Tonopah Electronic Combat Range, NV. The exercise's objectives are to improve electronic combat proficiency, train battle staffs, conduct suppression of enemy air defense (SEAD) operations, and evaluate current electronic combat systems.

Red Flag is another large scale tactical training exercise. Its purpose is to expose combat air crews to a realistic combat environment while they use their aircraft against simulated threat systems. Conducted at Nellis AFB, NV , the exercise focuses on the integration of various types of combat aircraft, with supporting aircraft such as air refueling tankers and electronic jammers, while opposing systems provide a credible air threat. Red Flag exposes air crews to the complexity and dangers associated with the first missions of any war. The exercise is conducted four to six times a year, and involves up to 100 aircraft, which fly up to 3,500 sorties in two weeks. Scenarios vary; however, the integration of attack aircraft and air-to-air fighters and the execution of the orchestrated attack plan on Nellis ranges provide a close replication of the air campaign conducted during Operation Desert Storm. The Nellis ranges are instrumented to provide real-time force attrition and accurate debriefing visualizations to enhance air crew learning and awareness in large scale operations. The exercises include elements from all Services; other nations often are represented. (The UK, Germany, Italy, France, Egypt, and Canada, among other nations, have participated in Red Flag exercises.)

Established in the mid-1980s at Naval Air Station, Fallon, NV, the NSWC is the Navy's foremost authority on strike warfare, the offensive air, land, and sea operations to destroy enemy military facilities and forces. As the single site for Navy strike warfare training, NSWC provides selected air crews and key staff personnel an intensive ground and flight training program. Prospective strike planners and strike leaders undergo a two-week Strike Leader Attack Training course. Air crews and staff also deploy to Fallon as an integrated air wing for a three-week course which includes exposure to realistic combat scenarios. Air crews plan, brief and fly simulated combat missions against an integrated air defense system using surface-to-air and air-to-air threats. Hundreds of missions are flown over the highly instrumented range complex, using the latest integrated air wing tactics. Crews return to an extensive debriefing including high-technology wide-screen displays to show the entire mission and to highlight the key lessons. The training provides the most realistic combat training available and prepared air crews well for Operation Desert Storm.

The Navy also has established Fleet Combat Tactical training centers (FCTC) and a Battle Group Tactical Training Continuum (BGTT) to support the carrier battle group's (CVBG) preparation for deployment. Before deploying to SWA, nearly every CVBG had the opportunity to train both in port and at sea. The FCTCs and the BGTT's Tactical Training Groups (TACTRAGRU) are in both Dam Neck, VA, and San Diego, CA. FCTCs provide realistic tactical training to individual units and CVBGs while in port. The TACTRAGRUs provide training in coordinated tactical warfare against multiple threats in a battle force environment, and have been stressing joint training in recent years. Integral to the BGTT is the Enhanced Naval Warfare Gaming System

(ENWGS). ENWGS assists fleet and CVBG staffs in examining organizational and command and control (C2) concepts, and testing staff management and tactical proficiency in Fleet training scenarios. ENWGS supports training in all naval warfare areas (e.g., antiair, antisurface, antisubmarine, and amphibious warfare). During preparations for Operation Desert Storm, CVBG commanders used ENWGS extensively to develop warfighting capabilities for the unique SWAsituation.

The MCAGCC at 29 Palms, CA, is the USMC's premier CTC. The MCAGCC combined arms exercises provide the only opportunity in which the full range of combat capabilities can be tested. Air-ground task forces regularly conduct live-fire maneuver exercises that integrate ground and air weapons in an environment that closely simulates combat. Ten battalion or regimental sized task force rotations, involving both regular and Reserve Component (RC) forces, are conducted each year; each rotation lasts three weeks. Task forces consist of ground, aviation and combat service support (CSS) elements formed and deployed in accordance with MAGTF doctrine. These components participate in a live-fire training program that emphasizes Command, Control, Communications and Intelligence (C3I) in fire support coordination in combined arms operations, with priority placed on air-ground integration in mechanized warfare and rapid movement across hundreds of kilometers of desert terrain.

There were two specific instances in which training at 29 Palms proved invaluable in preparation for Operation Desert Storm. First, the 2nd Tank Battalion, and two companies from the Reserve 4th Tank Battalion deployed to MCAGCC during November to train on newly acquired M1A1 tanks. These Marines conducted gunnery, maneuver, and combined arms training to qualify with these tanks. Crews of the 4th Tank Battalion played an important role in exploiting the Marine breach into Kuwait during the ground offensive.

The second, and perhaps the most important, MCAGCC contribution during the crisis, was the development and testing of engineering equipment and techniques for minefield and obstacle breaching. The Reserve 6th Combat Engineer Battalion constructed extensive models of Iraqi obstacles and conducted breaching exercises to evaluate newly fielded equipment and test tactical concepts. These were crucial to the success of the combat engineer teams that were to cut gaps in Iraqi defenses.

Through its exercises before the Gulf crisis and its training in the months before Operation Desert Storm, the MCAGCC had prepared the Marines extensively for the combat challenges they faced in SWA.

Combined and Joint Exercises

Large scale exercises provide an opportunity to synchronize maneuver and support forces in realistic, stressful situations. Short of combat, exercises are the best

method to determine training and readiness strengths and weaknesses. Often, exercises involve operations at the centers discussed in the section on training or in environments similar to the ones in which forces are expected to fight. In recent years, several training initiatives, including exercises and deployments, were designed to present challenges similar to those involved in moving troops and materiel enormous distances. Many involved major multinational training commitments which, as mentioned previously, helped develop the procedures that facilitated combined operations during the crisis. A discussion of some of these exercises will underscore this point.

One of the more important training exercises during the 1980s was the Gallant Eagle series. These war games involved large scale air, land, and sea maneuvers in California and Nevada. They were designed to simulate the rapid intervention of US forces to help an allied nation repel an invasion force.

US forces also have participated in combined and joint exercises in the Gulf region for several years. The major exercise in the region was Bright Star, conducted in Fiscal Years 83, 85, 87, and 90. Bright Star is a large scale deployment exercise with US forces deployed to Egypt, Oman, Jordan, Somalia, and Kenya. Major participants include Army Component, Central Command and Air Force Component, Central Command. USMC participation has included all levels of MAGTFs: Marine Expeditionary Units conducting amphibious landings; Maritime Prepositioning Force brigades unloading equipment and supplies; a Marine Expeditionary Force command element participating in CPX as well as deployment exercises (e.g. Bright Star). All units were combined and a full range of training was conducted. CVBGs also participated at sea and with strikes ashore. For example, the *USS Saratoga* (CV 60) Battle Group participated in Bright Star 87. Several small scale SOF deployment exercises to SWA also have been conducted during the past several years. In addition, CENTCOM periodically has conducted training exercises in the continental United States using a SWA scenario. An example of this sort of exercise was Exercise Internal Look 90 discussed earlier.

One of the more important joint and combined exercises instrumental in preparing US forces is the annual Return of Forces to Germany (REFORGER) exercise. Although focused on a completely different part of the world, REFORGER exercises provided an opportunity to test doctrinal and tactical concepts. Many RC elements were mobilized and deployed as they would be under actual crisis conditions. Of equal importance, forces gained experience deploying under tight time schedules, in shipping equipment by air and sea, and in operating with prepositioned equipment. Strategic lift systems were used as were deployment management systems. In all, REFORGER provided large scale training for the requirements of Operations Desert Shield and Desert Storm.

Other important exercises included multi-CVBG training exercises including FleetEx, Northern Wedding, and PacEx. While these were conducted outside of the CENTCOM area of operations, they played an important role in developing multi-carrier battle group operations, tactics, and skills.

Training In-Theater

The availability of time to train in theater, ranging from a few days to several months, proved invaluable. Initially, the broad spectrum of mission-essential requirements was reviewed to determine the deployed and deploying forces' live-fire and maneuver area needs. By the end of September, live-fire and live bombing practice ranges were established in the Saudi desert for training. Training to that point included cultural and regional orientation as well as multi-echeloned training such as decontamination exercises, squad and platoon maneuver live fire exercises, CPXs at all levels, and indirect fire integration exercises that included joint and combined forces.

By mid-October, training had evolved to company- and battalion-level exercises, artillery live firing, Joint Air Attack exercises with the USAF, and combined fire coordination exercises with Saudi and other coalition forces.

Forces conducted repeated rehearsals of virtually every aspect of defensive and offensive operations. Rehearsals and backbriefs of combat plans and maneuvers were conducted regularly as a result of numerous training exercises including battle drills, battle staff training, gunnery, and mass casualty exercises. Among these in-theater rehearsals were the widely publicized USMC amphibious operations. Less visible than the landing rehearsals, but equally crucial, were countless ground force obstacle-breaching rehearsals.

The threat of chemical or biological attack forced allied units to train and operate frequently in a Mission-Oriented Protective Posture (MOPP). All units deployed to SWA with standard chemical and biological defense equipment; these were used extensively both in training exercises during the buildup phase and during the offensive operations. Extensive training, in the form of battle drills and rehearsals in full MOPP, acclimatized forces so the additional stress of this protective equipment would not slow unduly the pace of operations. Based on this extensive training, commanders and troops expressed confidence in their ability to survive chemical/biological warfare (CW/BW) attacks and continue to fight. (Additional discussion on CW/BW is in Appendix Q.)

Aviation units with CAS missions practiced with ground units. Navy, USMC, and USAF strike forces and Army aviation attack helicopters thoroughly rehearsed their missions. Individuals and units endlessly repeated CW/BW defensive drills. Naval units en route to and in the theater conducted Rules of Engagement exercises. These regularly scheduled and coordinated exercises were designed to ensure US forces understood their obligations under international law.

The ability of units to adapt quickly to the particulars of the Saudi environment is a product of the Service's training doctrine. Training conducted in-theater was essentially the same as that done as a rule throughout the Services. Tough, realistic training at home stations and in-theater served the US military well in the preparation for and the conduct of the war. The result of this training was to

raise US forces to an exceptional peak of combat readiness and to maintain that peak throughout the crisis.

DEPLOYMENT PREPAREDNESS

Strategic Lift

Military preparedness includes the ability to project forces into a crisis area. Determination of preparedness levels must include an assessment of the quantity and readiness of deployment forces, capabilities, and prepositioned assets. Other sections of this report focus specifically on deployment and more detailed information is contained in those discussions. (See Appendices E and F.) However, the following overview will improve the overall discussion of preparedness in this appendix.

Airlift readiness was a key factor in US preparedness to project power rapidly. MAC has a peacetime mission serving a worldwide network of military and other governmental customers. The strategic airlift fleet – active duty USAF, Air Force Reserve, and Air National Guard – on the eve of Operation Desert Shield consisted of a total inventory of 265 C-141s and 126 C-5s. The Civil Reserve Air Fleet (CRAF) represents investments in preparedness extending back to the 1950s and was available to help in deployment and sustainment operations. Tactical airlift with C-130 aircraft maintained a rotational squadron flying airlift missions throughout Europe and SWA, supplementing the C-130s based at Rhein-Main Air Base, Germany. Because of these requirements, airlift was available almost immediately to begin moving personnel and equipment to and within the region. In a sense, the investment in aircraft to help in peacetime operations provided a dividend in the form of ready availability during crisis.

Military Traffic Management Command (MTMC) readiness was shown in the early loading in the Continental United States (CONUS) of the 24th Infantry Division (Mechanized) through Savannah, GA, the 101st Airborne Division (Air Assault) through Jacksonville, FL, and the XVIII Airborne Corps through Wilmington, NC. MTMC also demonstrated expertise by rapidly loading VII Corps through European ports on short notice and during severe weather. MTMC's Reservists, including 200 volunteers in August, were crucial to efficient operations and performed very well. These volunteers supervised the loading of early deployers until other Reservists were available.

Approximately $7 billion was invested to improve sealift during the 1980s. That investment provided the Military Sealift Command (MSC) a force structure with specific programs designed to improve mobilization and deployment of US armed forces. These programs included the Afloat Prepositioning Force, Fast Sealift Ships, and the Ready Reserve Fleet (RRF). Ships could have been added to the MSC fleet

from the Sealift Readiness Program (SRP) or through requisitioning, although the ready availability of other sources of sealift made this unnecessary. Prepositioning ships were available and arrived in the region relatively quickly. However, sealift was degraded by previous decreases in maintenance and exercise funds. Given the resources available, sealift was relatively well prepared.

One key to the effectiveness of strategic lift is the availability of aerial and sea port facilities, overflight rights and en route bases to support deployment. The availability of these assets, both in the US and overseas is an example of sound defense planning. Air and sea ports in the United States that could accommodate the deployment of large numbers of service members and their equipment had been identified. In the case of military terminals, many needed facilities were constructed years before the crisis. Facilities to load heavy equipment onto rail cars and ships also were available.

Bases to provide refueling and other support to air and sea transport were available in Portugal, Spain, Germany, Italy, UK, France, Greece, Egypt, and Turkey. Many of these facilities, such as Rota, Spain, were made available on very short notice – sometimes only a few hours. While availability of such bases became routine as the crisis lengthened, it is worth noting that availability in the crucial first days required rapid decisions by all governments involved. Many governments had not yet publicly declared their support for US initiatives and were unsure of the temper of their constituents with respect to the crisis. Nevertheless, rights were made available when the deployment began, in part owed to previous US security relations with these states, including security assistance programs, and the quick actions of State Department officials.

Ports of embarkation and support en route are crucial to deployment; however, equally as crucial are ports of debarkation within the crisis area. Largely because of previous programs, Saudi Arabia had a sophisticated air and sea port infrastructure. State of the art debarkation sites were available in harbors and at airfields. Although not all desired facilities were made available, substantial assets were designated for deployment and sustainment support.

Decisions to release ramp space at Saudi airfields required time. Some ramps were dedicated to reception of Saudi national aircraft or the aircraft of other nations. In other cases, dormant ramp space had to be brought on line. There also were concerns about the adequacy of airfield refueling facilities and, initially, there were concerns about the reliability of third country refueling crews. Although some delays were experienced initially, most problems were overcome quickly.

Seaports in Saudi Arabia were among the more advanced in the world, with a substantial number of berths and modern materiel handling equipment. However, the ability to move goods through the ports quickly was constrained by an inadequate road system away from the coastal region. This caused a backlog of supplies and equipment to develop at the ports. The problem was compounded by a lack of suitable warehouse space at the ports to accommodate this backlog.

Prepositioned Equipment.

Prepositioning equipment and sustainment supplies is an important strategic lift multiplier that reduces the initial strain of air and sealift and provides deploying commands with substantially increased flexibility. Whether ashore or afloat, prepositioned materiel is available readily and can be brought to bear on a crisis virtually as soon as units can be airlifted to it.

In depth discussions of prepositioning and its implications are in Appendices E and F. From the standpoint of preparedness, DOD had invested substantially in stocks and in the establishment of storage facilities on ships and at selected sites within the Persian Gulf region. These investments were complemented by plans to deploy forces to the appropriate locations quickly. As described in the discussion of deployment, lessons were learned from Operations Desert Shield and Desert Storm to improve prepositioning. However, on the whole, current prepositioning programs improved US preparedness markedly.

FORCE MODERNIZATION

Another aspect of military preparedness is the level and state of force modernization. Modernization is a continuous process by which the Services develop and field warfighting capabilities designed to take advantage of technology and to counter potential threats. There are several aspects of force modernization. While the focus in this discussion is equipment modernization, equally important are the development and implementation of modern doctrine, organizations, leader development, and training programs to capitalize on the capabilities of this equipment and, in some cases, determine what additional types of equipment should be procured. Force modernization ensures the United States maintains its superiority in research and development (R&D) and fielded high technology systems.

Force modernization before and during Operations Desert Shield and Desert Storm improved combat capabilities and force preparedness and readiness. Investments in R&D, and testing and evaluation (T&E) during the past several decades produced systems used during the war. The armed forces deployed for operations in the Persian Gulf benefited from the leadership of previous Presidents, government, congressional, and DOD leaders.

The forces in Operations Desert Shield and Desert Storm deployed both old and new equipment. Some systems had been used in combat before the Gulf War, but most were not yet combat proven. Some equipment still was in the developmental stage when the war began and was used before completion of normal research and development and test and evaluation programs. Acquisition of

a number of these systems was accelerated and sent directly to the theater for use by US forces.

The fact the United States has such a menu of defense hardware in research or in development with options to deploy contributed to the ability to respond on 2 August in at least two ways. First, there was a highly modernized force of aircraft, ships and ground forces with appropriate C3I deployed in significant numbers. In addition, there were numerous systems in various stages of R&D, some of which were accelerated to the field. There also was an industrial base and an acquisition process able to take several needed items from concept through R&D and deployment to the field during the conflict. These systems and technologies were in either in research (early in development), in full scale engineering development, or in early stages of development before deployment.

Perhaps the salient example of a system in an early stage of research was the Joint Surveillance Target Attack Radar System (JSTARS). This prototype system provided both wide area coverage and more focused views of moving or fixed equipment of interest. Other examples of R&D systems that were accelerated and fielded included the Constant Source intelligence fusion system, the Standoff Land-Attack Missile (SLAM), the Advanced Medium Range Air-to-Air Missile, the Army Tactical Missile System (ATACMS), JSTARS Ground Support Module (GSM), and the Light Applique System Technique ceramic armor for the USMC Light Armored Vehicles (LAV).

Examples of systems in low rate, early production that were accelerated by the acquisition system included the Low-Altitude Navigation and Targeting Infrared System for Night (LANTIRN) for the F-15E and F-16, and the associated targeting pod for the F-15E. Perhaps most remarkable were a few systems that were taken from concept to fielding in the time allowed, such as the Guided Bomb Unit (GBU-28) laser-guided 5,000-lb bomb, and an initial, but limited number of identify-friend-or-foe (IFF) beacons for US armored vehicles.

Army Modernization

The modernization effort so successful in Operations Desert Shield and Desert Storm is the result of a modernization program begun in the 1970s. Army forces benefited from a coherent, integrated and dynamic modernization strategy with the goal of increasing warfighting capability and ability to survive in combat by taking advantage of technological strengths. Driven by this goal and in accordance with established modernization principles ("first to fight" units have priority; field deployable, sustainable systems that are lethal and improve survivability; field advanced warfighting capabilities before potential opponents; design equipment for future modernization; and, modernize by force package according to unit missions and potential for use), ground force modernization resulted from normal

planned programs as well as Operations Desert Shield and Desert Storm unique initiatives.

Before notification for deployment, many units already had been equipped with modernized weapons, equipment and munitions developed during the past several decades. The M1A1 Abrams tank, M2 and M3 Bradley fighting vehicles, Patriot missile, M9 Armored Combat Earthmover, Multiple Launch Rocket System (MLRS), High Mobility Multi-Purpose Wheeled Vehicle (HMMWV), the AH-64 Apache helicopter, and OH-58D Kiowa helicopter were established in units prior to August.

Once deployment began, a major effort was undertaken to provide Army forces with the most modern and lethal weapons and support systems in the Army inventory. Modernization initiatives included equipping three divisions and an armored cavalry regiment (ACR) with M1A1 Abrams tanks (with 120-mm gun); one division and two ACR with improved, high survivability M2A2/M3A3 Bradley fighting vehicles; and numerous units with M9 Armored Combat Earthmovers; optical laser protection for all improved TOW vehicles and HMMWV TOW systems. Also fielded during the crisis were two M270 deep attack MLRS launchers capable of firing the Army Tactical Missile System (ATACMS); approximately 1,000 Heavy Expanded Mobility Tactical Truck (HEMTT) for divisions and ACRs; six divisions, one brigade and two ACRs worth of HMMWV light tactical vehicles; and three battalions of AH-1F helicopters. Some new equipment - notably the Small Lightweight Global Positioning System Receiver (SLGR) - was procured commercially specifically to meet SWA requirements. A few developmental systems, such as JSTARS, communication, command, and control projects also were fielded quickly and played crucial roles.

Several systems were upgraded or modified to address concerns associated with the theater. For example, the M1A1 tanks were given heat shields, armor plates, and an optical improvement program which increased fire prevention, survivability, and lethality. Helicopters were modified with the engine advanced particle separator and blade taping, both of which addressed the maintenance problems encountered as a result of the desert environment. Upgrades to the Patriot PAC-2 missile software improved lethality, range and capability. More than a dozen modifications were applied to systems in SWA.

Completing Army modernization initiatives, ammunition and missile deliveries were accelerated and assets diverted from units not scheduled for deployment. Similar support was provided to other services, most notably providing the USMC with M1A1 tanks, mine/countermine devices, and engineer systems.

The Army's success on the battlefield, was due, in large part, to the technological advantages afforded by modernized systems. Most systems met or exceeded performance requirements. Their contributions during the theater campaign were substantial. The M1A1 Abrams tank and the M2 and M3 Bradley fighting vehicles were effective. The AH-64 Apache helicopter was proven against armor and hard targets. the M9 increased mobility on the battlefield . Army deep attack artillery (ATACMS MLRS) provided a crucial asset for SEAD. The Patriot was key in keeping Israel out of the war and provided the only fielded anti-Scud

capability. The SLGR proved invaluable in allowing Coalition forces to bypass enemy kill zones, navigate unmarked terrain, use artillery rapidly, improve C2, and reduce fratricide. The HEMTTs delivered fuel and cargo when no other vehicles could move in the desert.

Indeed, before the ground offensive campaign began, all essential CINCCENT requested Army modernization objectives were achieved. The modernization underscores a profound lesson for the future - modern warfighting capabilities are essential for US forces to be successful on the modern battlefield.

Air Force Modernization

USAF modernization efforts since the late 1970s also paid dividends during Operation Desert Storm. Revolutionary aircraft such as the F-117, evolutionary aircraft such as the F-15E, and the solid designs of the F-16, F-15C, and A-10 contributed to the success of the strategic air campaign and air operations. The performance of these aircraft, as well as that of others, was improved through the addition of several new systems and recent modifications.

The *Pave Tack* infrared navigation and targeting pod allowed the F-111 to use precision guided munitions with lethal accuracy. The LANTIRN pod carried on the F-15E and some F-16Cs, and the F-15E's LANTIRN targeting pod (which was still under development at the start of the conflict) allowed aircraft to fly and fight more effectively at night.

The combination of new aircraft systems and improved air-delivered weapons developed during the last decade has been effective. For example, the improved 2,000-lb bomb mated to a laser guidance kit became the GBU-27. Delivered by the F-117, the GBU-27 could penetrate all but the hardest and deepest Iraqi targets. To be able to destroy targets impervious to the GBU-27, the USAF developed and tested the GBU-28 bomb (5,000 pounds) in less than six weeks. The GBU-15, another precision guided weapon, allowed the destruction of point targets from moderate standoff ranges. Improved antiarmor munitions like the AGM-65D imaging-infrared Maverick, CBU-87 Combined Effects Munition, and CBU-89 Gator mines were very effective against Iraqi armor and artillery. Additionally, 500-lb GBU-12 laser-guided bombs proved to be a very cost effective munition for use against Iraqi dug-in armor. GPS greatly increased target acquisition and blind bombing of area targets. High-speed antiradiation missiles (HARM), with precision targeting information from F-4Gs equipped with APR-47 electronic receivers, destroyed many mobile Iraqi threat radars. Newer versions of the proven air-to-air missiles, the AIM-7 Sparrow and AIM-9 Sidewinder, accounted for the majority of kills of Iraqi aircraft in air-to-air combat, performing with nearly the exact success rate predicted by pre-war training and testing.

Modernization of support aircraft and systems also contributed significantly. KC-10 and KC-135R tankers were able to refuel more aircraft per mission than the older KC-135A models, thus playing a key role in maintaining the tempo of the war. The C-141B stretch/aerial refueling modifications and the C-5A wing replacement program greatly increased strategic lift capability. Improvements of C2 aircraft systems kept commanders aware of what was going on in their sectors of responsibilities. Two JSTARS still in developmental testing and evaluation when they deployed to Saudi Arabia provided unique advantages. Tracking most ground force movements, the system was one of the key elements of the Scud-hunting effort. Working with Coalition attack aircraft, it effectively denied the enemy a night sanctuary and kept continual pressure on Iraqi forces in the theater.

Navy Modernization

Navy modernization included both ships and aircraft, which received new or upgraded weapons systems to improve their warfighting capabilities and keep pace with global threats. Navy Tomahawk Land Attack Missiles (TLAM) were used in combat for the first time in Operation Desert Storm. The weapon's success confirmed the results of operational testing in the 1980s and demonstrated the value of distributed firepower since TLAMs were launched from both surface combatants and submarines. The TLAMs uses a wide array of advanced technology. Launched with a solid rocket booster and propelled by a turbofan engine, the missile follows complex guidance commands from its on-board computer. Skimming the desert floor at 100 to 300 feet, it literally reads the terrain to avoid enemy radars and other defenses as it navigates to the target. TLAMs were effectively used against a wide array of targets, including CW and nuclear weapons facilities, surface-to-air missile sites, and C2 centers.

An upgraded A-6 aircraft was the principal long-range Navy strike aircraft in Operation Desert Storm. It performed well in an environment of established air superiority, using a wide variety of precision weapons including laser-guided bombs, HARMs, and the first successful use of the new SLAM in combat.

The F/A-18's performance confirmed the validity of the multi-mission strike/fighter concept. The EA-6B and other defense suppression aircraft were instrumental in the air operation's success. The F-14 was the primary fighter for the Navy during Operation Desert Storm and will remain the principal Navy fighter for the foreseeable future.

USS Avenger (MCM 1), the Navy's newest and most capable mine countermeasures ship, used the AN/SQQ-32, a sophisticated mine hunting sonar, to detect moored and bottom mines in shallow and deep waters. Using this sonar, *USS Avenger* successfully detected, classified and marked a bottom influence mine similar to the type that struck *USS Princeton* (CG59). *USS Avenger* also used the AN/SLQ-48 mine neutralization system (MNS) to locate, examine and destroy mines.

The MNS consists of a remotely piloted submersible vehicle equipped with sonar and two television cameras for locating mines, explosives for neutralizing mines, and cable cutters for cutting a mine's mooring so it floats to the surface for destruction.

Marine Corps Modernization

USMC modernization before the Persian Gulf crisis involved wide-ranging overhaul of both ground and air elements during the preceding decade. During the late 1980s, the LAV family of vehicles, consisting of scout and reconnaissance, antitank, mortar, command, and logistics variants, entered service in each division, adding substantial mechanized capability. Equipment modernization programs completed in the late 1980s included the M198, 155-mm howitzer, which replaced the aging and shorter range M101 105-mm and M114 155-mm. howitzers; the HMMWV; Kevlar body armor; the TOW-2 antitank missile system; and a new, longer range 81-mm mortar; and new small arms and infantry weapons ranging from the M16A2 rifle to the MK19 40-mm grenade launcher. Logistics capabilities were improved by the introduction of the Logistics Vehicle System (LVS) and the M900 series of trucks. Not only was Marine units' equipment modernized, but older equipment aboard maritime prepositioning ships also was replaced during scheduled maintenance cycles.

Marine armored capability remained dependent on the venerable M60A1 battle tank, with its 105-mm main gun. These tanks, scheduled to be replaced by the M1A1 beginning in 1991, still formed the core of Marine tank units during the war. Delivery of initial M1 tanks was advanced to October, when the Army provided 108 tanks to the USMC. These were issued to the 2nd Tank Battalion of the 2nd Marine Division and attached elements of the reserve 4th Tank Battalion when deployed to SWA.

Perhaps the most innovative new item was the Pioneer Unmanned Aerial Vehicle (UAV). This system allowed real time reconnaissance and provided a capability to adjust supporting arms fires in hostile enemy airspace virtually undetected.

USMC aviation modernization programs provided up-to-date multi-purpose equipment. Beginning in December 1982, the first F/A-18 entered service, replacing F-4 fighters. By 1991, transition to this new aircraft, with its dual fighter and attack capability had been completed. New fighters also were placed in Reserve squadrons. Included in this modernization was the introduction of the F/A-18D, a two-seat attack aircraft that carried forward looking infrared radar (FLIR). During the crisis, this aircraft was used extensively for airborne forward air control of close and deep air support missions, markedly improving attack accuracy and reducing the chances of fire from friendly forces.

The AV-8B, introduced in 1983, improved the ability of USMC aviation to support Marines on the ground by enabling aircraft to be based near ground commanders, greatly reducing response times. The OV-10 observation aircraft was in the midst of a Service Life Extension Program, which upgraded the largely visual capabilities of the OV-10A to the day-night capabilities of the OV-10D with improved avionics and FLIR. Both types of aircraft were deployed.

CH-53E heavy lift helicopters were introduced during the 1980s. This helicopter nearly doubled lift capability from the older CH-53D. The CH-53E was able to lift up to 32,000 pounds of cargo and was equipped for aerial refueling. The AH-1W attack helicopter, with Hellfire antitank missiles and improved night vision systems, had begun to replace the older AH-1T in the late 1980s. Although the change had not been completed in August, those helicopters that were available improved USMC antitank capabilities. While Marine helicopter aviation generally had been modernized during the 1980s, a shortfall continued to exist in terms of medium lift. The aging CH-46, in service since the mid-1960s, is rapidly nearing obsolescence. Its short range and relatively slow speed limited its tactical use, particularly for long-range amphibious assaults.

Other Modernization Issues

The ever increasing demand for real-time information exchange and command, control and communications (C3), was stretched to the limit during the war. Tactical satellites (TACSAT) is an area that should be exploited further for combat use, including space-based TACSAT systems for weather and tactical ground systems. A need to continue development and procurement of such items as a GPS, other space-based systems and anti-fratricide systems were identified.

Development and procurement of items such as the global positioning system and its user components must continue. Solutions to the difficult problems of detecting and targeting mobile relocatable targets and sorting out friend from foe on the fast paced modern battlefield must be found. There is a recognized need to improve the capability to deliver precision-guided munitions in all weather conditions, and to rapidly compile and disseminate accurate battle damage assessments. Finally, and equally important, problems in the orchestration of air war emphasize the need to develop interoperable systems for passing air tasking and intelligence data quickly to tactical units in all Services. (A discussion of some of these systems is in Appendix K)

Modernization of strategic depioyment capabilities by land, air, and sea must continue to ensure future national security objectives can be met.

PUBLIC AND FAMILY SUPPORT

An aspect of US preparedness that was fundamental to success was the tremendous support US forces received from the American people and family support programs within the respective Services. Public support was instrumental in the high morale and outstanding performance of US forces. US forces knew the American people were behind them. The Services' support for families of deployed forces played a crucial role in the ability of US forces to respond quickly and for a sustained period of time. Family support plans, support groups, and assistance programs were developed to take care of deployed forces families. Deployed soldiers, sailors, airmen, and Marines took great comfort knowing this. These programs contributed to the overall preparedness of US forces in future operations.

SUMMARY

The high level of US preparedness clearly contributed to the tremendous success in Operations Desert Shield and Desert Storm. This preparedness was a product of years of involvement and forward presence in the region; longstanding security assistance programs; previous detailed crisis planning by the Office of the Secretary of Defense (OSD), the JS and CENTCOM; investments in quality people; tough, demanding, and realistic training; and, force modernization programs that provided US forces with the best equipment possible. Most importantly, US forces had the American people behind them and they knew, as they deployed, their families were being cared for. In these respects, US forces were trained and ready to go to war.

OBSERVATIONS

Accomplishments

- US forces were well prepared for Operations Desert Shield and Desert Storm.

- Previous commitments to the region, a US forward presence, exercises, basing and access arrangements in and enroute to the region – supported in large part by longstanding, security assistance arrangements – improved preparedness.

- Planning for crises in the region began long before Iraq's invasion of Kuwait. These plans were based on Secretary of Defense and CJCS guidance and detailed analyses of the region. CINCCENT had developed a plan for the defense of the Arabian peninsula and had tested that plan immediately before the crisis. Lessons learned from that exercise provided much valuable information with which to modify the plan to fit the situation.

- Joint doctrine and exercises prepared US forces for operations with each other and with the forces of Coalition states.

- Training at sophisticated CTCs whose scenarios closely approximate actual combat prepared service members for Operations Desert Shield and Desert Storm. Large scale exercises provided interoperability and deployment experience.

- R&D choices, together with procurement decisions, made state-of-the-art equipment available to all Services.

- Family support programs were organized to provide support, information, and assistance to families of deployed soldiers, sailors, airmen, Coast Guardsmen, and Marines.

Shortcomings

- Deployment data was not fully developed in August. Initial deployments were done manually rather than automated. In this sense, US forces were not as well prepared as they might have been; however, innovation on the part of deployment managers in all organizations made the system work despite problems. Deployment data depends on approved plans and there is always the risk that plans will not be fully mature or that developments will require changes. The solution is to continue to develop automated systems that can respond rapidly to emerging requirements.

- Initial deployments were slowed because not all debarkation facilities were available. Lack of information on availability of support equipment and facilities delayed decisions and impeded the flow of in-bound personnel and equipment. One solution to problems of this nature is to conclude host nation support agreements long before projected need. This procedure for prior agreements has been used in Europe for years; it has relevance for regional contingencies as well.

- When road and rail infrastructure is inadequate, tactical airlift can improve intratheater transportation if enough airports are available.

- Insufficient numbers of large, roll-on/roll-off (RO/RO) ships, and the RRF slow response precluded CINCCENT from building combat power as rapidly as the situation required. Strategic sealift could not meet the requirements for rapid lift.

Issues

- Preparedness for future conflicts begins long before the crisis. In many respects, the forces that go to war are the forces inherited as a result of earlier decisions.

- As forces are drawn down and the defense budget becomes smaller, it is important to continue to improve those things that contributed to the preparation of forces for Operations Desert Shield and Desert Storm. These include: forward presence and military-to-military contacts to facilitate regional operations; security assistance to improve regional stability through the transfer of equipment and the provision of services and training; sound analysis and planning guidance that improves operational plans; joint and combined training and exercises under realistic conditions; and, continued investments in deployment infrastructure, mobility capabilities, and R&D.

- Maintaining a technological edge is one of the more important aspects of preparedness. As regional threats become more sophisticated, technology becomes more important to deter crises and to protect US interests. However, technology is only one part of an overall structure, and the edge in high quality service members who can use advanced equipment in innovative ways also is crucial.

TABLE 1, Appendix D

HISTORY OF DEFENSE PLANNING AND PROGRAM DEVELOPMENT FOR PERSIAN GULF/SOUTHWEST ASIA PRESENCE AND CRISIS RESPONSE

The following highlight the key decisions and major events in the policy and programmatic actions to develop and improve US defense capabilities in the region:

1951

The Army Corps of Engineers (COE) involvement in Saudi Arabia began with the rebuilding of the airfield at Dhahran. COE completed the construction of the Dhahran Civil Air Terminal in 1961.

15 November 1951

United States Military Assistance and Advisory Group (MAAG) to Saudi Arabia established to complement COE efforts in the Kingdom.

2 April 1957

United States MAAG to Saudi Arabia expands to become US Military Training Mission (USMTM), now the largest US security assistance organization in Asia.

May 1965

The US Ambassador to Saudi Arabia and the Saudi Minister of Foreign Affairs signed the Engineer Assistance Agreement in which the US agreed to provide advice and assistance for construction of certain military facilities for the Saudi Ministry of Defense and Aviation (MODA).

1972-88

COE directed five major construction projects funded entirely by the Kingdom of Saudi Arabia at a total cost of $14 billion. King Khalid Military City was completed in 1988 as part of this program.

1976 Saudi Naval Expansion Program

The US began sales, training, and logistics support in the expansion and modernization of the Saudi Navy.

1977 Presidential Review of US Regional Security Commitments and Capabilities

Conducted primarily within the Office of the Secretary of Defense, the effort resulted in a series of Presidential Review Memorandums (PRMs), including PRM 10 that stipulated the need for:

- A limited number of relatively light combat forces (such as USMC divisions and some light Army divisions).
- Naval and tactical air forces.
- Strategic mobility forces with the range and payload to minimize dependence on staging and logistical support bases.

July 1977

The US and Bahrain concluded an agreement for continued leasing of docking and shore facilities by the US Middle East Force (which had been stationed at Manama since 1949).

July 1978

Presidential Directive 18 identified a strike force of about 100,000 troops to respond to regional contingencies. Department of Defense identified two Army divisions, one heavy and one light, and a USMC amphibious force. The Pentagon also was instructed to increase its strategic airlift and sealift capability so it could quickly transport these forces to potential combat zones. The strike force was to be backed up by two to four aircraft carrier task forces and by up to three USAF tactical air wings totaling about 200 airplanes.

25 January, 1979

In his second annual report to the Congress, Secretary of Defense Harold Brown spoke of rapid deployment forces, saying that"we must have sufficient capabilities to permit the rapid movement of substantial forces to threatened theaters."

June 1979

As a result of the Iranian Revolution and increasing tension, the Secretary of Defense increased naval task force deployments to the Indian Ocean from two every other year to four a year and gradually expanded the duration of the deployments.

August 1979

In Department of Defense (DOD) Amended Program Decision Memorandum, maritime prepositioning was announced. It encompassed a combination of airlift and sealift, to include 13 Maritime Prepositioning Ships (MPS). These would carry the equipment and supplies for three USMC Amphibious brigades for a rapid global response capability.

1 October, 1979

In an address to the Nation, President Carter announced that "rapid deployment forces" would be used to meet contingencies anywhere in the world. This publicly announced the new US emphasis on the importance of an intervention capability to be used in Third World contingencies.

5 December, 1979

At a press conference, Major General P.X. Kelley, Deputy Chief of Staff for Requirements and Programs at Headquarters USMC revealed the Secretary of Defense had ordered the USMC to organize a 50,000 man spearhead for the Rapid Deployment Force (RDF). He also discussed the MPS program and underscored the glaring deficiency "in strategic mobility assets, particularly airlift" to respond to contingencies.

13 December, 1979

Secretary Brown described before the Senate Armed Services Committee the initial programs for improving rapid deployment capabilities. Previewing the FY81 budget and the FYDP, the Secretary said: "We are undertaking two major initiatives to help the US cope with crises outside Europe. The first will be Maritime Prepositioning Ships that will carry in dehumidified storage the heavy equipment and supplies for three Marine brigades. These ships would be stationed in peacetime in remote areas where US forces might be needed. The Marines would be airlifted to marry up with their gear and be ready for battle on short notice. The other initiative will be the development and production of a new fleet of large cargo aircraft able to carry Army equipment, including tanks, over intercontinental distances. These aircraft would be used initially to deliver the outsize equipment of the advance forces necessary to secure air bases or the ports or the beaches needed by the MPS to deliver their heavy gear."

December 1979

DOD began negotiating with Oman, Somalia, Djibouti and Kenya to permit the increased use of ports in those countries by US forces.

23 January, 1980

In the aftermath of the Soviet invasion of Afghanistan in December 1979, President Carter enunciated the "Carter Doctrine," which designated the Persian Gulf as an area of vital interest to the United States. Specifically, the doctrine stated, "Any attempt by any outside force to gain control of the Persian Gulf region will be regarded as an assault on the vital interests of the USA and will be repelled by any means necessary, including military force."

29 January, 1980

In his third annual report, Secretary Brown further described the RDF. In addition to the hardware programs, the Secretary reported the creation of an RDF based in the Continental United States (CONUS) under a USMC lieutenant general.

1 March, 1980

The Rapid Deployment Joint Task Force (RDJTF) was established to protect US national interests, including assured access to oil, stable and secure regimes in SWA, and prevention of the influence or takeover of the region whose interests are inimical to those of the US and the region.

5 March, 1980

DOD announced the Pentagon would deploy to the Indian Ocean seven existing cargo ships with enough equipment and supplies for early arriving forces of the RDF. This formalized the Near-Term Prepositioning Ships (NTPS) program.

Other Events

The RDJTF began planning for contingency operations and exercises throughout SWA under a variety of scenarios and potential threats to US security interests.

The RDJTF began exercises outside CONUS (Bright Star) with Egypt, Oman, Sudan, and Somalia and emphasized desert warfare training for component forces.

The RDJTF began to examine areas for desert training support. The Army National Training Center (NTC) and the Marine Corps Air Ground Combat Center (MCAGCC) were ultimately established, in part, to support realistic terrain and environmental training for Southwest Asia (SWA).

The NTPS was expanded to include six additional ships to support RDJTF contingency responses in the region and development of Fast Sealift Ship (FSS).

The United States expanded security assistance programs and defense cooperative efforts with friendly states throughout the region:

- Sales of modern US military equipment to Jordan, Egypt, Saudi Arabia and the rest of the Gulf Cooperation Council (GCC) states.

- Facilities support arrangements with Kenya, Somalia, Egypt, Saudi Arabia, Sudan, Oman, the United Arab Emirates, and Bahrain. Specifically concluded the only formal access agreement with a Gulf nation with Oman for aircraft landing rights.

- Programs were initiated (throughout the 1980s) to improve support for US military capabilities in the region including land-based prepositioning, brigade staging areas, water production, logistics-over-the shore, RRF expansion and hospital ships.

- Increased deployments of naval combatants and Amphibious Ready Groups (ARGs) to the North Arabian Sea and Indian Ocean.

1981

Military construction and improvements to existing facilities in Oman, Kenya, Somalia, Egypt, and Diego Garcia to support an increased capability for US forces in the region were approved.

The Royal Saudi Air Force bought US Airborne Warning and Control System aircraft.

President Reagan requested $81 million to begin development of a new transport plane, the CX, which could carry US military equipment several thousand miles non-stop in support of Persian Gulf security.

1 October, 1981

In a national press conference, President Reagan declared that "...there's no way the US could stand by and see that (Persian Gulf oil) taken over by anyone that would shut off that oil."

Congressionally Mandated Mobility Study (CMMS) completed. This analysis identified significant airlift requirements shortfalls in virtually every scenario investigated. The programmed buy for airlift through the present has been predicated on a fiscally constrained goal of 66 million ton-miles per day (MTM/D) which has never been realized. Airlift requirements in CMMS exceeded 100 MTM/D in some scenarios and exceeded 66 MTM/D in every scenario. Currently, airlift capability rests near 48 MTM/D.

1 January, 1983

The RDJTF took on unified command status and became the US Central Command (CENTCOM).

20 October, 1983

After Iran's threat to close the Persian Gulf and the Strait of Hormuz, President Reagan declared during a news conference that the Strait of Hormuz would not be allowed to be closed for oil traffic.

Prepositioning of USAF equipment in Oman in support of CENTCOM missions began.

6 April, 1984

At the National Leadership Forum of the Center for International and Strategic Studies at Georgetown University, President Reagan stated, "...given the importance of the region (the Middle East), we must also be ready to act when the presence of American power and that of our friends can help stop the spread of violence. I have said, for example, that we'll keep open the Strait of Hormuz, the vital lifeline through which much oil flows to the US and other industrial democracies."

May 1984

CENTCOM spearheaded Operation Intense Look (Red Sea mine clearing operations) after a Libyan Roll-On/Roll-Off ship probably dropped mines during its transit of the Red Sea/Suez Canal.

June 1984

CENTCOM commenced Shadow Hawk special operations exercises with Jordan.

1987-89

CENTCOM created the JTFME to spearhead efforts of the US reflagging of 11 Kuwaiti oil tankers (Operation Earnest Will) during the Iran-Iraq war. The US effort included a military structure of 22 naval combatants/support ships, Four US Airborne Warning and Control System (AWACS) aircraft and eight KC-135/KC-10 aircraft, two mobile sea bases used for operations against the Iranian Revolutionary Guard Corps Navy, five P-3 surface surveillance aircraft, 10 patrol boats, eight attack helicopters, eight mine clearing helicopters, and a Contingency Marine Air Ground Task Force (MAGTF) of approximately 400 Marines, and approximately 800 USAF aircrew and support personnel. US efforts in asserting the principle of freedom of navigation, providing distress assistance to neutral shipping, clearing mines from shipping lanes, and repelling Iranian gunboat and missile attacks clearly improved US economic, military, and political ties to friendly Arab states while reaffirming the resolve to protect US interests in the Middle East.

17 January, 1989

In his FY 1990 Annual Report to the Congress, Secretary of Defense Frank Carlucci defined maintaining access to regional oil supplies and promoting the security and stability of friendly states to be US regional goals in SWA. The report cited the continuing need for US rapid force deployment and resupply, access to local facilities, and assistance from local military forces to respond adequately to regional threats.

May 1989

CENTCOM conducted the CINCCENT War Game to review and examine newly revised Operations Plan OPLAN 1002 for SWA.

1988-89

CENTCOM revised its OPLAN 1002, originally to plan operations to counter an intra-regional conflict, without Soviet involvement, to specifically address the US capability to counter an Iraqi attack on Kuwait and Saudi Arabia.

October 1989

President Bush stated that "access to Persian Gulf oil and the security of key friendly states in the area are vital to US national security. Accordingly, the US remains committed to defend its vital interests in the region, if necessary and appropriate through the use of US military force." He further stated that the US is also committed to "support the individual and collective self-defense of friendly countries in the area to enable them to play a more active role in their own defense and thereby reduce the necessity for unilateral US military intervention."

January 1990

The Secretary of Defense's guidance made the US central objective for SWA the prevention of a hostile power from gaining control over a share of oil supplies or shipment routes sufficient to provide it with leverage over the US and its allies.

DOD was directed to reassess the appropriate response capability to the range of threats in the region. Accordingly, the Under Secretary of Defense for Policy directed a review to re-examine US policy, strategy, and programs for defense of US interests in Southwest Asia. The study also examined present threats in the region, specifically Iraqi military capabilities and Saddam Hussein's ability to threaten Kuwait and the GCC.

8 August, 1990

In an address to the nation, President Bush noted that his administration, as has been the case with every president from Roosevelt to Reagan, remained committed to the security and stability of the Persian Gulf.

APPENDIX E

DEPLOYMENT

Operation Desert Shield was the fastest build up and movement of combat power across greater distances in less time than at any other time in history. "It was an absolutely gigantic accomplishment, and I can't give credit enough to the logisticians and transporters who were able to pull this off."

General H. Norman Schwarzkopf
Commander-in-Chief,
CENTCOM

Figure E-1
24th Infantry Division (Mechanized) Tanks and Fighting Vehicles Loading Aboard Cargo Ship USNS Bellatrix in Savannah, Georgia

INTRODUCTION

On 7 August, President Bush directed deployment of US forces in response to a request for assistance from the government of Saudi Arabia. Operation Desert Shield had begun. The first US soldier, a member of the 82nd Airborne Division, was on the ground in Saudi Arabia within 31 hours of the initial alert order. What followed during the subsequent months was the fastest build up and movement of combat power across greater distances in less time than at any other point in history.

Although deployment of US forces in the operation ultimately was successful, it identified several weaknesses in US rapid deployment capabilities. As the US moves to implement a national military strategy based on the projection of power from the United States and forward bases, these deficiencies must be addressed. Deployment planning systems must be reviewed in light of changing priorities in response to regional contingencies; the need for structured, but flexible deployment schedules; and the requirement for transportation feasibility studies to ensure assets are sufficient and able to accommodate unit requirements. Equally important is the continued emphasis on improving worldwide mobility -- airlift, sealift, land movement, and prepositioning -- necessary to ensure that the United States can deploy and project power credibly.

The following discussion focuses on the deployment of US forces, supplies, and equipment to the theater of operations. Deployment planning, priorities, and execution will be reviewed in detail. Mobility will be addressed by examining current capabilities and how these assets were used in support of Operations Desert Shield and Desert Storm. An assessment of these capabilities is included so that future improvements may be developed. A summary of observations, to include accomplishments, shortcomings, and issues, is provided at the end of this appendix. (Discussion of deployment often overlaps with discussion of logistics. A report on logistics is contained in Appendix F.)

DEPLOYMENT PLANNING

Operation Desert Shield deployment planning required close coordination and interaction between Central Command (CENTCOM), the Services, the Joint Staff (JS), and Transportation Command (TRANSCOM). This planning was conducted within established joint systems; however, it became readily apparent during early deployments that modifications and adjustments had to be made to developed deployment plans, based on deployment priorities and orders.

Department of Defense (DOD) planning for deployment operations is conducted within the framework of the Joint Strategic Planning System (JSPS); Joint Operations, Planning and Execution System (JOPES), and the accompanying Time Phased Force Deployment Data (TPFDD). These systems, which the Services use to

plan and execute deployment actions, provide forces to meet military Commander-in-Chief (CINC) requirements. Procedures and systems have been tested in numerous exercises and have worked well; however, Operation Desert Shield surfaced some areas where refinements are required.

The JSPS translates national security policy into strategic guidance, force structure requirements, and provides long and short term operational planning guidance to the CINCs and Services. The JOPES establishes polices and procedures and provides automated systems for the development of Concept Plans (CONPLANs) and Operation Plans (OPLANs) required by JSPS. JOPES, a developmental system, has shown its utility in the past as an effective planning tool.

However, in the initial Operation Desert Shield deployment phases, three factors prevented full use of the JOPES. First, information necessary for deployment was not loaded into the TPFDD. Second, operational considerations in the area of responsibility (AOR) required CENTCOM to repeatedly change the priority and the scheduling of unit movements in midstream. Given its current level of development, JOPES cannot react quickly enough to changes of such frequency and magnitude. Third, the infrequent use of JOPES in peacetime resulted in a shortage of JOPES-capable operators during the early days of Operation Desert Shield.

Essentially, the initial phases of the deployment were done manually while the Services, CENTCOM, and TRANSCOM constructed a TPFDD. This document, initially established in the third week of August, provided discipline to the system, improved deployment procedures, enabled JOPES to begin functioning as designed, and gave TRANSCOM the necessary perspective on total deployment requirements.

Planning for the deployments of US forces is based on operations plans (OPLANs) and the accompanying TPFDD; actual deployments are predicated on operations orders (OPORDs) and Time Phased Force Development Lists (TPFDL). The TPFDD contains deployment data, including ports of embarkation and debarkation; the amount of cargo and personnel deploying; and the type lift required to deploy them. Because there were no approved plans in August, CENTCOM planners had to improvise a solution quickly. Deployment data had not been reviewed to determine transportation feasibility, or revised to reflect actual capability. Accordingly, early movements of units to Saudi Arabia were accomplished with a draft TPFDD, which was built as it was executed.

This meant that early deployments were orchestrated through staff-level conversations between CENTCOM, JS, TRANSCOM, and the Service components. As the need for particular units arose, the CENTCOM staff notified the Joint Staff Crisis Action Team, which, in turn, began producing a deployment order. At approximately the same time, CENTCOM discussed transportation requirements with TRANSCOM. Simultaneously, the Services, CENTCOM, and TRANSCOM began work on the construction of a deployment list. (An in-depth discussion of the planning prior to Operation Shield deployment is contained in Appendix D).

Based on CINCCENT's requirements, TRANSCOM directed strategic lift assets to permit the timely flow of forces and material. TRANSCOM is the unified command responsible for strategic mobility planning; direction, coordination, and management of air and sealift assets for the movement of forces and materiel in crisis and war; maintaining JOPES; and wartime traffic management. Its mission is to provide global air, land, and sea transportation to meet national security needs. The command has three components: Military Airlift Command (MAC), Military Sealift Command (MSC), and, Military Traffic Management Command (MTMC) (Fig E-2).

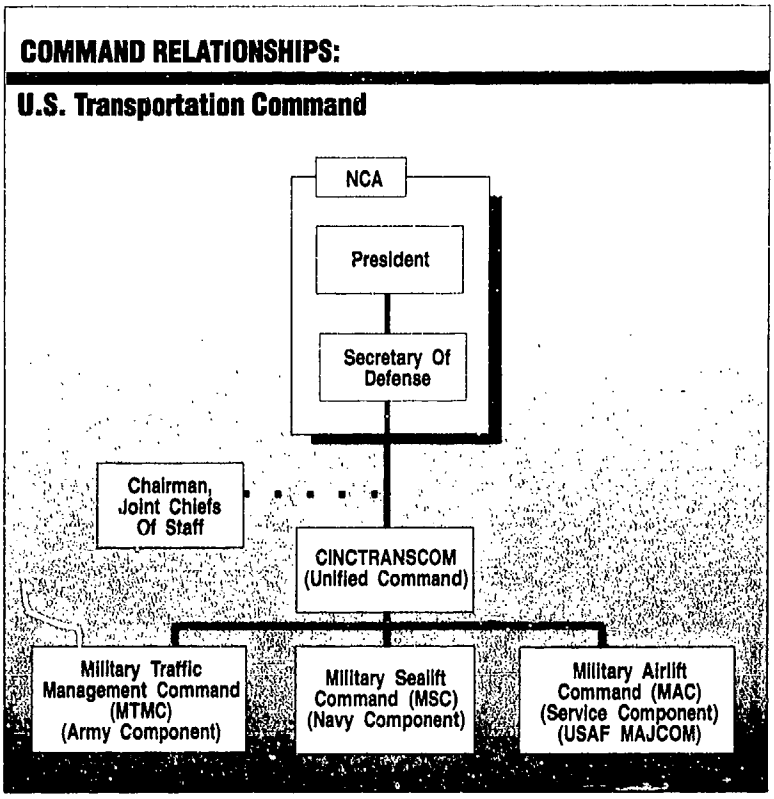

Figure E-2
TRANSCOM Organization

TRANSCOM exercised command over assigned common user- transportation resources of each of its components. During Operations Desert Shield and Desert Storm, TRANSCOM was responsible for common-user airlift and sealift, Continental United States (CONUS) land transportation, port loading operations, and management of chartered or donated commercial lift.

MAC common-user transportation resources include active, Air Force Reserve (AFR), and Air National Guard (ANG) C-141 and C-5 strategic airlift and support units. MAC also manages the DOD Civilian Reserve Air Fleet (CRAF) program -- a systematic activation of commercial passenger and cargo aircraft to support crisis airlift situations -- providing additional airlift capability and flexibility to the strategic air flow.

MSC common-user assets available during crisis include Fast Sealift Ships (FSS) and Ready Reserve Force Ships (RRF). FSS consists of eight ships capable of 33 knots at full power, usually dedicated to rapidly deploy Army mechanized units, but available for use by any Service as the supported CINC desires. These ships are maintained in a reduced operating and manning status in peacetime, but are kept ready to sail in 96 hours or less. RRF ships are also maintained in reduced operating conditions, and consist primarily of break-bulk ships, roll-on/roll-off (RO/RO) ships, barge carriers, and tankers. These ships are older vessels and are activated according to a multi-tiered schedule.

Afloat Prepositioning Ships (APS) and Maritime Prepositioning Ships (MPS) can be made available to TRANSCOM for common-user transportation after they have discharged their initial cargo and are released by the supported CINC. APS consists of 11 ships carrying ordnance, supplies, and fuel for the Army and Air Force (USAF) and Navy fleet hospital ships. MPS consists of 13 ships, divided into three squadrons: two squadrons with four ships and one squadron with five ships. Each squadron carries a full complement of equipment and 30 days of supplies for a Marine Expeditionary Brigade (MEB).

MTMC is the DOD single manager for military traffic management, CONUS land transportation, common-user worldwide water terminals, and intermodal movement. MTMC relies upon its active and Reserve Component (RC) personnel to support deployments by air and sea. During Operations Desert Shield and Desert Storm, MTMC was responsible for loading 560 ships, carrying 945,000 vehicles and other cargo, and for arranging the transport of 37,000 containers.

EARLY DEPLOYMENT ISSUES, DECISIONS, AND PRIORITIES

During the first few weeks, several complex issues developed which complicated TRANSCOM's contribution. In addition to the lack of a structured schedule and the absence of transportation feasibility studies, CENTCOM made an early decision to deploy as many combat elements as possible. Although this meant that logistics and administrative units (needed to ensure expeditious reception of units and supplies) were late in arriving, this decision seemed prudent given the fact that Iraq might have attacked Saudi Arabia. The decision to change deployment priorities also necessitated corrections in the flow of units already enroute to ports of embarkation. The immediate impact that such changes had on transportation

assets were significant. Each time a short notice change was made, crews and transportation assets had to be repositioned.

CINCCENT was aware of the difficulties imposed by changes in deployment priorities. However, he clearly required immediate combat power to deter Iraqi aggression, and the decision was easier to implement because of the availability of host nation logistics support and port infrastructure. The ability to use Saudi resources to support arriving forces was providential. The assets available were considerable, and, although there were some initial problems in rapidly concluding formal agreements, dependence on host nation support (HNS) -- in Saudi Arabia and other Persian Gulf states -- worked relatively well. However, Persian Gulf states have infrastructures that are unusual among countries where the United States may deploy forces to resolve regional crises. A more detailed discussion of HNS provided by Saudi Arabia and other GCC states is contained in Appendix F.

Another issue which arose early involved transportation feasibility. Transportation feasibility studies examine the assets needed to move personnel and equipment. Rapid response units, such as the 82nd Airborne Division, the 1st and 7th MEBs, and the USAF tactical fighter squadrons, were the only ones for which current transportation feasibility data was available. The feasibility of moving other units was determined while deployment decisions were being made.

Manual intervention and management to meet short notice deployments and changes in the theater tactical situation cannot be totally eliminated. In fact, some degree of personal intervention will always be required to account for unforeseen circumstances and to provide flexibility. However, as JOPES continues to mature and more sophisticated software becomes available, planning and execution of deployments will become more efficient. The tasks of balancing the deployment ledger and matching units to available transportation assets will be performed more or less automatically. At that time, changes in priorities or the deployment of forces without fully developed deployment data will be easier to accommodate.

A discussion of the deployment of forces must focus on two aspects: the assets available to transport personnel and equipment and the actual deployment. The former governs to a great extent the options for the latter. The following discussion focuses on the assets that were available to successfully deploy US forces and equipment and also identifies some of the difficulties encountered as the deployments occurred.

STRATEGIC LIFT CAPABILITIES

The US ability to project and sustain combat power from CONUS or forward bases is crucial to attaining US national security objectives. Operations Desert Shield and Desert Storm clearly demonstrated the capability to deploy and project combat power. The United States projected forces, equipment, and sustainment farther,

faster and in greater quantities than ever before. Airlift and sealift formed the core of the US strategic lift capabilities. These assets, coupled with land movement and prepositioned equipment and supplies, formed the mobility capabilities so crucial to success in the Gulf War.

Land movements and port operations -- in CONUS, Europe, SWA, and elsewhere -- include the movement of materiel and loading of aircraft and ships to meet rapid deployment schedules. MTMC arranged all commercial rail and truck moves in CONUS.

This conflict also served to identify deployment capability shortcomings. Requirements substantially stressed capabilities. A credible power projection strategy cannot be executed without adequate worldwide capability and deployability. This requires reviewing capabilities and exploring improvements in worldwide mobility -- land movement, airlift, sealift, and prepositioning.

Airlift

A very quick and flexible part of US mobility capability is airlift. TRANSCOM directed, and MAC executed, strategic airlift for rapid force projection during Operations Desert Shield and Desert Storm. Key to US airlift capability is the augmentation provided by the AFR and ANG; their aircraft and crews augmented the active component by providing a total USAF airlift force of 118 out of a total 126 C-5 airlift force and 195 of 265 C-141 cargo planes used during Operations Desert Shield and Desert Storm. These assets were further augmented by Navy C-9s in January, February, and March 1991. USAF KC-10s were employed as cargo carriers when not involved in refueling missions. Airlift system flexibility was also demonstrated by meeting unexpected requirements, such as airlifting Patriot missiles to Israel, rapidly moving particular munitions which were used at higher rates than expected, and deploying additional vehicles to the theater to meet land transportation requirements.

Civil Reserve Air Fleet (CRAF)

CRAF is a program in which commercial airlines agree to make aircraft available for DOD deployments in exchange for peacetime military business. The CRAF is organized into three stages which can be activated incrementally to support DOD airlift requirements of increasing intensity. Thirty-four airlines took part in CRAF operations during this period. US civil air carriers also voluntarily provided passenger and cargo aircraft to support deployments.

CRAF Stage I was activated on 17 August to supplement MAC's organic aircraft during Phase I deployment. This provided 18 long-range international (LRI) passenger aircraft and crews and 21 LRI cargo aircraft and crews. Additional cargo requirements during Phase II of Operation Desert Shield deployments required implementing CRAF II on 17 January. This provided access to another 59 LRI passenger aircraft and 17 more LRI cargo aircraft, some of which already had been committed voluntarily. Throughout the deployment, air carriers volunteered more aircraft than required by the CRAF activations. Commercial assets delivered 27 percent of the air cargo and 64 percent of the air passengers. (Commercial assets included aircraft which were not part of the CRAF).

While CRAF aircraft are very effective in transporting large volumes of passengers, CRAF is less flexible for cargo than MAC organic assets. For example, some kinds of military cargo cannot be carried on civil aircraft because of its size or hazardous nature. Large communications vans, Patriot missile components and helicopters are characteristic of the cargo that can only be moved on organic military transports. Also, some crews were unfamiliar with military cargo and had difficulty determining what they could or could not carry without first consulting airline officials.

Some CRAF members volunteered aircraft and crews before formal activation; volunteer lift in excess of activated CRAF aircraft continued throughout deployment operations. However, some air carriers were reluctant to volunteer additional passenger aircraft for MAC use during the December holiday travel period -- a time when Phase II deployments were under way. Throughout Operations Desert Shield and Desert Storm, DOD also received donated airlift support from government carriers in South Korea, Japan, Luxembourg, and Italy.

Strategic airlift depended on enroute bases in Germany, Italy, Portugal, and Spain. Key facilities such as Torrejon Air Base, Spain; Rhein-Main Airport, and Ramstein Air Base, Germany; the bases at Sigonella, Italy; and Diego Garcia in the Indian Ocean, were well established, integral part of the airlift infrastructure and proved invaluable during deployment. Eighty-four percent of all aircraft missions flowed through Torrejon and Rhein-Main, emphasizing the importance of well-established bases with the capacity necessary for deployment.

Saudi Arabian infrastructure -- especially airfields and ports -- was well developed. The Saudis were forthcoming in providing access to their facilities -- even though there were initial delays that were ultimately remedied. Ramp space at these airfields was also limited, as were ground refueling facilities. In some cases, this meant that aircraft were refueled in the air prior to, or just after, departure. These constraints highlight several key points. First, it is important to have pre-existing host nation support arrangements to ensure access to arrival facilities whenever possible. A second factor illustrated by air deployment is that there were difficulties in servicing aircraft, even though Saudi Arabia has some of the most up-to-date facilities in the world. These difficulties would certainly be exacerbated were there a requirement to deploy a similar sized force to less developed airfields.

Figure E-3
Troops board CRAF Aircraft

Several additional observations emerge from reviewing the airlift. First, airlift delivered more than 544,000 tons of cargo (about 5 percent of the total cargo) and more than 500,000 passengers (about 99 percent of the total passengers moved). During the early deployment period, more than 25 percent of the cargo delivered by air was outsized (larger in size than commercial standard pallets), deliverable today only on C-5s. Another 60 percent was oversize (too large for commercial carrier), most of which could be more efficiently delivered by military aircraft. Secondly, Air Reserve Component (ARC) volunteers augmented the MAC effort for varying periods of time from the outset. The airlift system relies on the call-up of these ARC members to sustain airlift capability. Had they not been available, the airlift system would have run out of crews to sustain the aircraft. Eventually, more than 18,000 ARC volunteers augmented MAC. Reserve units called to duty consisted of seven C-5 squadrons, 11 C-141 squadrons, and 10 C-130 squadrons, comprising more than 80 percent of USAF lift assets.

It also should be noted that the US provided substantial strategic airlift, primarily C-5s, to other Coalition members during Operations Desert Shield and Desert Storm. This included support to NATO allies and several East European and Arab-Islamic countries. For example, MAC lifted equipment and personnel from France and the UK to Saudi Arabia, and German Roland and Dutch Patriot air

defense units to Turkey. The US also transported Czech and Romanian chemical defense units to the theater and airlifted equipment for both Saudi Arabia and Kuwait directly from CONUS to SWA. US aircraft were even used to fly crucial spare parts from Argentina.

The Navy also provided organic airlift support to supplement the heavily stressed TRANSCOM system. Four of the 11 Navy Reserve Transportation squadrons flying C-9 aircraft were recalled and, together with additional support from the other squadrons, flew more than 9,000 hours, carrying passengers and cargo between Europe and the Middle East.

Sealift

Strategic sealift was crucial both for deploying forces to Saudi Arabia and for their sustainment. Although personnel usually were flown to the Gulf, most equipment and supplies were sent by sea. Because of the huge amounts of heavy equipment requiring transport, and the limited strategic assets available to lift this equipment within the time CENTCOM specified, TRANSCOM had to manage sealift assets carefully and put sealift elements in motion immediately. Close coordination among the entire transportation network was necessary to ensure that airlifted personnel reached the theater near the date their equipment was scheduled to arrive. Arrival of personnel before their equipment would increase the burden on the Saudi infrastructure. It also would expose troop concentrations in the port areas to possible enemy attack by ballistic missiles, aircraft and terrorists.

Ready Reserve Force (RRF)

The RRF was activated for the first time, providing additional RO/RO ships, break-bulk cargo ships, and barge carriers. In the late 1970's, the Navy began purchasing militarily useful ships to bolster the aging mothballed fleet of World War II-era cargo ships. During the next 10 years, the RRF grew and was maintained at various sites by the Maritime Administration in an unmanned status.

The RRF program was designed to provide militarily useful ships in five, 10, or 20 days depending on each ship's current readiness status. There are 17 RO/RO ships in the RRF, and these were the first ships activated. Upon activation, RRF ships moved to a shipyard or dock and were prepared for deployment. They were manned by civilian merchant mariners. Initially, there were problems which led to slow RRF activations. Only 12 of the initial 44 RRF ships were activated within the specified time and only six of 27 additional RRF ships required for deployment of follow-on forces were activated within their established times. Ships scheduled for five-day breakout took, on the average, 11 days to prepare. It took an average of 16

days to prepare 10-day ships. Delays were directly related to prior year funding cuts for RRF maintenance and activation exercises. Once activated and brought to operating condition, however, RRF ships performed well. They maintained a respectable 93 percent reliability rate and delivered 22 percent of the unit cargo for US forces. Figure 4 below depicts RRF activation distribution and reflects the amount of time it took to breakout the RRF fleet.

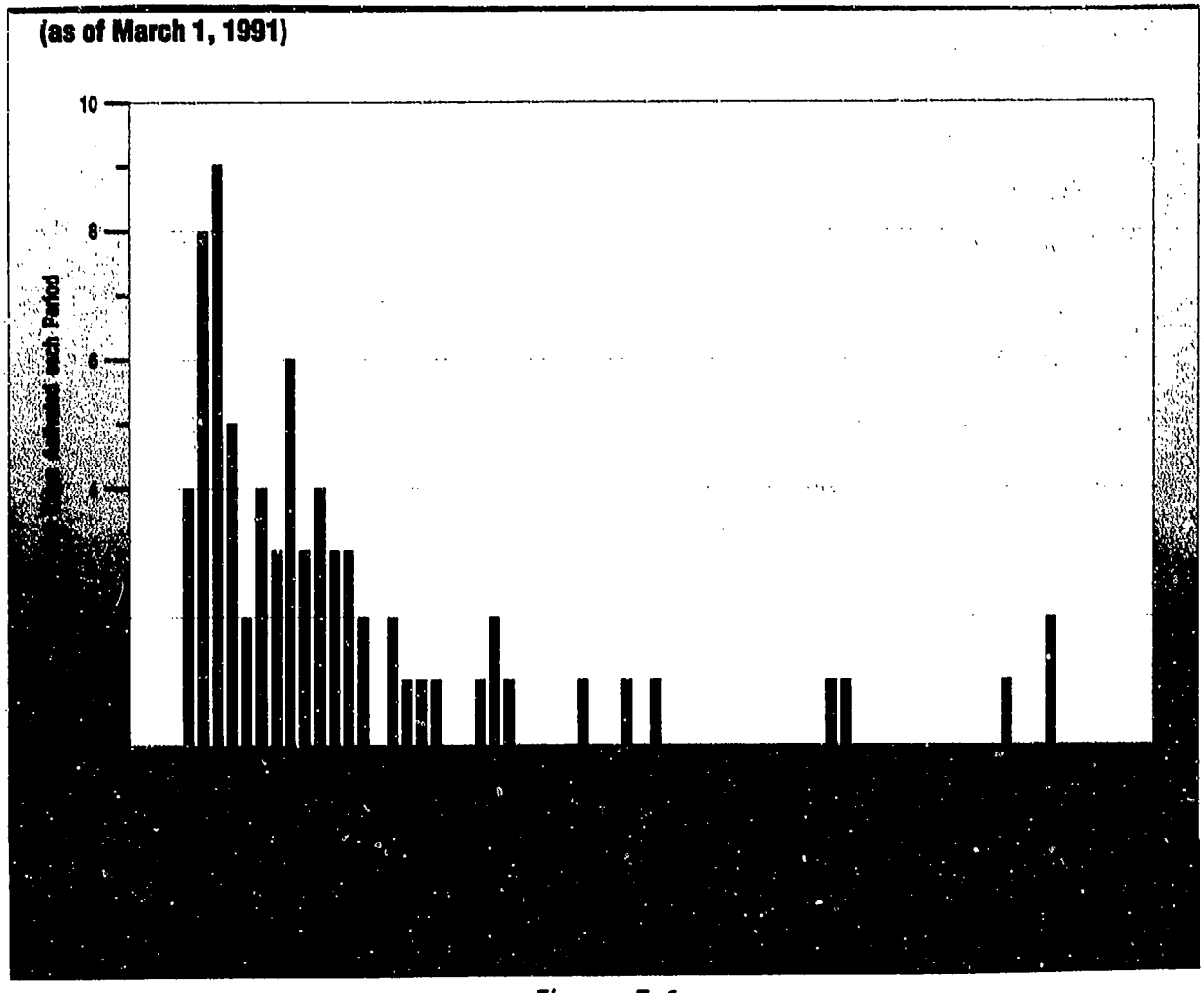

Figure E-4
Ready Reserve Fleet Activation

The advantages of RO/RO and container vessels were clear in this deployment. Most of the RRF consists of break-bulk ships which generally have a smaller cargo capacity and take two to three days longer than RO/ROs to load and unload.

The use of containerized cargo shipments was not as widespread as it might have been during deployment. Increased containerization could have substantially

increased the throughput capability of ports. Had events moved more quickly, the two or three days of delay caused by the lack of containerized cargo shipments might have been crucial. However, despite its advantages, containerization presents its own set of problems. For example, there is currently no West coast port equipped to handle containerized ammunition. (Appendix F contains further information on this subject).

Fast Sealift Ships (FSS)

The MSC's FSS had a good performance record. FSSs have both RO/RO and limited container capabilities and are a rapid and versatile transportation means for unit equipment. They have a larger capacity than break-bulk ships and require less

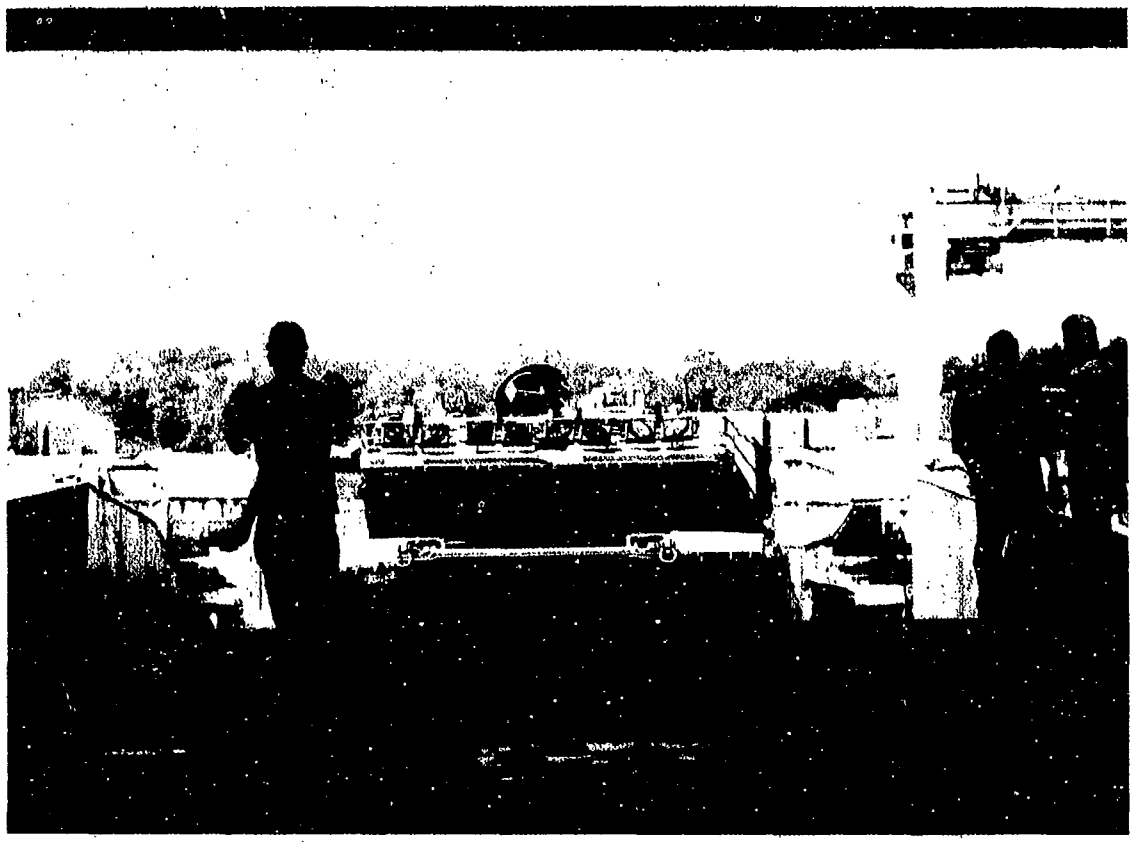

Figure E-5
Heavy Equipment Loads on Fast Sealift Ship

time to load and unload. However, there are only eight FSS ships, thus availability was limited. Unfortunately, one FSS, the *Antares,* failed off the East coast of the United States with a considerable amount of the 24th Infantry Division (Mechanized) equipment aboard. The ship was towed to Spain. Some of the cargo was airlifted to Saudi Arabia but most had to be unloaded and reloaded aboard another FSS returning from her initial voyage. This cargo arrived about three weeks later than planned. (Before the war, the *Antares* had been scheduled for major overhaul, but this was delayed. Thus a degree of risk was accepted in the decision to use *Antares* to speed the deployment.)

The FSS size and speed allowed the remaining seven ships to deliver more than 13 percent of the total cargo of the unit equipment. FSS carried the 90, 000 short tons of equipment for the 24th Infantry Division (Mechanized) at average speeds of 27 knots. Although normally on 96-hour standby, the first FSS was ready to deploy in 48 hours. The typical FSS load included more than 700 Army vehicles such as M-1 tanks, M-2 fighting vehicles, and fuel trucks. By comparison, 116 World War II Liberty Ships would have been required to move the same tonnage in the same period.

In conjunction with the FSS and RRF, chartered commercial ships played a vital role in the deployment. There were a total of 213 ships chartered by the US when redeployment began on 10 March. US charters carried 14 percent of all dry cargo and foreign flag charters carried 20 percent. In addition, MSC contracted with US shipping companies to transport containers aboard regularly scheduled United States-Middle East liner service. Through this contracting arrangement, the Special Middle East Shipping Agreement, MSC delivered almost one million short tons of containerized cargo, capitalizing on the strength of US maritime industry.

Sealift Readiness Program (SRP)

Another program that can be called upon when necessary is the SRP. The SRP, a contractual program, requires that shipping companies that bid on MSC contracts commit 50 percent of their cargo capacity to the program. Additionally, those ships built with construction subsidies or receiving operating subsidies are committed to the SRP. The SRP, as currently structured, was not used during the crisis because the US maritime industry responded voluntarily with an adequate number of vessels available for charter.

Several other points in regard to sealift need to be emphasized. First, sealift delivered 95 percent of all cargo, including 85 percent of the dry cargo and 99 percent of the petroleum products. Additionally, once ships became available, overall shipping performance was sound. During Phase I, only six out of 110 ships that entered the sealift system had reliability problems that delayed them in accomplishing their missions. On the other hand, because there are so few fast cargo ships, delivery times were relatively slow.

Prepositioned Equipment

DOD had been preparing for a major expeditionary operation in the Gulf since the 1970s and had made improvements in its expeditionary prepositioning capabilities as part of these preparations. The value of prepositioning -- both afloat and ashore -- was proven during Operations Desert Shield and Desert Storm. Prepositioning allowed for a more rapid response by combat forces to the theater, providing essential supplies and equipment to early deploying forces.

Afloat Prepositioning Ships (APS)

During the 1980's, the Army established afloat prepositioning of equipment in support of Southwest Asia. These ships are referred to as APS and, when the war started, consisted of 12 ships (eight dry cargo and four tanker).Two tankers were already being used in a fleet support role. These vessels were located at Diego Garcia and one ship was in the Mediterranean. This program involved storage of cargo on four Army APS which would be strategically positioned and could be moved to support CENTCOM contingencies carrying equipment, fuel, and supplies for the Army.

During Operations Desert Shield and Desert Storm, these ships sailed from forward bases in Diego Garcia to the Middle East, and the first APS arrived in Saudi Arabia on 17 August. The war reserve cargo on board these ships included: subsistence, general supplies and equipment, packaged fuel, construction and barrier material, ammunition, and medical supplies. One semi-submersible heavy lift vessel carried port operating equipment (e.g. tugboats, floating cranes, utility landing craft, rough terrain forklifts, containers, and support parts). These ships proved to be indispensable during the operation's first days providing a readily available source of supplies.

Air Force Prepositioning

The USAF prepositioned $1 billion worth of fuel, ammunition, and equipment on the Arabian Peninsula, complementing materiel stored on its three prepositioned ships. Prepositioned assets stored in Oman and Bahrain (as well as on APS) included rations, munitions, medical supplies, aircraft fuel tanks, vehicles, and basic support items consisting of shelters, materiel handling equipment, power generation and distribution equipment, kitchens, water purification and production equipment, and airfield support items. These bare base support items were designed to support

1,200 personnel at each of 14 aircraft bed-down locations but eventually supported 21 locations. HNS initially provided some feeding and facilities support, reducing the need for all available prepositioned assets. (Saudi Arabia had built many airfields that could be used for deployed forces. Those airfields often were bare bases which required improvements, but were available to receive Coalition forces in August).

Maritime Prepositioning

The Navy-USMC maritime prepositioning program was begun in the late 1970s as a result of a DOD strategic mobility enhancement initiative to improve response times for SWA contingencies. Until the full MPF capability (specially built or converted ships) was achieved in the mid 1980s, an interim measure known as Near Term Prepositioning Ships was created in 1980 to provide an initial response capability. The NTPS ships were on station at Diego Garcia by July 1980 and contained the equipment and 30 days of supplies for a USMC Brigade. By early 1985, the first combination RO/RO and break-bulk ships specifically built or converted for the Navy had been commissioned and were loaded with prepositioned vehicles, equipment, and supplies. By 1987, 13 ships organized in three squadrons had been commissioned, crewed with civilian mariners, loaded, and deployed.

The ships were more than just floating warehouses. Each of the three MPS carried equipment for a MEB, along with enough supply sustainment for at least 30 days. The squadrons were associated with a specific MEB to ensure effective planning and training. MPS-1, associated with the 6th MEB, stationed at Camp Lejeune, NC, was deployed in the western Atlantic; MPS-3, associated with the Hawaii-based 1st MEB, was home ported at Guam/Saipan; MPS-2, associated with the 7th MEB in California, was anchored at Diego Garcia. Together, each squadron and its associated MEB become an MPF.

The MPF concept performed largely as expected during the crisis, due to an aggressive training, exercise, and maintenance program carried out during the 1980s. Exercises had established planning goals of about 250 strategic airlift sorties to deploy a MEB; this figure was confirmed by the 7th MEB which deployed to Saudi Arabia using 259 sorties. (The additional nine sorties reflected the addition of an infantry battalion and more helicopter antitank assets to the MEB.) The expected time of 10 days to unload ships and marry equipment with arriving units was met by all three MPFs. In fact, 7th MEB combat elements occupied defensive positions near Al-Jubayl in August within four days of their arrival. The only problem encountered during initial deployment of the 7th MEB centered on refueling support to Marine fixed wing aircraft flying from CONUS, which competed for scarce assets with other service aircraft. Elements of 1st MEB and II MEF, although deployed using MPF concepts, did not do so as complete units. Instead, their air, ground, and logistics elements were deployed and integrated into I MEF as they arrived, drawing their equipment from their associated MPS ships.

Figure E-6
USMC MPS Ship Being Off-Loaded At Al-Jubayl

DEPLOYMENT OVERVIEW AND EXECUTION

Force deployments were initially based on a Concept Outline Plan (COP) and draft OPLAN developed as part of the DOD deliberate planning process in the spring and summer of 1990. These were put into immediate use as the best available plans at the time of the Iraqis' invasion of Kuwait. The OPLAN was translated into an Operations Order (OPORD) which provided deployment instructions, and priorities to CENTCOM's component Services and provided tasking direction to supporting unified and specified commands. The order also requested intergovernmental support from the departments of State, Transportation, and Justice. The OPORD directed that Operation Desert Shield deployments occur in two phases.

Phase I

Phase I began on 7 August which was designated as C-Day, the day on which deployments began, and lasted until mid-November. This phase was designed to deploy enough forces to deter further Iraqi aggression; prepare for defensive operations; and conduct combined exercises and training with multinational forces in theater. Although the US build-up of forces was larger and occurred faster than any in history, during this phase of the deployment, the ground forces, major ports and airfields in Saudi Arabia remained vulnerable to Iraqi attack. (Combat forces from other Coalition nations, particularly Egypt, Syria, France, and the United Kingdom joined the US and Saudi forces during this period as well.)

In the first 10 days, a significant joint force of Army, USAF, Navy, and Marine (USMC) units deployed to the theater. Modern airfield and port facilities contributed substantially to the initial deployment's success. These facilities and years of experience with the Saudis gave the United States a head start. Ultimately, during Phase I deployments, the United States deployed about 1,000 aircraft, 60 Navy ships, an amphibious task force, and 240,000 military personnel.

Phase I deployments involved a number of simultaneous movements by elements of all Services. Because a number of events occurred at once, it is easier to consider force deployments in terms of individual Service movements rather than by laying out all of the deployments that occurred on a particular date. The following discussion deals with each Service, and how together they contributed to the accomplishment of the CINC's objectives.

Army Component, Central Command (ARCENT) Deployments

Because the US did not have substantial ground forces or prepositioned equipment in Saudi Arabia, a major deployment of these assets was required. To ensure a more efficient deployment, the MTMC Contingency Response Program was activated on 8 August. This organization ensured that DOD requirements for commercial transportation within CONUS were appropriately coordinated and met. Civil aircraft, under MAC contract, began arriving in Saudi Arabia on 9 August with troops from Pope Air Force Base. As early as 8 August, Defense Fuel Supply Center and its Middle East regional office were arranging rapid expansion of contract fuel support at MAC reception points. Elements proceeded rapidly after initial preparations were made.

During Phase I, US strategic lift moved substantial forces into the region. However, much was required before all of these elements were available in theater. Early-arriving troops established defenses around the airfield at Dhahran to provide security. The Army's XVIII Airborne Corps' assault command post and lead elements of the 82d Airborne Division's ready brigade departed Pope Air Force Base, NC, on 8

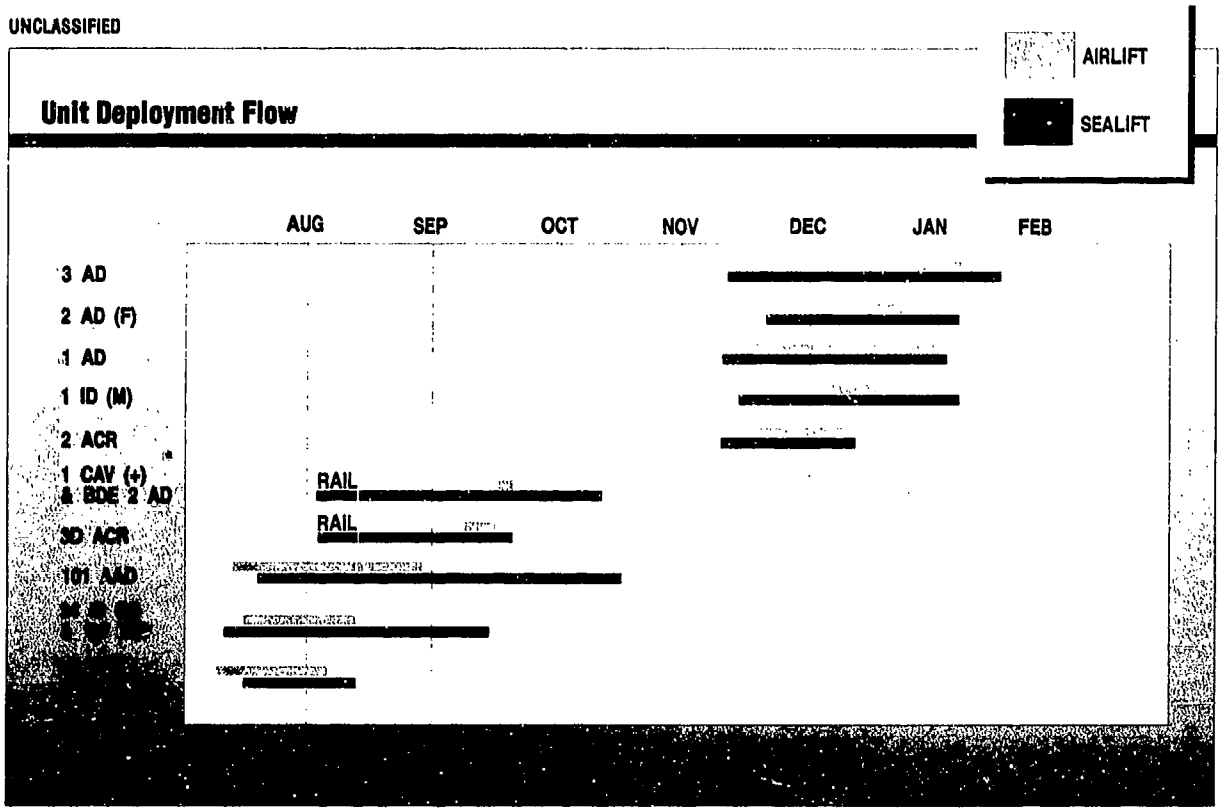

Figure E-7
Army Unit Deployment

August. The following day, the 101st Airborne Division (Air Assault) stationed at Fort Campbell, KY, began to deploy by air.

Armored and mechanized infantry forces from the 24th Infantry Division (Mechanized) (augmented by the 197th Separate Infantry Brigade in place of a round-out brigade), 1st Cavalry Division, 1st Tiger Brigade, 2nd Armored Division and the 3rd Armored Cavalry Regiment (ACR) were selected as the initial follow-on forces for the deployment order issued on 10 August.

On 10 August, orders for the activation of the first 17 RRF ships were issued. On the same day the first FSS ship arrived at Savannah, GA, and began loading the tanks, infantry fighting vehicles, and self-propelled artillery of the 24th Infantry Division (Mechanized) under MTMC supervision. The first contract to charter a US ship also was signed on 10 August.

The rapid deployment of the 82nd Airborne Division continued. By the afternoon of 13 August, most of the 82nd's first ready brigade had arrived in Saudi Arabia. As the only significant ground combat force in theater during the first days of the crisis, the brigade provided security for critical sites, ports, and airbases, including the port of Al-Jubayl which was vital to the arrival of MPS, APS, and unit equipment.

Eighteen M-551 armored assault vehicles (Sheridans) and 15 AH-64s of the 82nd Airborne Division arrived on 14 August. Combined with the arrival of air Force elements and the mechanized air-ground capability of the 7th MEB, the three airborne battalions and Army aviation task force that comprised the ready brigade gave CENTCOM a mechanized force with supporting air early in the operation.

By 17 August, the first of four Army APS arrived in Saudi Arabia with enough supplies, equipment, and fuel to support the 82nd Airborne Division and other deployed or deploying forces. (As requirements increased, they surpassed the capability provided by MAC and volunteer civil aircraft. As a result, Stage 1 of the CRAF was activated on 17 August.) The first element of the 101st Airborne Division (Air Assault) arrived in Saudi Arabia two days later. The capabilities of the Army Component, Central Command (ARCENT) forces in theater during this early stage were further increased during the next several days with the arrival of the lead elements of the Army's 24th Infantry Division (Mechanized) with its M1 tanks, M2/M3 infantry fighting vehicles, and self-propelled howitzers on 27 August.

The first elements of a Patriot missile battery of the 11th Air Defense Artillery Brigade also deployed in August. Eventually, twenty-nine Patriot batteries were deployed in support of Operation Desert Shield and Desert Storm: 21 in Saudi Arabia, six in Israel (four-US/two- Israeli Defense Forces), and two in Turkey.

The 3rd ACR movement began on 22 August with equipment unloading finished in Saudi Arabia by 17 October. The 1st Cavalry Division began loading 6 September and was in defensive positions during the first week of November.

The 12th Combat Aviation Brigade, assigned to V Corps in Germany, was the first major combat unit to deploy from Europe to the Middle East. The brigade began arriving by 27 September and was in its assembly area by early October. Army divisions had their own logistics organizations, capable of supporting operations for limited periods.

During the Phase I deployments, the Army deployed an airborne division, an air assault division, a mechanized infantry division, an armored division, and an ACR along with logistical and administrative units to support not only Army forces, but those of US forces and other nations as well. This effort ultimately involved the deployment of more than 115,000 soldiers by the end of October and more than 700 tanks, 1,000 armored personnel carriers, 145 AH-64 Apache helicopters, 294 155mm self-propelled howitzers, and hundreds of other major items of equipment and thousands of ancillary pieces.

Marine Component, Central Command (MARCENT) Deployments

On 7 August, 7th MEB received its deployment order; simultaneously, ships from MPS -2 were ordered to sail. The first three ships deployed from their homeport of Diego Garcia and arrived in Saudi Arabia on 15 August, marking the first use of the MPS in a crisis. The airlift arrival of the 7th MEB began on 14 August. CONUS-based fixed wing attack aircraft from 7th MEB, from CONUS, began arriving on 20 August. This Marine Air-Ground Task Force (MAGTF), consisted of a

Marine Corps Deployment of Forces

Unit	Combat Ready	Deployment Option
7th MEB	25 Aug	MPS
13th MEU(SOC)	7 Sep	Amphibious (FWD deployed to WESTPAC)
1st MEB	10 Sep	MPS
1MEF* (1st MARDIV, 3d MAW, 1st FSSG)	3 Sep	MPS, Airlift, Sealift
4th MEB	16 Sep	Amphibious
2d Marine Division	8 Jan	MPS, Airlift, Sealift
5th MEB	14 Jan	Amphibious
II MEF (Air, CSS Elements)	15 Jan	Airlift, Sealift

*NOTE: I MEF assumed command of all marine forces ashore, compositing the ground, air, and service support elements of 7th MEB and 1st MEB (along with follow-on forces) into 1st marine division, 3d marine aircraft wing, and 1st force service support group, respectively.

Figure E-8
USMC Unit Deployment

mechanized ground combat element with more than 50 M60A1 tanks, self-propelled artillery, and a supporting aircraft group with attack helicopters and fixed-wing aircraft. Within four days of their arrival in the port of Al-Jubayl, Navy cargo handlers and Marines unloaded the three 755-foot MPS ships containing the MEBs equipment and 30 days of combat supplies. The 17,000 Marines of the 7th MEB linked with their MPS equipment and supplies and were ready for combat on 26 August. This provided the first mechanized ground combat capability for CINCCENT.

On 25 August, the 1st MEB initial units deployed by strategic airlift to Al-Jubayl to link with MPS-3. By 11 September, the final elements arrived and were integrated into the I MEF major subordinate commands.

The I MEF command element which arrived in Saudi Arabia on 4 September, assumed command of all Marine forces ashore. These included ground, air, and logistics elements organized into the 1st Marine Division (MARDIV), 3rd Marine Aircraft Wing, and 1st Force Service Support Group (FSSG), respectively. Continued deployments of reinforcements brought these units to full strength by early October. (The 7th and 1st MEBs, having carried out their deployment mission, were dis-established and their assets were distributed among other I MEF units.) Reinforcements continued to arrive during the next three months to bring the I MEF command to full strength.

USMC aviation deployed to the theater in three increments: fly-in echelon; elements brought in on MPS; and, aviation logistic support ships (TAVB). The aircraft, initial spares and supplies, and support personnel constituted the fly-in echelon. Ordnance, support equipment, aviation fuel, and other items arrived aboard MPS. Aviation logistics support ships provide the maintenance and repair capabilities essential to sustaining aircraft readiness. Competing requirements for aerial refueling tankers caused several days' delay in deploying USMC aircraft. This delay concerned the 7th MEB commander, who relied on these aircraft for much of his combat power. Despite these difficulties, the actual arrival date corresponded fairly closely to arrival of the first MPS squadron and associated USMC ground units.

By the end of August, the USMC had deployed 48 FA-18A/Cs, 40 AV-8Bs, 10 A-6Es, 12 EA-6Bs, and six KC-130s, as well as 90 helicopters, which included 40 AH-1Ws. These numbers increased during the next several weeks as additional attack aircraft, OV-10s and helicopters arrived in theater, to include 20 AV-8Bs embarked aboard amphibious ships.

Air Force Component, Central Command (CENTAF) Deployments

Before Iraq's invasion of Kuwait, the USAF had a small operations support detachment in Dhahran that provided ground handling service for regularly scheduled airlift missions. At the time of the invasion, KC-135 air refueling tankers were operating in the United Arab Emirates as part of exercise Ivory Justice. Also,

USAF pilots and support personnel were stationed as instructors at key Royal Saudi Air Force F-15C and F-5 fighter bases throughout Saudi Arabia, as part of the US Military Training Mission – Saudi Arabia.

Additional USAF assets were sent immediately after the invasion. MAC began moving airlift control elements (ALCEs) to key air facilities around the world in anticipation of deployment requirements. The MAC crisis action team had prepared plans and began the notification process to use enroute staging bases in Europe to support a possible large-scale deployment to Saudi Arabia.

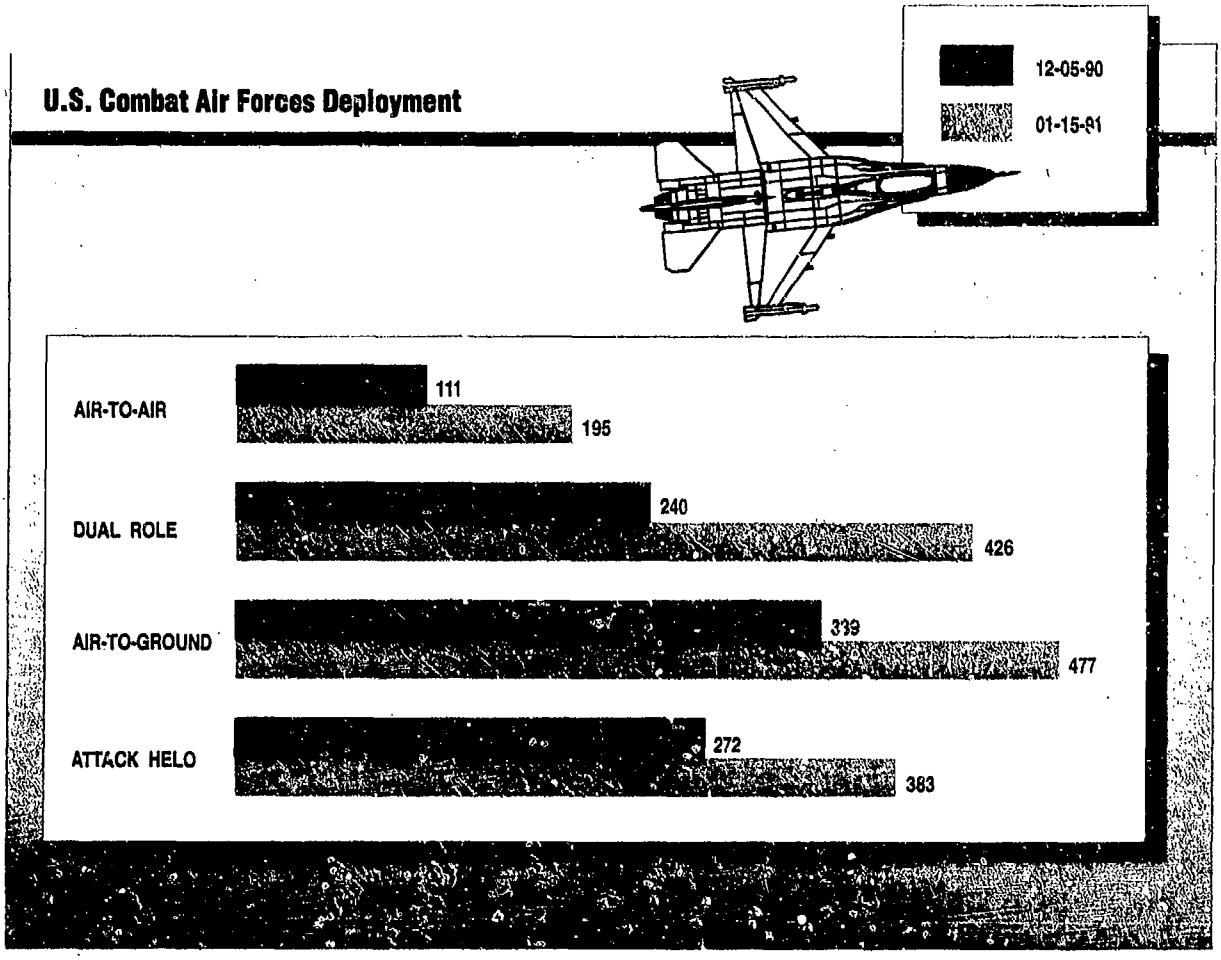

Figure E-9
Combat Air Forces Deployment

The first USAF combat aircraft from the 1st Tactical Fighter Wing (TFW), supported by five AWACS from Tinker AFB, OK, arrived in Riyadh on 8 August. Twenty-four F-15Cs from the 71st Tactical Fighter Squadron, Langley AFB, VA, arrived in Dhahran 34 hours after receiving the deployment order, and were on combat air patrol alert four hours later. Enroute to Dhahran, the F-15Cs were refueled by KC-10 tankers from Zaragoza Air Base, Spain, Royal Air Force Base (RAF) Mildenhall, UK, and Sigonella, Italy. The first RC-135 *Rivet Joint* aircraft began providing support on 9 August. By 19 August, four RC-135s were operating from Saudi Arabia.

On 8 August, strategic airlift began its movements in earnest. The first aircraft supporting the 1st TFW from Langley began to arrive in Saudi Arabia on 8 August. On 9 August, a MAC mission carrying the first CENTCOM command elements landed in the Saudi capital. In the early days of deployment, on average, one airlifter left from both Langley and Pope AFB every hour.

By 10 August, 45 air superiority F-15Cs, 19 deep strike interdiction F-15Es and 24 multi-role F-16s were in the AOR, fully armed and either on airborne patrols or on ready alert. A day later, the first squadron of C-130 transports arrived in Saudi Arabia. The same day, MAC deployed a theater ALCE to Riyadh; it was fully operational on 11 August. Twenty additional F-16s and seven B-52s arrived on 12 August. The same day, USAF C-130s arrived at Thumrait and Masirah, Oman, where they began immediate distribution of equipment, armament and supplies.

By 14 August, more than 200 USAF combat aircraft had deployed to the theater. By 24 August, the USAF force structure in SWA included three squadrons of air-to-air superiority fighters, eight squadrons of air-to-ground fighters, and U-2/TR-1 aircraft to provide imagery intelligence (IMINT) coverage of Iraq and Kuwait.

Deployment continued through September and October. By 8 November, the Coalition air forces had increased significantly. The USAF had more than 1,030 aircraft. These forces included the deployment of more than 590 combat aircraft from CONUS and European Command (EUCOM) since 14 August. More than 90 US fighter aircraft were dedicated to air superiority missions; more than 260 were dedicated to air-to-ground operations; and, more than 240 dual role aircraft to air-to-air and air-to-ground missions.

Navy Component, Central Command (NAVCENT) Deployments

Additional forces soon were deployed to reinforce the Naval presence in the theater of operations. Ultimately, the total naval forces deployed consisted of six CVBGs, two battleships, the command ship *USS Blue Ridge, (*LCC 19), several support ships, four mine warfare ships, maritime patrol aircraft, several submarines, an amphibious task force that numbered 31 ships, and Naval Special Warfare (NSW) Units.

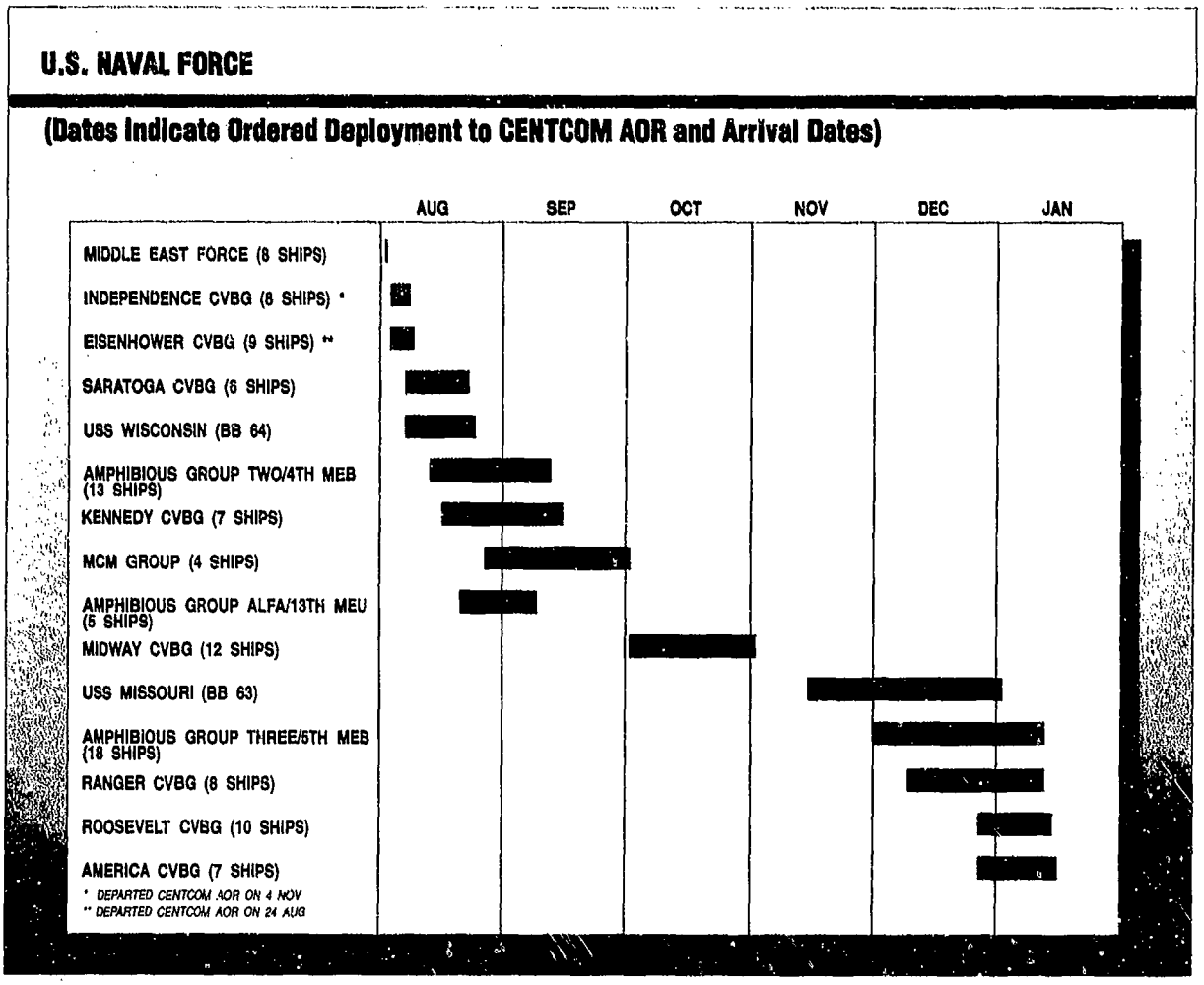

Figure E-10
Naval Forces Deployment

Two carrier battle groups with more than 100 fighter and attack aircraft and more than 10 surface combatant ships were directed to sail to the Gulf region on 2 August. The carrier *USS Independence* (CV 62) battle group sailed from near Diego Garcia to the North Arabian Sea, while the *USS Dwight D. Eisenhower* (CVN 69) battle group moved to the eastern Mediterranean in preparation for entering the Red Sea. MPS 2 and 3, based in Diego Garcia and Guam, were ordered to sail on 7 August.

Amphibious deployments were supported by both Atlantic and Pacific Fleet forces. The Amphibious Ready Group (ARG) in the Mediterranean Sea, the closest

amphibious force, was not diverted to Operation Desert Shield because of its involvement in the Liberian evacuation and the need to maintain some expeditionary capability in the Mediterranean. In the Atlantic, the 4th MEB had been scheduled to participate in North Atlantic Treaty Organization (NATO) exercises in September. When the order was received, 4th MEB deployed on 13 amphibious ships and one RO/RO ship with 8,340 Marines. Arriving in the North Arabian Sea between 11 and 16 September, the 4th MEB began a series of amphibious exercises in Oman and the Gulf.

Pacific Fleet amphibious forces sailed from several locations. The 13th Marine Expeditionary Unit (Special Operations Capable) (MEU (SOC)), consisting of five amphibious ships and 2300 Marines, arrived from the Philippines on 7 September and was integrated into the 4th MEB, which arrived in the Gulf of Oman on 11 September. This force was supplemented by a Battalion Landing Team (BLT) that had been deployed with III MEF in Okinawa, and amphibious ships home-ported in the western Pacific. The combined force contained eight ships and 4,600 Marines. The landing team disembarked at Al-Jubayl and reinforced the 1st MARDIV in mid-September. Three ships of the Pacific ARG remained in the Gulf for several weeks to provide additional amphibious capability before returning to the Pacific fleet.

Other Force Deployments

While US forces were deploying, several Arab League member nations announced they would send forces to Saudi Arabia also. Egyptian and Syrian special operations forces were among the first Arab forces to deploy. They arrived in August to augment Saudi Arabia and Gulf Cooperation Council forces. Other forces followed throughout the fall.

By 1 September, the Coalition had deployed a small, but militarily well-balanced and highly capable force. The rapid projection of combat power to an area 8,000 miles from the United States demonstrated tremendous capability to project power and served to deter further Iraqi aggression.

Phase II

At the end of October, the NCA decided it would be prudent to increase the forces available in theater to provide an offensive option to eject Iraqi forces from Kuwait with minimal casualties. Phase II deployment began with the President's announcement on 8 November that the US presence in the theater would be reinforced by approximately 200,000 additional personnel.

Decisions were made to move forward-deployed elements of the Army VII Corp from Europe as well as additional forces from CONUS. Additional RC personnel were mobilized and deployed to assist the deployment of forces from Europe and the United States.

Forces moved during this phase included the 1st Infantry Division (Mechanized), a heavy division from Fort Riley, KS; the European based VII Corps (consisting of the 1st and 3rd Armored divisions, the 2nd ACR, a headquarters, and the VII Corps, associated combat and support elements); three additional CVBGs, one battleship and Amphibious Group 3 with the 5th MEB; substantial air and service support elements of the II MEF including MPS -1 and the 2nd MARDIV. Four hundred and ten additional USAF aircraft were also deployed, (including 24 F-15C, 18 F-117, 24 F-15E, 32 F-111F, 42 F-16, 12 RF-4C, 12 F-4G, eight B-52, 32 C-130, aerial refueling tankers, and other supporting aircraft). By 15 January, the number of US forces in the theater effectively doubled and the strength of the other Coalition forces also increased.

The deployment of the VII Corps was considered essential to the theater campaign's success. Because it was forward based in Europe, it could be moved into the SWA theater of operations and declared combat ready somewhat more rapidly than the forces from the US. Additionally, VII Corps' degree of modernization and preponderance of active component units were key factors in the decision to deploy them to SWA. Finally, the military threat was significantly lower in Europe and would safely permit the removal of one Corps. Although significant cross-leveling was required to support VII Corps and prepare it for deployment, the value of forward basing US combat power in geostrategic areas from which they can then be redeployed was demonstrated in this instance. However, as discussed later in this Appendix, there were some difficulties in meeting deployment requirements.

Substantial numbers of Army Reserve and Army National Guard personnel and units began deployment during Phase II. Although there were some combat units, these units were primarily CS and CSS units intended to augment support units already deployed in theater and to replace VII Corps units deployed from Europe.

Additional USMC forces deployed in December, eventually raising the total of Marines ashore to more than 70,000. II MEF forces deployed by sea, air, and MPS. MPS-1, located in the Atlantic, arrived in theater on 12 December and began unloading equipment and supplies. The 2nd MARDIV arrived by 8 January. In early December, the 5th MEB, onboard Amphibious Group-3 ships, deployed from California. They arrived in theater on 12 January and joined afloat forces already in the Gulf. The amphibious task force now numbered 31 amphibious ships and 17,000 Marines. USMC air and ground forces were in theater by 19 January. This was the largest amphibious force assembled in nearly 40 years.

Simultaneously, and at CENTCOM's request, support from the Departments of State, Transportation, and Justice was being requested. The State Department initiated diplomatic actions to establish Status of Forces Agreements, basing, staging, enroute refueling locations, and overflight rights. It also requested

embassies in the AOR to help DOD elements arrange for HNS, especially, water, fuel, transportation, air and sealift facilities service. The Transportation Department was asked to activate additional RRF vessels for transfer to the DOD. The Justice Department, through the Federal Bureau of Investigation, was asked to provide pertinent counterintelligence and security information.

During this phase, US Army, Europe (USAREUR) deployed Patriots to provide air defense capabilities in Turkey and Israel. On 12 January, the Secretary of Defense authorized the deployment of two USAREUR Patriot batteries from Dexheim, Germany, to Turkey to provide air defense for Incirlik Air Base. By 22 January, six of the eight launchers were in place and operational, with 43 missiles on hand. The United States and Israeli political authorities also agreed to deploy Patriot units to counter Scud threats to Israel. Shortly after the war began, Iraq attacked Tel Aviv and Haifa, Israel, with an extended range variant of the Scud B missile. A direct Israeli military response to these attacks might have weakened the commitment of Coalition Arab members to Operation Desert Storm. Task Force Patriot Defender, created from 32nd Air Defense Command (USAREUR), deployed to Israel to provide antitactical ballistic missile defense of priority Israeli assets and to provide training and maintenance support for the two newly formed IDF Patriot batteries. Patriot units from the 32nd Air Defense Command were ordered to deploy on 18 January, and within 29 hours from verbal notification to deploy, the task force was operational and ready to conduct fire missions. A second deployment of two more batteries to Israel began on 23 January and was completed and operational by 26 January.

SUMMARY

Iraq's failure to move into Saudi Arabia allowed sufficient time to deploy substantial countervailing forces. The success of the deployment was dependent on the availability of aircraft, ships, and crews; timely decisions to augment active force lift assets with the Selected Reserve, CRAF, RRF; ability to load effectively; forward staging bases for international flights; forward deployed forces; superb Saudi ports facilities; cooperation of European allies; and TRANSCOM's effectiveness. The focus for the future must be on further strengthening both military and civil transportation capability, completing HNS agreements with allies in areas of potential crisis, and integrating those logistical requirements that may have to be met by organic resources. To project military power, sustain it, and decisively win future conflicts, the United States must be able to execute deployment plans in a timely manner, gain access to local ports and airfields, and possess adequate airlift and sealift to accomplish the mission.

Time is one factor over which DOD may not have much control in future crises. Although US forces arrived quickly, there was a lengthy period of vulnerability during which Coalition forces could not have repulsed an Iraqi invasion into Saudi Arabia. DOD can improve its ability to respond to crises by taking several actions in

advance. First, sea and land based prepositioning and forward deployed forces can provide ready forces and initial sustainment early, easing lift requirements. Comprehensive HNS agreements with those nations where there are vital US interests will be essential for deployment, sustainment, and employment of most foreign US military operations.

A comprehensive Joint Chiefs of Staff exercise program, which includes movement of Army heavy divisions, is essential. As the US moves toward a strategy that bases a larger proportion of forces in CONUS, the ability to respond to regional contingencies must be convincing and expeditious. In that regard, strategic lift capabilities, particularly sealift, must be able to meet surge requirements to deploy forces and associated sustainment into a theater. While sealift resources are available, the number of specific types of vessels to accommodate requirements, the readiness posture of these vessels, and the amount of time it takes to activate and make operational these assets should be reviewed.

Unit operational and logistics readiness of CONUS-based forces and strategic lift also will play a crucial role in sharpening the US ability to respond quickly. The Mobility Requirements Study (MRS) and further analysis of deployments in Operations Desert Shield and Desert Storm will help assess those needs.

OBSERVATIONS

Accomplishments

- Policy and contingency planning aided deployment
- Airlift, sealift, and landlift moved enormous quantities of personnel and equipment.
- Airlift transported about 5 percent of all cargo and 99 percent of all passengers in support of Operations Desert Shield and Desert Storm. CRAF, volunteer civil carriers, and donated foreign lift delivered 27 percent of the air cargo and 64 percent of the air passengers. Organic MAC aircraft delivered the rest.
- Reservists who augmented MAC, MSC, and MTMC early were crucial to expeditious deployment.
- Sealift delivered 95 percent of all cargo.
- Prepositioned ships and MPS worked well and added flexibility to strategic lift.
- Staging bases in Europe were crucial to efficient strategic airlift. Forward basing in Europe of combat and service support elements also increased the speed of deployment. These units should be routinely trained in deployments.
- Investments in sealift (the RRF, APF, MPF, FSS, hospital ships, and aviation support ships) have proven their value.

Shortcomings

- If the Coalition had lacked the extended period of time to deploy, the tactical situation might have been precarious. DOD needs the ability to bring forces to bear more quickly, effectively, and decisively, with minimum risk to human life.
- Maintenance and repair, logistics and spare parts, and test activations of RRF vessels have been underfunded.
- CRAF is intended to augment organic aircraft, but is less capable of handling effectively more demanding loads of equipment that must be deployed. CRAF does not have the degree of flexibility expected from military aircraft, especially in terms of handling military cargo and equipment. This

limitation, although long recognized, requires careful oversight for scheduling CRAF missions involving unit equipment and cargo.

- Most RRF ships were not activated on schedule. Ships with breakout schedules of five and 10 days took, on the average, 11 and 16 days to break out. RRF crew availability (quantity and quality) affects activation and timeliness.

- Some delays were created because there were insufficient RO/RO assets in the RRF and because of the longer times required to load and unload break-bulk ships compared with RO/ROs and container vessels. The mix of RRF ship types may require adjustment.

Issues

- Efficient strategic airlift for long distance deployment depends on enroute staging bases. More than 80 percent of all airlift missions flowed through two bases scheduled to close: Torrejon and Rhein-Main. If enroute staging bases are not available, reliance on air refueling increases and overall payloads decrease. Forward based forces can both provide staging bases for aircraft that originate in the US and shorten the distances to hasten deployments.

- To address the problems encountered in activating the RRF, the Deputy Secretary of Transportation and Deputy Assistant Secretary of Defense (Logistics), agreed to form a joint DOD and Transportation Department Ready Reserve Force Working Group (RRFWG) to study and make recommendations regarding RRF management based on lessons learned from Operations Desert Shield and Desert Storm. The RRFWG submitted its report, "The Ready Reserve Force, Enhancing a National Asset," on October 23, 1991. The report addresses the ability of the RRF to augment DOD organic sealift assets and the nation's commercial merchant marine fleet in time of national emergency. It also documents DOD and Transportation Department agreements on an integrated plan for the RRF based upon experience during the recent activation of RRF ships. The RRFWG will continue to meet and monitor the implementation of its recommendations.

- There were early problems in airlift systems management. Coupled with the absence of a TPFDD and the uncertain situation confronting CINCCENT, the airlift system did not operate initially at full capacity.

- There are reports that more lift than programmed was required to transport deploying forces. What appears to have happened is that units which had previously deployed only for exercises took much more equipment and supplies when they deployed for actual combat missions.

- There was difficulty in using the developmental JOPES system. An automated airlift scheduling capability, linked between JOPES and an airlift

scheduling function is required. OPLANs must also be updated to identify changes or additional requirements for existing systems.

- While the overall utility of the MPS was proved out, the lack of an early decision to sail MPS -- which is designed to be unilaterally deployed in international waters in ambiguous situations -- reduced the options available to CINCCENT in the early days of the crisis.

- TRANSCOM was not the fully operational common-user manager needed. TRANSCOM's peacetime activities should be organized the same as its wartime activities. Action is under way to identify CINCTRANS as the single manager for common-user transportation and assign all transportation component commands and all common-user transportation forces to CINCTRANS.

- Some prepositioned assets, nominally deployed for other contingencies, were in areas not convenient to the KTO. Nevertheless, they were closer to the KTO than if they had been stored in CONUS. Requirements for prepositioning and for continued US cooperative presence in the Persian Gulf region will remain crucial to US ability to exercise a stabilizing influence there.

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APPENDIX F

LOGISTICS BUILDUP AND SUSTAINMENT

"The overall logistics effort to mobilize and support Desert Shield/Storm was herculean, especially in the weeks prior to initiating hostilities. The superb performance of the logistics community deserves high praise."

General H. Norman Schwarzkopf
Commander-in-Chief, Central Command

The logistician's trade is an essential element of the art of war. From 2 August until hostilities ended 28 February, a common thread that linked Coalition forces' success was the logistics effort to transport, sustain, and maintain a force in the often hostile Arabian peninsula environment as well as a large number of forces, from all Services, outside the theater. A force is only as combat capable as the effectiveness of the logistics support it receives. Logistics is the science of planning and carrying out the movement and maintenance of forces. In its most comprehensive sense, logistics encompasses those aspects of military operations that deal with: design and development, acquisition, storage, movement, distribution, maintenance, removal, and disposition of materiel; movement, evacuation, and hospitalization of personnel; acquisition or construction, maintenance, operation, and disposition of facilities; and acquisition or provision of services.

Although each nation was responsible for its own logistics, in addition to the support Coalition members provided to US forces there were occasions when the United States had to give assistance to other Coalition partners. Also, when deployed for major operations, the Services become more interdependent. Strategic land, sea and airlift are examples of this. Often, commanders-in-chief (CINCs), in their operations plans (OPLAN), designate a Service to provide a common logistics function for the entire theater beginning, for example, 60 days after deployment. For Operation Desert Shield, in some cases, common item support responsibilities exceeded the providing Service's capabilities. After the first 60 days, for example, the other Services and host nation support (HNS) helped the Army provide supply class I (subsistence), and class III (petroleum, oil and lubricants (POL)). In fact, Saudi HNS provided a large share of subsistence, averaging 250,000 meals a day and an estimated two million gallons of potable water a day.

Because of the size of the Coalition response to the Saudi request for assistance, theater support could not simply be integrated into the existing infrastructure. Distribution systems were developed, storage depots and repair facilities built, and supply communications established. Logisticians ensured that

complex support systems worked efficiently in a remote theater's very demanding environmental conditions, where the well-developed coastal infrastructure becomes a rudimentary road system inland. Operations Desert Shield and Desert Storm logisticians succeeded despite the lack of complete information resulting from rapidly changing and often uncertain situations. Finally, very complex force structures magnified logistics challenges.

Though not without its problems, the logistics efforts of the United States and its allies were among the more successful in history. Moving a combat force halfway around the world, linking supply lines that spanned the entire globe, and maintaining unprecedented readiness rates, are a tribute to the people who make the logistics system work. Logisticians from all Services supported more than half a million US Service members with supplies, services, facilities, equipment, maintenance, and transportation. A survey of logisticians' accomplishments shows, among other things, that they:

- Maintained many major weapons systems at or above normal peacetime standards
- Moved more than 1.3 billion ton-miles of cargo from ports to combat units
- Shipped and received more than 112,500 tracked and wheeled vehicles
- Armed weapons systems with more than $2.5 billion worth of munitions
- Constructed more than $615 million worth of support facilities, and,
- At the peak of operations, issued up to 19 million gallons of fuel a day.

These feats were made possible by and are a tribute to the foresight of military logistics planners and investments made in modernization, reliability, and maintainability over the past two decades. Conceptually, the logistician draws the line beyond which the tactician cannot go.

LOGISTICS PLANNING, PREPARATION, AND STRUCTURE

The Army deployed a much larger proportion of combat service support (CSS) than combat units. Army truck transportation is a case in point. Despite the deployment of 72 percent of its truck companies in support of 25 percent of its combat divisions, the Army still relied on HNS trucks to meet requirements. Also, the Navy deployed most of its Combat Logistics Force (CLF) ships to the Central Command (CENTCOM) area of operations (AOR). Within the Army, many support units which eased the logistics mission came from the Reserve Component (RC). Although this was anticipated in force structure planning, the availability and mix of Active Component and RC must be monitored as the Total Force draws down.

Another fundamental influence on the ability to sustain the forces in the theater was the lack of a theater-wide contingency plan before August for supporting the forces that became part of the effort. The discussions in Chapter V and Appendix D highlight the fact there was no approved plan for dealing with the crisis when it occurred. The concept plan had been war gamed extensively during Exercise Internal Look 90, and senior commanders and planners were aware of factors to be considered. However, because logistics support plans are based upon OPLANS and the tactical commander's concept of operations, there was no existing logistical support plan for the scope of support required. The seemingly *ad hoc* creation of the required support organization and structure was carried out quickly and effectively and was based on Service doctrine and experience. Preparation by the Services, their organization, and structures for dealing with the logistics effort should be explained so the context of the effort is better understood. A brief description of some Service-unique arrangements follows.

Army

Army divisions and regiments have Combat Service Support (CSS) units organic to their structures. These units are fixed organizations and generally are the same for comparable types of divisions and regiments. They provide immediate support to the combat elements of those organizations. However, their capabilities for sustaining combat forces are limited, and they depend on organizations at higher echelons to provide a more complete and longer lasting sustainment base.

Absolutely crucial to the successful sustainment of deployed forces is the correct determination and timely introduction of the logistics force structure into the theater. Above the division level, that is at Corps and Theater Army, the composition of logistics units is tailored to the specific force being supported. Size and type of units deployed dictate CSS unit requirements. In addition, the level of enemy activity, expected duration of deployment, geographic location, and theater infrastructure all influence decisions on the scope of support requirement and the type and quantity of CSS units to deploy. Typically, support detachments, companies, battalions, and groups are formed and distributed to support brigades and support groups, which are further organized into support commands (SUPCOMs). The Theater Army Area Command analyzes the commander's logistics requirements, then prepares the plans to satisfy them. These plans are executed by SUPCOM subordinate elements. The theater support command headquarters determines, in large measure, whether support will be provided quickly.

When Operation Desert Shield began, there was a brief period when an adequate command and control (C^2) structure for Army logistics units was not available in the theater. Deployment of these headquarters units was delayed while combat units with higher priority missions were moved into the theater. Earlier in Chapter III, the discussion of deployment priorities explained that Commander-in-

Chief, Central Command (CINCCENT) determined his primary need was combat forces. This assessment resulted in lowering the priority for support unit deployment and thus detracted from the support available to early-deployed combat units.

Since the deployment's length was unknown, and the authority to activate RC forces initially was limited, Army Component, Central Command (ARCENT) elected to establish an *ad hoc* logistics headquarters to oversee this part of the force. This provisional support command became a satisfactory solution during the first phases of the deployment. When the size of the force increased in November, ARCENT did not request mobilization of a theater-level logistics C2 element because this would have disrupted an already functioning system.

This *ad hoc* logistics command element quickly discovered early in the deployment it alone could not effectively handle the massive deployment of combat troops. The soldiers who began arriving in Saudi Arabia on 9 August needed food, shelter, equipment, supplies, sanitation facilities, and transportation. Anticipating this problem, Forces Command sent a general officer to the theater to serve as ARCENT deputy commander for logistics. He and a small handpicked staff were the nucleus of logistics support in the theater. They had experience in deployment and sustainment of large forces as a result of their involvement in annual Return of Forces to Germany exercises and that experience served as the model for creating the Operation Desert Shield logistics support plan.

This small staff was charged with coordinating logistics for the Army. The initial concept had three major tasks:

- Reception of arriving forces;
- Onward movement of those forces; and,
- Sustainment of all soldiers, equipment, and supplies arriving in theater.

These tasks occurred almost simultaneously, and required complex arrangements to ensure coordination throughout the logistics effort.

The decision to deploy combat forces versus CSS units first, while tactically prudent, was a principal reason for the initial burden on the logistics system. The placement of CSS units later in the deployment flow meant deployed units' support was delayed. Initial delays led to support backlogs that grew geometrically and required time and intense management to correct.

Another problem force planners and logisticians faced early was identification of specific units required to support deploying combat forces. Most of these units were not large, but were crucial to sustainment. They included water purification, storage, and distribution detachments; petroleum operating units; supply and service companies; and truck companies. Many of these units are in the RC; rapid mobilization of RC units that could provide vital services became an imperative. Until these units were deployed, Saudi HNS was the logistics mainstay. The ARCENT

logistics cell in Riyadh established special contracting teams to expedite service support agreements for housing, storage facilities, water, food, transport, and more. Another expedient theater logisticians used was to use the logistics elements organic to deploying units to assist with support efforts. Commanders of units arriving in theater frequently provided manpower, drivers and vehicles for the common good of all forces.

The support for the first deployed units was augmented by prepositioned stocks from Army and Air Force (USAF) Afloat Prepositioning Ships (APS) and Marine Corps Maritime Prepositioning Squadron (MPS) vessels, air deployable packages of war reserve materiel (WRM), and agreements with local suppliers for essential items. In early September, Saudi Arabia agreed to provide all food, fuel, water, facilities, and local transportation at no cost for all US forces in Saudi Arabia and surrounding waters. As a result, CINCCENT asked the Department of Defense (DOD) to send a team to negotiate HNS agreements with the Saudis. Because of the lack of any formal HNS agreement with Saudi Arabia, a DOD team of experts, led by a general officer, went to Saudi Arabia on 17 October to work out detailed arrangements. The DOD team eventually concluded an agreement with the Saudis by mid November called "Implementation Plan for Logistics Support of the United States Forces in Defense of the Kingdom of Saudi Arabia."

The plan was retroactive to the beginning of the deployment, and the Saudis subsequently provided $760 million in cash to the US Defense Cooperation Account as reimbursement for US expenses incurred from August to October for items covered by the implementation plan. This effort bore fruit and the Saudis provided a large amount of logistics support. The initial process was difficult as a result of the administrative difficulty of coordinating such a massive transfer of in-kind assistance. Equally important was the HNS for US forces deployed in other nations of the region, which also included free fuel, water, food, and housing provided by the respective host. To facilitate CINCCENT's ability to support his force and to develop a theater infrastructure, advance agreements to enable more expeditious support should be concluded whenever possible.

By 17 August, four Army APS had arrived in theater and provided rations, cots, tents, blankets, and medical supplies, as well as refrigerated trailers, reverse osmosis water purification units (ROWPU), forklifts, packaged fuel, construction and barrier material, ammunition and medical supplies. One semi-submersible Heavy Lift Preposition Ship (HLPS) carried port operating equipment such as tugboats, floating cranes, landing craft, rough terrain forklifts, and repair parts. This satisfied the immediate needs of the new arrivals and eased the most immediate crises in supplying and sustaining them.

Two days after the APS arrived, the *ad hoc* logistics staff became the ARCENT SUPCOM (Provisional). As requirements grew, so too did the SUPCOM staff. Eventually, the staff consisted of more than 750 personnel, of which more than 60 percent were RC soldiers; the mature logistical structure responsible for planning and providing CSS in Saudi Arabia consisted of a theater support command and the two Corps Support Commands (COSCOM).

In addition to meeting its own requirements, CINCCENT appointed ARCENT as executive agent for support of certain common items for all US forces in the theater. Common-item support, provided directly (or arranged through contracting or HNS), consisted of inland surface transportation, port operations, food, backup water support, bulk fuel distribution, common munitions, medical, veterinary services, and graves registration. For various reasons, including lack of items and lack of CSS units, the Army could not meet its common-item support obligations for some items by the specified time. As a result, the other Services relied on organic supply systems much longer than planned. (A diagram of the Army theater organization is in the discussion of C2, in Appendix K.)

The effectiveness of logistics automation during Operations Desert Shield and Desert Storm was substantially degraded by the lack of tactical communications support below corps level. Because of this, CSS units became dependent on commercial telecommunication to augment C^2 tactical communications. In Southwest Asia (SWA), the host nation telecommunications infrastructure in the remote regions of the country was limited to nonexistent.

Army supply transactions were consolidated each day and carried to the next higher level support activity for processing. Supply requests often had to be couriered more than 100 kilometers by tactical vehicle or helicopter. The terrain and long distances between units resulted in delays of eight to 15 days to pass requisitions from company level to the US wholesale system. During the peak of supply activity, requisitions reached as many as 10,700 per day. The effect on the supply system included the loss of manpower to courier transactions, longer order-ship times, and a larger number of parts in the supply pipeline. Processing delays resulted in a loss of confidence in the supply system; the abuse of priority requisitions, with 64.9 percent of all requisitions submitted as high priority; and, in the submission of multiple requisitions and status requests, thus worsening run time, backlog and system saturation problems. Both the Corporate Information Management and Total Asset Visibility initiatives will help to correct these practices and restore confidence in the system.

Air Force

The concept of operations for deployed USAF combat units centers on the unit's ability to deploy with its own organic supply, spares and maintenance personnel to be self sustaining for 30 days, if combined with munitions, fuels and rations. A key aspect of this concept is the War Readiness Spares Kit (WRSK) maintained by deployable aircraft units, and prepackaged for rapid movement. These kits are stocked with spare parts, common use items and hardware according to predicted and known failure rates and contain necessary parts and supplies to repair the unit's aircraft. Within an established theater of operations, USAF units link to an established supply system, usually at the component command level (such

as Air Force Component, Central Command (CENTAF) in SWA). The concept then provides for 30 days to get the lines of communication (LOC) in place to support the longer term requisition system for crucial replacement parts and supplies.

To orchestrate the deployment, beddown, and sustainment of CENTAF units as they arrived in the AOR a CENTAF logistics staff was created and a CENTAF Logistics Readiness Center established. More than 100 personnel coordinated the movement into and within the theater of necessary items such as prepositioned stocks and those supplies required to sustain follow on forces.

Initial USAF logistics support in SWA hinged on effective investments made during the past several years in support systems for bases with little or no improved facilities, called bare bases, investments in WRSK, and prepositioned munitions. The WRM for use in a contingency to convert a bare base into a functional airfield was procured and maintained through a series of Harvest Programs. For example, in addition to the Harvest Eagle housekeeping sets, each capable of supporting more than 1,100 people, and a 4,400-person Harvest Bare package capable of supporting 72 aircraft, a WRM package known as Harvest Falcon was being procured and maintained at the time of the SWA contingency. Harvest Falcon is a bare base contingency package to support 55,000 people and 750 aircraft at 14 separate locations. It includes hardwall shelters, temper tents, vehicles, materiel handling equipment, power generation and distribution equipment, kitchens, water purification and production equipment, and airfield support equipment. At the start of Operation Desert Shield, this package was about 82 percent complete. Even though much equipment had to be maintained in the continental United States (CONUS), having approximately 35 percent of it available in the region made beddown at 21 principal airfields more rapid and much easier than otherwise might have been possible. The equipment and prepositioned munitions worked well despite years in storage.

Units deployed from various commands to Operations Desert Shield and Desert Storm. As mentioned earlier, USAF contingency plans for providing supply support to deployed squadrons called for the units to deploy with their combat supply system to maintain accountability and inventory control of resupply to the WRSK, with kit replenishment provided by a computer support base mainframe computer. The WRSK replenishment was dependent on getting the combat supply system transaction files back to the unit's computer support base. Original plans called for the deployment of a mainframe computer with tactical shelter systems (TSS). The TSSs, however, were not deployed. Because computer-to-computer links were not available, combat supply system transactions were updated at the unit computer support base by mailing, hand carrying floppy diskettes, or modem transmission by phone. This was cumbersome and less than satisfactory. Also, as the US presence in the AOR was extended, a longer term approach to provide sustainment supply support had to be developed. As a result, the CENTAF Supply Support Activity, which regionalized computer support for the 21 individual supply accounts and integrated these efforts under a single CENTAF chief of supply, was created. This system was installed and fully operational on 5 January.

The Activity was established at Langley AFB, VA, with a central data base to which all supply, equipment, and fuels transactions were funneled by satellite. Base supply systems specialists orchestrated the transfer of supply records from home station to Langley. This eased online processing of supply transactions and improved weapon system support. The Activity was manned by 109 personnel from all USAF major commands, who maintained constant liaison with deployed chiefs of supply and remote processing stations. This online standard base supply system capability represented a truly revolutionary way of doing business for deployed units and, while indicative of the lack of adequate organization to provide for unique USAF unit needs, it improved logistics support.

In keeping with operational plans, USAF units deployed with WRSK for initial support of their aviation packages. Each kit was as robust as possible, designed to support the unit for the contingency's first 30 days. For example, when the 317th Tactical Airlift Wing (TAW) arrived in theater, it operated solely out of its WRSK during the initial stages of the deployment. After 60 days of operation, the 317th TAW had maintained a 94 percent mission capable rate, validating the WRSK concept as an essential element of the core wartime materiel requirement.

A contributing factor to this success was funding to support the purchase of aircraft WRSK through FY87, which provided an excellent baseline for most systems in Operations Desert Shield and Desert Storm. From FY 84 through FY 87, WRSK funding averaged 92 percent of the required fill of parts and supply. This funding baseline was instrumental to the mission capability (more than 92 percent) of the deployed tactical aircraft. However, WRSK funding in FY 88 and 89 was cut to less than 35 percent, which caught new systems (such as the F-15E with no established parts supply line) in a funding gap. This caused a significant amount of cannibalization from non-deploying F-15E units to support F-15E requirements for robust WRSK before to deployment. Cannibalization also was required to support other systems with short lead time parts no longer available from earlier funding. Where there were parts shortcomings, the shortcomings were overcome by the surge of logistics centers, discussed in greater detail under Industrial Base, later in this appendix.

Before the air campaign began, USAF units simultaneously sustained ambitious training while maintaining high alert states. Units deployed to SWA maintained average in-commission rates some 10 percent higher than normal peacetime rates, and were able to effectively surge before the air campaign. The overall mission capable (MC) rate of combat aircraft in the AOR on the day prior to Operation Desert Storm was 94.6 percent. (Monthly averages are in table F-10).

Another contribution to USAF logistics performance during Operation Desert Shield was in the area of reliability and maintainability (R&M). R&M improvements in the 1980s meant less spare parts money was needed for newer generation aircraft (e.g. F-16s require only one sixth the dollar value in spare parts of the F-111, and less than half that required for the F-15C). This has produced higher peacetime readiness rates and an improved wartime sortie capacity at lower operating costs and

manpower levels. Improved components reduced maintenance loads, which increased the maintenance crews' ability to keep weapon systems at a high state of readiness.

Dedicated and innovative personnel performance also played a role in the mission readiness levels sustained during Operations Desert Shield and Desert Storm. Despite the harsh environment, USAF logisticians developed effective work arounds. For instance, in 120-degree plus temperatures, some air-cooled engines, such as those on ground-support equipment for aircraft maintenance, tend to shut down as designed after prolonged, uninterrupted use. Effective work arounds included equipment rotation pools, scheduled cool down periods, and the more frequent changing of air filters to catch the fine sand prevalent in certain parts of the region. On-the-spot modifications enabled the relocation of voltage regulators, power supplies, and other temperature sensitive components away from engine hot spots to cooler locations.

Finally, the contributions to readiness achieved through effective analysis were crucial. The recently modernized logistics management systems allowed immediate distribution of depot products to the requester. The weapons system management information system allowed deployed wing commanders to do hypothetical requirements analysis of their assets while it simultaneously determined repair priorities for the depots.

Navy

CLF ships supported the Navy's battle groups in the Persian Gulf and Red Sea much as the Navy performs peacetime battle group resupply. These CLF ships were, in turn, supplied from forward expeditionary logistics sites. CLF ships, along with various Military Sealift Command (MSC) and Ready Reserve Force (RRF) ships, were responsible for the logistics support of more than 115 combatants. In general, CLF operations successfully supported the fleet both in the Red Sea and the Persian Gulf. Most Navy CLF ships were deployed to the CENTCOM AOR, however, this heavy commitment left a minimal mobile logistics support capability in other theaters. By the time Operation Desert Storm began, the increased operations tempo (OPTEMPO) had increased resupply requirement substantially.

Forward logistic sites in Jiddah, Al-Fujayrah, Djibouti, Hurghada, Masirah, Ad-Dawhah (Doha) and Bahrain for both airhead and port operations, and an additional surface resupply port established at Jebel Ali to resupply CLF ships in the Persian Gulf and north Arabian Sea, proved crucial to the fleet logistic operations. They were used as transshipment points for commercial shipping that brought material from the United States.

By the end of Operation Desert Storm, the forward logistic support sites in Bahrain, Al-Fujayrah, and Jabal 'Ali supplied more than 100 Coalition ships in the

Persian Gulf. The combat logistics stores facility in Jiddah provided the CLF ships assigned to the Red Sea the ability to restock, repair, and rearm without depending on the Suez Canal as the logistics link. Airfields in Saudi Arabia and Bahrain also were used as bases for 25 helicopters and fixed-wing aircraft dedicated to logistics support.

Principal NAVCENT Logistics Bases

Map F-1
Principal NAVCENT Logistics Bases

The Navy also was responsible for coordinating port security and harbor defense (PSHD) for the three major ports in the Gulf region. Three PSHD groups, consisting of a Mobile Inshore Undersea Warfare Unit (providing radar and sonar surveillance), a Coast Guard small boat security team, and a Navy explosive ordnance disposal diving team, protected the key ports of Al-Jubayl and Ad-Dammam, Saudi Arabia, and Bahrain.

Marine Corps

Marine Corps (USMC) logistics forces are structured to be expeditionary and integral to a Marine Air-Ground Task Force (MAGTF). Task-organized CSS elements

assigned to MAGTFs are tailored for the specific force they support; they deploy with the MAGTF to provide immediate support to air and ground combat units. In the early stages of Operation Desert Shield, this structure proved itself, as the 7th and 1st Marine Expeditionary Brigades (MEB), both linked to MPS ships, deployed to Saudi Arabia and were able to establish logistics support facilities immediately. USMC CSS units assumed control of Al-Jubayl port operations, and established logistics sites near the city. In early September, the two deployed MEB service support groups were combined and reinforced to form the 1st Force Service Support Group (FSSG), a logistics command able to meet I Marine Expeditionary Force (MEF) logistics requirements. The 1st FSSG subsequently expanded to meet all additional USMC needs from USMC and Army common-user stocks. Before the crisis, USMC planners had anticipated these actions .

USMC doctrine states that a MEF deploy with 60 days' sustainment, a MEB with 30 days and a Marine Expeditionary Unit with 15 days. MPS ships carry the unit equipment and 30 days' sustainment for a mechanized MEB of 16,500 Marines and sailors. Once a MEB is committed, additional sustainment is shipped based upon the assigned mission. Equipment and supplies from MPS-2 and MPS-3 contributed to the rapid I MEF buildup. The nine MPS ships provided the equipment and 30 days' sustainment for food, fuel, ammunition, medical supplies, two days of supply (DOS) of potable water, and repair parts for two-thirds of the USMC forces ashore.

(U) While expeditionary in nature, USMC logistics forces are not structured for sustained operations ashore, at great distances from the coast. To conduct such operations, Marines rely on joint doctrine and service agreements for such support as intratheater transportation, common-item support, and establishment of extensive base areas and theater-level logistics structures. Joint doctrine and service agreements call for much of this support to be assumed by the Army and USAF after 60 days. The late deployment of Army logistics forces strained USMC logistics capabilities, and the Marines found themselves not only providing support beyond the 60-day sustainment, but also providing support, particularly rations and water, to Army combat forces from MPS stores. Later, when I MEF moved inland before the ground offensive, the USMC relied on extensive HNS and the other Services for heavy ground transportation.

To ensure aviation maintenance and supply support, Aviation Logistics Support Ships (TAVB), activated from reduced operating status, were loaded at the beginning of the crisis with adequate supplies and facilities to provide intermediate maintenance support for both fixed-wing and helicopter aircraft. TAVB operation is described in greater detail under equipment maintenance strategy.

Each Service had unique logistics capabilities, matched to the unique strength it brought to the conflict. But just as important to the logistics preparation was the infrastructure within which they had to sustain combat operations. CENTCOM 's ability to bring together a complex array of forces was eased by the regional Coalition partners' cooperation. While some aspects of the region's infrastructure were among the more modern in the world, the vastness of the area, the variable topography, the recent decade's industrial boom from oil revenues, and limited

societal need for complex road and rail networks each affected the success of the sustainment operation. Before describing that operation, it is useful to understand the support provided by the region's nations.

REGIONAL NATIONS' SUPPORT

US forces rapidly deployed a large, heavy force with no prior Saudi Arabia/US HNS planning or acquisition procedures in effect. US military organic support capabilities in August and September were austere and inadequate to support the mission. Large, crucial support shortfalls surfaced immediately. Saudi Arabia reacted well to meet US requirements and considerable HNS was provided immediately for support needs at airports, seaports, and initial base camps. By 15 August, US logisticians laid out the initial HNS requirements into these 20 functional areas.

- Accommodations
- Airports
- Construction
- Communications
- Facilities
- Fuel
- Hygiene
- Medical
- Maintenance
- Materiel
- Seaports
- Security
- Services
- Specialized equipment
- Storage
- Subsistence
- Supplies
- Transportation
- Utilities
- Water (includes ice)

As HNS requirements grew, it became readily apparent that a formal Saudi/US HNS organization was needed to request, acquire, and integrate HNS assets into organic US support systems. An assistant chief of staff for host nation activities was established to deal with all Saudi Arabian and allied support for US forces to include contingency contracting policy and civil-military operations.

In November, Saudi Arabia signed the Saudi Arabia HNS Implementation Plan agreeing to support US forces. This plan rolled the original 20 HNS functional area requirements into five areas: fuel, food, water, transportation, and accommodations/facilities. The HNS Implementation Plan did three things. It provided US forces with government controlled/owned assets, contracted to obtain assets to be provided US forces, or reimbursed the United States for contracts the US let to provide for US forces' needs. As of 1 August 1991, Saudi Arabia had provided US forces with HNS amounting to $13.4 billion.

Infrastructure

While the region's major seaports and airports were modern, there still were many limits on the region's ability to support the rapid influx of a large force. Away from the immediate arrival facilities, the support infrastructure was less robust. The major transportation arteries were primarily between the major population centers. The secondary road network also had limited fresh food and developed housing. The national infrastructure's strengths caused by the build up of the oil industry in the 1970s and 1980s also highlight the limitations it presented to such a large fighting force. The industry had developed an infrastructure that principally supported those avenues of access required for that industry's particular operations. This left the vastness of the country relatively less developed, complicating military transportation requirements and delaying resupply that would accommodate the sudden influx of more than half a million people.

(U) US development of the theater infrastructure also was constrained. Because spending was limited to minor construction, it was difficult to improve the infrastructure to receive and sustain a large force. Most required construction exceeded the $200,000 limit in Section 2805, Title 10, USC, for new construction using US operations and maintenance (O&M) funds. While this limit adequately constrained peacetime spending, it curtailed the Service component's ability to provide timely facilities support, using US funds, to their forces during a contingency. Even when raised to $300,000, as recommended in the President's FY92 budget submission, the limit constrains crucial construction support requirements during contingencies. Emergency construction authority under Section 2808, Title 10, USC, allowing use of unobligated military construction funds, was obtained by Executive Order on 14 November. However, because of this late approval, and the availability of host nation construction support and assistance-in-kind from the Government of Japan, the unobligated funds authorization was used for only two projects. Since future contingencies may not enjoy this extensive host nation and third party support, procedures should be implemented to trigger access to higher O&M limits and early activation of Section 2808, Title 10, USC, to ensure responsiveness of construction funding support to the combatant commander.

Aerial Ports of Debarkation (APODs)

The two initial primary aerial ports of debarkation (APODs), Dhahran and Riyadh, had long, modern runways, associated airport environment structures such as navigation aids, modern facilities, communication capabilities, and more ramp space than most commercial airports. The ability to handle large numbers of aircraft, however, was limited. And, because of the large numbers of rapidly arriving aircraft, there was limited available ramp space for parking aircraft. Despite this, primary APODs were better than most in the region. Eventually, the United States expanded the airlift operation to other airports, principally King Fahd, King Khalid,

and others. Also of importance were the airport facilities provided by Oman at the preposition bases of Thumrait and Masirah. Each offered long, well-established runways.

Sea Ports of Debarkation (SPODs)

The Coalition was fortunate that Saudi Arabia has an excellent port infrastructure, with seven major ports capable of handling large quantities of material daily. Four of the major ports are on the Persian Gulf coast; three are on the Red Sea coast. The two principal theater seaports, Ad-Dammam and Al-Jubayl, had heavy lift equipment, warehouses, outdoor hardstand storage and staging areas, and good road networks around the port facilities. The warehouses generally were full, though, and there was not enough storage capacity at these port facilities to handle the large amount of equipment and supplies that arrived in such a short period. Saudi Arabia cooperated fully in making the port facilities available, and allocated more than 70 percent of the throughput capability in the theater to support Coalition forces. Other in-theater port operations, used to move prepositioned stocks and provide storage, were conducted in Bahrain, Oman, and the United Arab Emirates (UAE).

Storage Facilities

While some large storage facilities existed at the main ports, there was a significant shortage of storage capacity at virtually every location. At the sea port of debarkation SPOD, the Army Engineers and Navy Seabees constructed storage space to protect arriving shipments until they could be moved from the ports. The lack of good road networks inland and the overall shortage of trucks worsened the problem at the ports. The same was generally true at the APOD as well, where Army and USAF engineers also constructed temporary storage space. Warehouses and staging yards also were leased from local owners, using a combination of US funds and HNS.

Surface Transportation Network

The transportation network in theater consists of a mix of six-lane, four-lane and two-lane asphalt roads. Hard surface roads connect Saudi Arabia to Kuwait, Iraq, Jordan, Qatar, the UAE, Bahrain, and Yemen. Secondary roads connect the major cities and towns to minor towns and villages and into the outlying region. Paralleling the Trans-Arabian Pipeline is the Tapline Road, a crucial east-west roadway. The other significant roadway is the 500-km/300-mile-long coastal

highway from the Kuwaiti border south to the Qatari border. In terms of rail network, there is only one active rail line in the country, a standard-gauge single track from the port of Ad-Dammam to Riyadh.

Distances from the ports of debarkation to the final combat positions were great. From Dhahran to the theater logistical base at King Khalid Military City (KKMC) is 334 miles along the northern main supply route and 528 miles through Riyadh. The XVIII Airborne Corps forward tactical assembly area was more than 500 miles from Ad-Dammam by the northern route and 696 miles by the southern road. The highways became high-speed avenues for combat units and supplies moving to their destinations. Because large stretches were multi-lane roads, they allowed heavy volumes of traffic to move fast, both as individual vehicles and as convoys. Even those roads that were not multi-lane were paved and generally in good condition. Unfortunately, the established road network, while good where it existed, was limited to major arteries between major cities. US engineers and host nation contractors solved the limited road network problem by constructing or maintaining more than 2,150 miles of roads used to support the deployed forces.

To increase the road network's efficiency, ARCENT established convoy support centers. These truck stops operated 24 hours a day and had fuel, latrines, food, sleeping tents, and limited repair facilities. They added to the comfort, safety, and morale of the forces traveling in the theater. Because of the long distances, these rest areas quickly became favorite landmarks to those who drove the main supply routes (MSR).

Supply Support

Another factor that multiplied the logistics effort effectiveness was the supply support other nations provided. In fact, this support was crucial to the rapid deployment of forces to the theater and allowed the flexibility of deploying substantial amounts of combat power early in the sequence when risks were greatest. Had HNS or assistance in-kind not been provided by the Coalition partners and other responsible allies and friends, some combat units would have been displaced by support units when that did not seem prudent. This sort of support was crucial to US efforts throughout the operation. Food supplements, fuel, and services provided by the Gulf Cooperation Council states were invaluable.

Early in the deployment, the newly established ARCENT SUPCOM began to formalize requests for Saudi Government assistance. As early as 18 August, the logistics operations center developed a list of the command's basic HNS needs for 45 days. Discussed in greater detail in the assistance-in-kind section in this report, the Saudis agreed to provide tents, food, transportation, real estate, and civilian labor support.

However, HNS within the context of Operations Desert Shield and Desert Storm was much broader than the substantial Saudi Arabian support. The preposition storage facilities at Thumrait, Masirah, and Seeb, Oman, were significant to the CENTAF operation. Oman also provided construction materials, food preparation facilities, local worker labor support, and helped correct the transportation problems the initial units encountered. The UAE, another aircraft beddown location, provided port facilities for the Coalition ships as well as lodging, food, fuel and security. Bahrain hosted a large segment of the fighter and tanker force, and provided important port facilities to maintain Coalition shipping. It also provided lodging, food, and facilities support for the forces based there. All countries in the region increased output of refined petroleum products and made them available to Coalition forces, in certain cases putting themselves in the position of having to import a particular type of fuel for domestic use.

Host nation contributions were a major factor in the fuels operation's success. All ground fuels, and most jet fuel, except for JP-5 and jet fuel, thermally stable (JPTS), were provided from in the theater. Commercial airport contractors provided refueling support, host military provided aircraft refueling at military bases, and host nation trucks and drivers provided most inland distribution to move fuel from refineries and depots to the bases. This removed a major burden from ARCENT, which was responsible for bulk fuel inland distribution and had committed most of its truck companies to moving fuel for ground forces. By the time the offensive started, US fuels personnel and mobility equipment, such as portable hydrants, bladders, pumps and fuel transfer systems, combined with host nation personnel and fuels facilities, were available at each deployed location to provide refueling support to sustain the operation. Additionally, fuel distribution and storage equipment from the Southwest Asia Petroleum Distribution Operational Project (SWAPDOP) was deployed from CONUS to the AOR. It consists of pipeline, tactical petroleum terminals, and pump stations used to distribute large quantities of fuel across great distances. During Operations Desert Shield and Desert Storm, more than 127 miles of tactical pipeline were laid to provide a quick response to urgent operational support requirements, enabling the movement and storage of greater quantities of fuel farther forward.

Most sustainment fuel was acquired in the AOR from the host nations. The inland fuel delivery to air bases and component units behind the Corps area was done by host nation transport and organic line-haul tank truck, freeing tactical military vehicles to deliver fuel forward of the Corps rear boundary to divisions and brigades. Requirements for specialty fuels, however, posed a special challenge.

JPTS was required for some aircraft deployed to the Theater. Initially, no JPTS supply was available in the AOR; the closest sources were in southern Europe. The JPTS at one location consisted of 3,000 55-gallon drums which were airlifted to the Theater using organic KC-10 and Transportation Command (TRANSCOM) C-141 airlift. The JPTS at another consisted of approximately 700,000 gallons which was stored in bulk fuel tanks. Approximately 100,000 gallons were airlifted from this location to the AOR by Aerial Bulk Fuel Delivery Systems, mounted in C-141s. Additional needs were moved in drums by truck from the refinery in Texas to

Barksdale AFB, LA, where it was airlifted to the AOR. Once 60 DOS was established in theater, resupply was established using sealift and line-haul tank trucks. This requirement was the exception to the single fuel used by most forces in the AOR.

The single fuel concept, which involves the ability of land-based air and ground forces to operate with a single, common fuel, was successfully used by several USAF, USMC, and Army units. JET A-1 was used as the common fuel for aircraft and ground vehicles, weapons systems, and equipment within these units. The use of a single, common fuel increased tactical flexibility, simplified battlefield logistics, and maximized available fuel transport equipment. Some Army units chose to use diesel fuel since it was readily available in theater and produces a better smoke screen when used in the M1A1 engine exhaust smoke system. USAF aircraft operating from host nation air bases used the same type fuel as the host nation forces except USAF injected anti-ice, antistatic, and anti-corrosion additives.

The availability of facilities, supplies, and manpower at the host nation locations established the baseline for the initial sustainment requirement. The requirement, however, was a complex iteration of needs that encompassed all aspects of receiving, storing, expenditure planning, and consumption prediction. To accommodate this intricate planning and sustaining process, a sustainment base was established that lashed together the forces' needs and capabilities.

SUSTAINMENT

Nature of the Sustainment Base

Within the theater, a complex logistics sustainment effort was required to maintain and improve combat capability. Deploying forces depended on extensive lateral support from other theaters, requiring the movement of stocks between theaters for some items, known as cross leveling. Most notable was the heavy use of equipment and stocks from the European Command (EUCOM), explained in greater detail throughout this section. Extensive use of depot resupply before deployment to overcome normal peacetime deficits also was required. Post-deployment support and sustainment of forces in theater was significantly improved by the surge of organic depot production, Defense Logistics Agency (DLA) efforts, the availability of lateral support from EUCOM, industrial base responsiveness, and the availability of airlift to bring high priority items into the theater quickly and sealift to move efficiently the large volume of sustainment cargo.

Sustainment includes providing and maintaining the force and equipment a combatant CINC requires to accomplish the national objectives. Establishment of a sustainment base involves determining what is required to let a force achieve those objectives within a specific period of time. As a general rule, the theater commander

estimates the length of time the operation will require. This estimate is passed to the logistician in the form of a stockage objective. Logisticians then calculate, and combat force commanders approve, the amount of supplies and services required based on time, environment, type of operation, type of force, and the number of troops in theater.

The computations involved are relatively complex and the data must be tempered by judgment. Supply calculations resulting from this process are expressed in terms of days of supply (DOS). Although the calculations themselves are more sophisticated, involving failure rates, order times and demand analysis, DOS are shorthand expressions of tonnages or gallons. For example, rather than give the number of tons of a particular commodity available in the theater – a relatively meaningless figure in itself – logisticians speak of the number of days those tonnages will support the force at the present or anticipated consumption rates. Thus, to report there are 10 DOS of a particular commodity on hand indicates that, if there is no change in plans, the stocks available are sufficient to sustain the force for 10 days.

The DOS also tell logisticians how close the sustainment base is to satisfying the commander's stockage objective and whether expenditure controls should be imposed. If, for example, the commander has estimated the operation will require 10 DOS of ammunition and there are seven DOS on hand, action must be taken to increase stock levels or limit expenditures by establishing priorities.

Supply calculations for the size of the sustainment base also are used as part of the formula to compute transportation requirements and the need for units to receive, store, and issue supplies. Both requirements are predicated on the quantities of materiel at the base and the need to distribute it to using units.

Although it is not difficult to understand the November decision to increase the size of the force in terms of personnel, the fact this decision had significant meaning for the sustainment base is not always as clear. Essentially, as initial deployments were made, sustainment stocks were introduced into the theater, first through the use of prepositioned ships, and later from CONUS or stocks in forward bases. As the deployment flow slowed, more lift became available to increase sustainment base shipments. As these shipments arrived in theater, they were distributed to units that required them or to theater storage areas. When the decision to deploy additional forces was made, the demands for these stocks increased, and increased the requirement for the transportation system to bring additional amounts into the region.

Expanding Logistic Requirements

The logistics requirements visualized in August were far less than those projected just a few months later. In August, the concept of operations was

primarily defensive, with logistics sustainment requirements developed accordingly. However, the decision to move into offensive posture required increases in: forces deployed; operations tempo (OPTEMPO), with its corresponding expansion in the geographic AOR; expected consumption of munitions, fuel, spare parts, storage requirements; maintenance; and demands for intratheater transportation. The change in sustainment requirements also had other effects. It necessitated establishing additional forward logistics support bases to reduce the distance between fighting forces and the support base and making the transportation system more efficient. In addition, CINCCENT directed the stockage levels in theater for food and ammunition be increased from 30 to 60 DOS. The increase in the number of forces, the requirements for new bases and the increase in stockage levels caused a major increase in logistics workload. A discussion of the effect of these factors on petroleum and munitions provides insights to the logistics challenges to the theater.

The CENTCOM Joint Petroleum Office developed petroleum requirements and passed them to the Defense Fuel Region/ Middle East (DFR/ME), a subordinate element of the DLA Defense Fuel Supply Center (DFSC) at Cameron Station, Alexandria, VA. In turn, DFR/ME identified sources of supply and, in coordination with MSC, scheduled the tanker ships to carry the bulk petroleum to the AOR. Although fuel was shipped to the AOR from both CONUS and other regions, the primary fuel source throughout the operation was Saudi Arabia and, to a lesser degree, other Coalition nations; the remaining fuel required to attain the desired stockage levels was shipped from other sources.

Fuel already had been prepositioned both in and near the AOR before the Iraqi invasion. Defense Fuels Supply Points (DFSP) had also been established. Support also was provided from DFSPs in Spain, Italy, Greece, Turkey, Singapore and Hawaii. Three Afloat Prepositioning Force (APF) ships with POL also had been stationed at Diego Garcia. The DFSP, along with the APF ship cargoes, represented approximately 32 DOS of prepositioned stocks for the early plans. In addition to the prepositioned WRM stocks ashore and afloat, on-base stocks of USAF-owned fuel in theater added another two DOS. And, each MPS squadron had enough fuel on board its ships to sustain its deployed Marines for 30 days.

But when the force levels were increased, in-theater requirements increased proportionately. Even though the 30 DOS theater stockage policy did not change with the increase in force levels, the ability to stock the larger quantities required by the increased number of users became more of a challenge. A more complete discussion of storage follows in the consumable storage section of this appendix.

The increase in force levels and the commensurate optempo increase anticipated by the change from defense to offense called for a substantial increase in the amount of fuel required to sustain the force. Increasing the share of output from Saudi refineries for jet fuel, bringing tanker ships to safe haven berths as floating storage capacity, and the laying of tactical pipelines to ease movement to forward storage bladders are but a few of the methods used to increase the available usable fuel for the forces. Munitions, however, posed an even more challenging task for the logistician.

The increase in the force structure, and the increased stockage objective from 30 to 60 DOS had perhaps the greatest impact on munitions supply functions. This was because stocks of munitions generally require significant amounts of material handling equipment (MHE) (e.g., forklifts and roller conveyors), special handling and shipping precautions, and must be sent to storage sites reasonably near the user. Because of the weight and handling characteristics associated with munitions, early identification of requirements is crucial to planning the most efficient shipment and delivery. Airlift is an extremely inefficient means of movement because munitions tend to be too heavy to carry in efficient loads when that aircraft could be carrying greater quantities of other high-value goods. Sealift is the most efficient for moving munitions, but requires time for the transfer from land transportation to sea ports, sea transit time, and then movement to the point of intended use. Transport is limited by the number of trucks available to move the ammunition within the theater and the nature of the road network. The effect of some factors is reduced if ammunition is containerized. However, there is a need for the necessary infrastructure – in terms of containers, container ships, port handling equipment, line haul equipment, and MHE for unloading containers at their destinations. Therefore, careful planning and positioning of munitions is crucial.

Before Operation Desert Shield, munitions of all Services aboard the MPS and the APS were being upgraded in both quantity and quality. The Committee for Ammunition Logistics Support had made reallocation decisions concerning the worldwide stockage levels of munitions and the types allocated to each theater. As a result of these decisions, part of the worldwide munitions assets were reallocated to CINCCENT. This action began the process of identifying preferred munitions, or those that would most likely be used against the types of anticipated targets within the planned threat scenario, and the requirements for modernization. This gave the CENTCOM logisticians a better understanding of the shortfalls and requirements for munitions in the theater.

As the initial 30 DOS requirement was established, munitions requirements, though not fully satisfied, were met initially by APS, USAF preposition stocks in theater, and APF and MPS munitions ships. Except for the MPS ships which unloaded at Al-Jubayl, these ships started to arrive at Ad-Dammam, a principal SPOD, on 17 August, and continued to arrive through 31 August. Unloading these vessels was delayed by port congestion. This was, in part, a result of an inadequate CSS structure, which included a shortage of trucks and drivers to move the cargo out of the ports and into the storage sites. Inadequate CSS structure also delayed development of ammunition storage sites in the Corps and Theater areas, which also contributed to port congestion.

The arrival of the *USS Cleveland* on 21 September continued the flow of sustainment munitions to the theater. The requirements for munitions varied with the many types of weapons the forces had in the theater. The services focused on stockpiling munitions such as Hellfire, 120-mm tank ammunition, Maverick air-to-ground missiles, 30-mm rounds, laser-guided bombs (LGB) and anti-tank cluster

bombs, all of which are effective antitank munitions. These types of ammunition were crucial to effective defensive as well as offensive operations.

The decision to deploy an armor force composed mainly of M1A1s required an exchange of 105-mm tank rounds for 120-mm tank rounds. During the sustainment buildup, nearly 220,000 120-mm tank rounds were supplied. However, because of the short duration of the war and fewer active engagements than anticipated during the ground campaign, expenditures were only about 3,600.

Requirements calculations improved as the planning for conflict got closer to actual execution. Requirements determination by the Service components reflected frequent changes in planning assumptions and optempo reassessments. Coupled with malpositioning, these changes in requirements were reflected in perceived shortages of some types of munitions. For example, Marine Component, Central Command (MARCENT) did not achieve a satisfactory stockage level in air munitions until early February. This was due to delays in determining aviation munitions requirements because of the changes in plans, the length of the sustainment pipeline, and dependence on obtaining common aviation ordnance items from Navy and USMC stocks.

Also, CENTAF munitions requirements were adjusted during planning for the air campaign, but while the initial stockage levels were within the planned expenditure rate at the beginning of hostilities, once the air campaign began, expenditure rates increased well beyond the anticipated resupply levels for certain preferred munitions, such as the 500-lb LGB. This affected sustainment by changing the requirement for the 500-lb LGB. Another early emphasis was on movement of Maverick antitank missiles and high-speed antiradiation missiles, and this emphasis was validated by the expenditure rates experienced during the air campaign. Also, though the high expenditure rate of precision-guided munitions (PGM) was anticipated, full stockages were not received until after the air campaign began. The short notice approval for introduction of B-52 operations in Theater caused special airlift requirements for M-117 (750-lb bomb) from alternate storage locations.

The successful effort to provide the material required to sustain a force of a half million people was not without its difficulties. However, robust support infrastructure near the theater was invaluable to the success of the sustainment effort of Operations Desert Shield and Desert Storm. That robust support infrastructure was in Europe, under EUCOM, which played an important role in establishing an adequate sustainment base from which CENTCOM could operate.

EUCOM Support

Because of its location so near the CENTCOM area of responsibility, EUCOM provided en route support; munitions, maintenance, materiel and equipment;

major combat forces; and Joint Task Force (JTF) operations in support of Operations Desert Shield and Desert Storm. As a major command charged with the defense of Europe, EUCOM is home to major US fighting forces. As such, units and assets not readily available from other areas added their strength to the Coalition forces.

As the SWA situation developed, EUCOM geared up to support the operation. Forward-deployed forces helped maintain strategic agility. The value of existing facilities and prepositioned stocks and equipment reaffirmed the concept of forward basing. Individual relationships and personal trust developed during years of close work with the North Atlantic Treaty Organization (NATO) paid great dividends. Bases within EUCOM received cargo and personnel en route to the conflict and set up intermediate maintenance facilities. These facilities were established to support increased repair requirements dictated by increased use of weapon systems and the harsh SWA desert environment.

As a transit and staging base, 84 percent of all US strategic airlift, combat aircraft, and naval vessels passed through the EUCOM AOR. Bases in England, Germany, Spain, Italy, Greece, and Turkey provided support, personnel, and supplies to help sustain the forces of Operations Desert Shield and Desert Storm.

EUCOM supply support to the CENTCOM area of operations was substantial. To help feed and protect deployed troops, more than 2.1 million meals, ready to eat (MREs), more than one million T- and B-rations, and more than one million chemical garments were provided from EUCOM stockpiles. Considerable amounts of munitions, including preferred munitions and Patriot missiles, also were shipped. Support extended beyond expendables; major end items also were contributed. More than $2 billion of the Prepositioned Organization Materiel Configured in Unit Sets (POMCUS), totaling 1,300 tanks and armored combat vehicles, were sent to the AOR. EUCOM's largest contribution to sustainment of the deployed forces in SWA for the long term was its European-based maintenance complex.

EUCOM sites were used as a readily available base for the repair of equipment that required facilities or test equipment beyond that available in theater. US air bases in Europe repaired avionics components not only for aircraft owned by US Air Forces in Europe (USAFE), but for units deployed from CONUS as well. Jet engines also required extensive facilities to provide maintenance and overhaul necessary to maintain high readiness rates. European bases provided these engine repair shops. Bitburg and Hahn provided F-15 and F-16 support and the Rhein Main Air Base C-130 engine shop was expanded to provide support for all C-130 aircraft within the CENTCOM AOR. More than 4,500 avionics and 500 engine repairs were performed.

The desert environment and amount of complex repair and test equipment needed also made existing US bases in Europe the choice for some repairs. For example, C-130 propeller repairs require large amounts of heavy, low technology equipment and fixtures as well as a clean room for assembling hub gear boxes. Instead of moving all this to the desert, it was decided to expand the existing shop at

Rhein Main Air Base and perform the repairs there. Completed propellers then were shipped to the AOR for final assembly of hubs and blades.

Army Materiel Command (AMC), Europe, also provided a ready military industrial base to repair ARCENT engines, transmissions, transfer cases, and other end items. AMC shops completed more than 7,500 repairs, which were set aside for CENTCOM use. These repairs included 1,800 engines, 832 transmissions, and 852 transfer cases.

Naval Forces, Europe (NAVEUR), provided similar support for deployed naval forces both in and around the theater of operations. NAVEUR repaired more than 200 jet engines for MARCENT aircraft. These efforts kept both end items and components from being sent to CONUS for maintenance and repair.

In addition to support for forces deployed to the SWA AOR, EUCOM also supported combat operations from within its own theater. JTF Proven Force, based in Turkey, a country for which EUCOM has responsibility, conducted military operations into the AOR in direct support of CENTCOM. EUCOM provided continuing support to forces including fighter and tanker aircraft, naval forces, Army special operations forces and Patriot batteries. The support EUCOM provided allowed CENTCOM logisticians to concentrate on the problems associated with beddown of the forces within the AOR, and relieved many aspects of the long supply lines to SWA.

Proven Force

EUCOM support to Operation Proven Force included all aspects of logistics. From an initial plan to support a small force designed to divert enemy equipment and resources, the concept quickly grew to support deployed Army units and 1.2 fighter wing equivalents.

Deployed aircraft assets quickly took on the aspects of a composite wing, made up of small numbers of aircraft from many units. This created a challenge for maintenance personnel since EUCOM had not tested true, composite support organizations previously. Fighter units were consolidated under a single support organization umbrella using a two-level maintenance concept, while Strategic Air Command (SAC), MAC and the Airborne Warning and Control System (AWACS) detachment maintenance support was provided by their own deployed personnel. The two-level concept relied heavily on each unit's home station to provide intermediate level repair support. The timely repair of parts by home station, coupled with a responsive transportation flow, was very effective as demonstrated by a low total not mission capable supply rate of 9.5 percent for the fighter aircraft fleet. A drawback to this support concept was that it placed an added burden on an already-taxed transportation system.

After initial delays with Turkish customs concerning the inspection and release of large quantities of equipment and supplies arriving in the AOR, airlift became the life blood of deployed operations. Transportation personnel prepared, packaged, loaded, moved and unloaded tens of thousands of items in direct support of JTF Proven Force. Ninety-eight C-5, 102 C-141, 82 C-130, and 35 other support aircraft moved more than 8,000 short tons of cargo and more than 4,000 passengers into the AOR. In addition, more than 3,300 short tons of cargo were moved by surface. This large quantity of items destined for several different deployed units posed not only a tremendous workload for transportation personnel but also a special challenge for the supply system in Turkey.

USAFE opted to establish a separate supply account for each deployed aircraft unit to provide better support. This necessitated establishment of five new supply accounts at Ramstein Air Base, since the Incirlik supply computer already was saturated. With a framework in place, supply operations began in earnest. Units processed up to 45 Mission Impaired Capability Awaiting Parts (MICAP) requests daily. Most MICAP parts were located in hours in the European theater, using the MICAP Asset Sourcing System. The problem was to get the parts to the user quickly. To solve this transportation problem, two pallet spaces were dedicated on daily C-130 missions to Turkey. Project code Fox pallet space was used only for MICAPs, WRSK replenishment, and other high priority assets. Fuel support, however, proved to be as much of a challenge for supply as parts support.

The fuels infrastructure in Turkey was saturated. USAFE, EUCOM/J-4, the DFSC, and the Defense Fuels Region/ Europe negotiated with the Turkish government to ensure adequate fuel supplies were available. This effort added almost eight million gallons of fuel storage and pipeline time to existing capabilities. Contacts also were let for daily tank truck deliveries of more than 600,000 gallons of aviation fuel to Incirlik Air Base.

In addition to fuel, USAFE provided operational contract support in several areas. Besides providing support to units deployed to Incirlik Air Base, contracting support also was required for a forward base for the Joint Special Operations Task Force. In all, contracting officers obligated $5.7 million on more than 1,100 actions.

TRANSPORTATION

The detailed discussion on strategic lift in the section on mobilization and deployment in Appendix E emphasizes the accomplishments and limitations of US mobility capabilities within the context of deploying forces. But the importance of lift to the sustainment of the Coalition forces cannot be overlooked. While the scale of the deployment is impressive, equally impressive is the sustained operation to supply the forces even while the deployment was occurring. To place the sustainment lift effort in context, the fact that in little more than seven months more than 544,000 tons of equipment and supplies were airlifted, more than 3.4 million

tons of dry cargo and more than 6.1 million barrels of petroleum products were moved by sea reflects the intensity of the sustainment effort. By comparison, cargo delivered during the Persian Gulf Conflict was greater than the cargo moved across the English Channel to Normandy in support of the D-Day invasion during a comparable seven-month period, and significantly exceeded the more than 2.3 million tons of coal, food, and medical supplies that had been moved to West Berlin during the Berlin airlift. The transportation of the sustainment cargo for Operations Desert Shield and Desert Storm involved all aspects of available lift – including land, sea and airlift, water terminal operations, Civil Reserve Air Fleet (CRAF) elements, foreign-flagged air and sea carriers either donated or leased, and tactical air and ground transportation assets, organic, donated or leased from foreign sources.

MHE to load and unload unit equipment and supplies is a crucial factor in deploying and sustaining forces. A large amount of MHE was deployed, including 204 40,000-pound capacity cargo loaders to support military cargo aircraft and specialized equipment to support wide-body cargo aircraft, which was sent to the AOR. A shortage of equipment to support wide-body contract cargo aircraft slowed commercial operations and resulted in some extended ground times in the AOR in August. (The 40,000-pound loaders are not compatible with the wide-body cargo aircraft and rapidly are completing their useful life. Additionally, the weight capacity of current equipment limits some operations.)

The first major phase of the transportation effort was the initial deployment of combat forces, covered in the appendix on deployment. Of equal magnitude was the task of receiving and moving troops and their equipment to operating areas once they arrived in theater. The arriving forces began the task of developing high combat readiness levels while concurrently preparing for sustained combat. As the arrival of forces, support material, and supplies began to stabilize, ARCENT SUPCOM began work on a comprehensive plan to support the arrival of additional forces, sustain operational requirements during offensive operations, and provide for redeployment after hostilities.

The SUPCOM faced severe limitations from the beginning. While the region's infrastructure, such as the sea and air ports, was large and modern by any standard, the requirements to house, feed, and move troops to their combat locations overwhelmed available facilities. Also, when the decision was made to deploy combat units first, the long supply lines, limited host nation transportation infrastructure, and limited initial HNS increased the difficulty. Innovative command and personal involvement at all levels made the logistics support work. But the requirements levied on the logistics system changed as the decision to increase the number of forces in the theater changed, and the lift, sustainment, intratheater transportation, storage and maintenance requirements became all the more taxing on an already stressed logistics system.

Strategic Lift

The sustainment of combat forces and equipment would not have been possible without the combined assets of MAC, MSC, and Military Traffic Management Command (MTMC); supporting civil assets; and the material prepositioned in or available to be moved to the theater. These three elements comprise the nation's strategic lift capability. During Operations Desert Shield and Desert Storm, airlift delivered more than 544,000 tons of cargo -- five percent of the total cargo or 15 percent of all cargo when bulk petroleum is excluded -- while simultaneously delivering more than 500,000 passengers during the deployment and sustainment phases. Sealift was the work horse of the deployment and sustainment operations and, for Operations Desert Shield and Desert Storm, delivered 95 percent of all cargo. The role of the prepositioned equipment and supplies was crucial to the early combat capability and the sustainment of the forces, and reduced the number of airlift and sealift missions required into the theater.

Airlift

After the initial surge to deploy forces, strategic airlift objectives shifted to sustaining the force. There normally were 50 to 65 Operation Desert Shield C-5 and C-141 missions into the theater each day during the August surge, simultaneously deploying troops and sustainment cargo for the units already in the theater. C-5 and C-141 Operation Desert Shield activity tapered to an average of 44 missions a day when the sustainment supply effort was beginning to meet the required delivery rates into the theater by mid September. The sustainment requirements will be discussed in detail in the sustainment section of this appendix. By the end of September, the average number of airlift missions flown daily (including commercial aircraft, KC-10 tankers and C-130s in addition to the C-141s and C-5s) increased to approximately 100 a day. MAC missions supporting non-Operation Desert Storm areas averaged 25 a day, providing resupply to other service supply points such as the Navy's Cubi Point, Philippines, and repositioning equipment and supplies in other theaters in anticipation of their use in SWA. From early October through Thanksgiving, C-5 and C-141 Operation Desert Shield sustainment activity leveled off at 36 missions a day to the Arabian peninsula.

By the time Operation Desert Storm began on 16 January, after 165 days of airlift activity, MAC organic aircraft and contracted commercial carriers had completed more than 10,500 missions to move more than 355,000 short tons of cargo from CONUS, Europe, and elsewhere to APODs in the Persian Gulf region. The level of effort by the airlift forces is illustrated by the fact that all but a few of MAC's active C-5 and C-141s were committed to flying Operation Desert Shield missions in August 1990. Two weeks after C-day, on 21 August, 94 percent of the USAF C-5s (118 of 126) and 73 percent (195 of 265) C-141s were supporting Operation Desert Shield.

SAC KC-10 and KC-135 aircraft also played a vital role in cargo and passenger movement. These tankers moved more than 4,800 tons of cargo and more than 14,200 passengers to support SAC operations alone. Part of this effort was conducted by shuttles established on a scheduled basis to improve resupply efforts to the Pacific, European, and SWA theaters. Additionally, KC-10s transported more than 1,600 tons of cargo and more than 2,500 passengers in a dual-role capacity for USAF and USMC fighter unit moves, providing refueling support and airlift for the units on the same sorties. Up to 20 KC-10s also were assigned to MAC for pure airlift sorties, moving more than 3,800 tons of cargo and more than 4,900 passengers in this capacity.

Figure F-1
C-141 and C-5

Civil Reserve Air Fleet (CRAF)

From the moment Operation Desert Shield began, MAC depended on the civilian airline industry to help fulfill its enormous airlift requirements. The CRAF program, through which participating US civil air carriers voluntarily commit their aircraft and other resources to support US national interests, was a crucial asset. Daily commercial air carrier operations peaked at approximately 25 missions a day in support of Operation Desert Shield, with additional aircraft supporting other airlift requirements.

The airlift system effectively meshed active airlifters, Air Reserve Component (ARC) members, and the CRAF to provide the flexibility and short response time needed to meet time-sensitive requirements. When TRANSCOM implemented Stage I CRAF on 18 August, an additional 18 passenger and 21 cargo aircraft were added to the fleet, the cargo aircraft dedicated primarily to sustainment operations. When Stage II CRAF was implemented on 17 January, an additional 59 passenger and 17 cargo aircraft were available for service, increasing the available sustainment lift considerably.

Figure F-2
CRAF Plane Unloading at Riyadh

Air refueling – The Force Multiplier

The tremendous productivity of the airlifters would not have been as impressive were it not for the synergistic interaction of tankers and transports. Modification in the 1970s added air refueling capability to transport aircraft. This had substantial effect on readiness, rapid deployment, and the sustainment of forces to the theater. In the first few weeks of the deployment, as many as 16 percent of the airlift missions were aerial refueled for non-stop flights. Sometimes the C-5s and C-141s were aerial refueled by tankers just before landing or shortly after taking off to help reduce refueling congestion at the APOD in the theater. This action also helped ease the shortage of refueling points and parking space at the airfields.

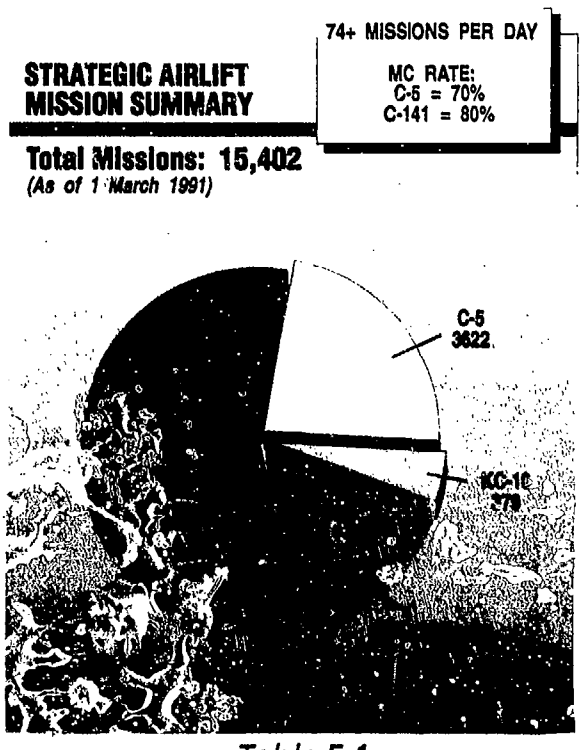


Table F-1
Strategic Airlift Mission Summary

Air refueling was important to the logistical support of Operations Desert Shield and Desert Storm, and went far beyond the initial airlift support. SAC used 262 KC-135s and 46 KC-10s during Operation Desert Storm; they flew more than 17,000 sorties, to include more than 11,500 air refueling sorties and nearly 75,000 hours; refueled more than 33,000 receivers, including 5,500 Navy and USMC aircraft; with nearly 70 million gallons of fuel, in six months. Tankers surpassed this effort during the six weeks of Operation Desert Storm when they flew almost 17,000 sorties (more than 15,000 of these air refueling sorties) logged more than 66,000 hours, and refueled almost 52,000 aircraft with more than 125 million gallons of fuel. Approximately 12 percent of the fuel and 17 percent of the sorties supported the Navy and USMC. Nearly every air refueling capable aircraft used USAF tankers at some point.

The USAF was responsible for providing much of the aerial refueling for the Navy during Operations Desert Shield and Desert Storm. To support the requirement, JP-5 storage sites were established in the Theater. Resupply from DFSC stocks in theater and afloat storage tankers in the Red Sea was established. USAF tankers operated from Seeb and Jiddah to provide JP-5 aerial refueling for the Navy,

Figure F-3
Tanker refueling Fighter Aircraft

in addition to the other locations throughout the AOR where the tankers operated with the standard JP-8. Although JP-5 is the preferred Navy aviation fuel, it was not practical to designate part of the tanker force to carry JP-5 only to support the Navy, because of the lead time required to refuel tankers, the vast numbers of refueling requirements, and the need for mission tasking flexibility. JET A-1, the primary jet fuel available in the theater, provided by Saudi Arabia, was dispensed to the Navy most of the time. JET A-1 is the same basic fuel as the military fuel JP-8. The difference is that additives for anti-ice, antistatic, and corrosion have been added to JET A-1 to make JP-8. The flash point for JP-8 is 100 degrees Fahrenheit; the Navy requires a 140 degree F flash point for carrier safety and JP-5 meets that requirement. The reason JP-5 is not the US forces standard fuel is its availability and cost; only two percent of a barrel of crude oil can be refined into JP-5.

The success of the USAF's air refueling contribution was not without its trade offs, however. The additional air refueling requirements, including the Navy, USMC and Coalition, prevented wider use of the KC-10 in an airlift only role and affected the ability to plan for KC-10 apportionment in this role. Also, the demand for tanker

support was so great that the USAF allocated a larger part of the total world wide tanker fleet to the effort. Fully 81 percent of the USAF's KC-10 fleet and 44 percent of the KC-135 fleet was committed to the Gulf crisis. While these may be comparably high percentages, the strategic deterrence posture of SAC was not adversely affected.

The sustained airlift operation would not have been possible were it not for dedicated crews, including those who flew the aircraft and those who loaded and maintained them. Long missions from CONUS to the theater stretched aircrew resources to the limit. Until the ARC call up on 22 August, all C-5 and C-141 missions to the Arabian peninsula were performed by active duty air crews and ARC volunteers. In addition to the time spent flying between designated locations, each crew day included the time an aircrew spent waiting for its aircraft to be loaded, unloaded, and refueled. As a result of long in-flight times and unpredictable ground times, MAC extended the maximum consecutive duty hours between rest periods for a basic air crew from 16 (the peacetime limit) to 20 hours. Backlogs of cargo at many stateside terminals and delays in refueling en route compounded an already demanding situation for the crews. Actions such as staging crews at forward locations such as Rhein Main Air Base, Germany, and Torrejon Air Base, Spain, through which more than 80 percent of the airlift staged, helped ease demands on aircrews.

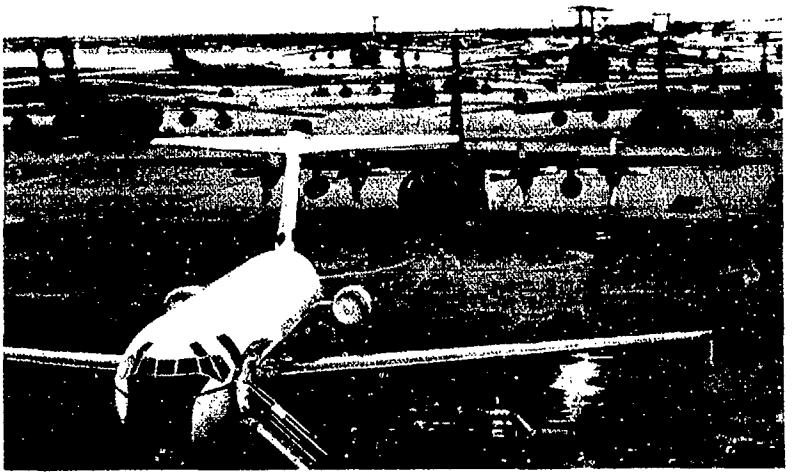


Figure F-4
Loading and Ramp Operations at Rhein Main AB, Germany

Desert Express

Hundreds of aircraft, tanks, and other equipment in the theater of operations created the need for extraordinary logistics pipeline support. In late October, with 200,000 American forces in theater, MAC, at TRANSCOM's direction, began a special airlift called Desert Express. This operation, flown daily from CONUS to the theater, provided overnight delivery of spare parts considered absolutely crucial to accomplish the mission and ensure maximum wartime readiness. While the idea of aerial resupply of crucial items is not new, the concept of a regularly scheduled, dedicated aircraft operation was innovative. The Desert Express system included a dedicated C-141 aircraft flying each day from Charleston AFB, SC, to deliver high priority logistics items to the AOR. TRANSCOM designated Charleston as the collection point for logistics parts the Army, USAF, Navy and USMC needed to provide a link with commercial air express services. Functioning like the commercial overnight express delivery systems, Desert Express departed daily at 1230. Cargo destined for SWA had to arrive at Charleston by 1030 to be on that day's Express. The 1030 cutoff time dovetailed with CONUS overnight mail and air express parcel delivery schedules and the flight schedules of LOGAIR, (a private cargo airline under contract to the Air Force Logistics Command (AFLC) and AMC) and QUICKTRANS (under contract to the Navy). Desert Express reduced the response time for high priority shipments from as long as two weeks to as little as 72 hours.

Deployment of additional forces to the Arabian peninsula in November increased the requirement for overnight delivery of high-priority spare parts. To provide a link with the logistics and maintenance support facilities in Europe, a similar dedicated, special airlift operation was started from Europe and dubbed European Desert Express. The mission aircraft departed Ramstein and picked up cargo at Rhein Main Air Base, Germany, once daily, seven days a week. The C-141 left Ramstein at midnight and arrived at Rhein Main 45 minutes later. After loading cargo and fueling, the aircraft departed for Saudi Arabia with a scheduled arrival time at Dhahran of 0530. Unloaded and refueled, the C-141 returned to Ramstein.

When crucial parts arrived in Saudi Arabia, they were taken to their final destinations within the theater by surface transportation or by MAC's theater based C-130s. These were part of the Camels and STARS airlift system, explained later in this appendix in intratheater airlift.

As of the end of February, the cumulative Desert and European Desert Express airlift had moved nearly 2,500 tons of cargo to the AOR. Table F-2 summarizes Desert Express and European Desert Express by month and shows the tonnage airlifted for each service customer.

SAC tankers also flew regular missions from Castle AFB, CA, to support operations at Andersen AFB, Guam and Diego Garcia during Operations Desert Shield and Desert Storm. These Desert Express type missions were important in providing mission capability support and high-priority surge and sustainment cargo to these locations. In addition to these efforts, SAC began Mighty Express in mid

DESERT EXPRESS/EUROPEAN DESERT EXPRESS

(Cargo in Short Tons)

	Desert Express[1]					European Desert Express[2]		
	Army	AF	Navy	MC	Total	Army	AF	Total
Aug 90	-	-	-	-	-	-	-	-
Sep 90	-	-	-	-	-	-	-	-
Oct 90	2.17	0.27	-	-	2.44	-	-	-
Nov 90	171.45	52.53	1.49	9.31	234.78	-	-	-
Dec 90	229.31	124.62	26.32	17.07	397.32	19.58	61.55	81.13
Jan 91	266.25	251.42	36.01	22.59	576.27	110.42	184.72	295.14
Feb 91	274.58	273.74	39.49	40.88	628.69	91.17	168.76	259.93
Total	943.76	702.58	103.31	89.85	1839.50	221.17	415.03	636.20

[1]Start Date: 30 October 1990; Discontinued: 19 May 1991
[2]Start Date: 8 December 1990; Discontinued: 9 March 1991

Table F-2
Desert Express and European Desert Express Cargo Carried in Short Tons

January primarily to sustain deployed B-52 operations. Six KC-135 aircraft airlifted 680 personnel and 198.8 tons of cargo in four months.

Sealift

Key to the buildup and sustainment of forces was the workhorse of the strategic mobility triad, sealift. Sealift in Operations Desert Shield and Desert Storm was composed of ships under MSC operational control, and domestic and foreign ships under charter to MSC. The size and swiftness of the buildup required the United States to use almost every element of its sealift capability. Almost all Navy sealift elements were involved in the operation, and they were supplemented by

large numbers of chartered domestic and foreign ships. During the entire operation, 385 ships delivered unit equipment, related support, and petroleum products (see Table F-3).

Ship Classification	Total Number of Ships
Afloat Prepositioning Ships	
MPS (Marine equipment)	13
PREPO (Army & Air Force Cargo	8
PREPO tankers	3
Fast Sealift Ships (FSS)	8
Ready Reserve Force (RRF)	71
Chartered Ships	
US flagged or controlled cargo	25
Foreign flagged cargo	187
US flagged or controlled tankers	47
Foreign flagged tankers	23
Total Sealift Ships utilized (entire operation)	385

Table F-3
Breakdown of Sealift Ships Used

The sealift logistics deployment and sustainment effort of Operations Desert Shield and Desert Storm took place in two phases. The first sealift phase extended from August to November, and was designed to deploy and sustain forces to deter further Iraqi aggression. During that period, sealift moved the equipment of more than four Army divisions along with sustainment for the initial defensive support requirements. By September, more than 100 of TRANSCOM's MSC-controlled ships had delivered the equipment and sustainment for the 100,000 US military personnel who had deployed to the theater. When the first sealift phase ended, more than 180 ships were assigned or under charter to MSC and nearly 3.5 million tons of fuel and 1.2 million tons of cargo had been delivered.

By 15 January, the total number of US forces deployed in the theater had more than doubled. From the beginning, while deploying a unit, ships also would be loaded with sustainment supplies required by the forces in theater. By March, an average of 4,200 tons of cargo arrived in theater daily. The average one-way voyage for the Operations Desert Shield and Desert Storm sealift covered nearly 8,700 miles.

Strategic sealift made a vital contribution to logistics sustainment in Operations Desert Shield and Desert Storm. RRF ships with breakout schedules of

five and 10 days took, on the average, 11 and 16 days to break out. However, they performed well once activated, carrying the largest percentage of dry cargo of all the sealift assets. RRF ships began arriving in theater on 8 September and the first chartered ship, which had been under contract when Operation Desert Shield began, arrived the next day. The first ship chartered after the beginning of Operation Desert Shield arrived in the AOR on 9 September. In addition to shipments to the theater on US government owned or controlled and chartered ships, many US-flagged container ships delivered cargo in support of Operations Desert Shield and Desert Storm as part of their regularly scheduled service to the region. These ships delivered cargo under the Special Middle East Sealift Agreement (SMESA). Fuel deliveries required MSC to increase the number of tankers in its fleet from 22 in August to 48 in early February.

Afloat Prepositioning Force

The APF consisting of the MPS and APS fleets worked well and added flexibility to strategic lift. All ships delivered their initial loads, and 11 ships made subsequent deliveries after reverting to a common-user status when CINCCENT had no further requirements for them in theater. Three MPS were out of position on 7 August because of regularly scheduled maintenance and training exercises. Because the other MPS and APS were so well positioned relative to the crisis scene, their response was excellent.

Fast Sealift Ships (FSS)

The Fast Sealift Ships (FSS) performed well in their part of the overall logistics effort, doing more relative to their numbers than any other type of sealift asset. This performance was due to their large size, the special configuration to accommodate the equipment, and speed. There are eight FSS and, although they only represent four percent of the total sealift ships, they delivered 13 percent of unit cargo. One FSS, *Antares*, broke down on its initial trip. Before the crisis, *Antares* had an electrical fire in an automatic combustion control system. She had been scheduled to begin regular maintenance on one boiler in mid-August, which would have delayed her activation by about 90 days. The decision was made to defer the maintenance and take the calculated risk of a breakdown to speed delivery of the equipment. After a series of boiler breakdowns during her initial Atlantic crossing, *Antares* put into Rota, Spain, for repairs; the FSS *Altair* subsequently picked up *Antares'* cargo after delivering her own initial load. *Antares* break down delayed the complete delivery of the first wave of FSS-delivered material and reduced the FSS fleet delivery capacity by about 12 percent, for the duration of the conflict. The remaining FSS fleet responded as planned, although speeds on the initial trips,

about 27 knots, were lower than their rated capability. After the initial crossings, FSS averaged 24 knots for the entire operation.

Ready Reserve Force (RRF)

RRF activation orders started 10 August with 18 ships (including 17 roll-on/roll-off (RO/RO) ships). During Phase I of the sealift, 44 ships were activated. In Phase II, 27 more ships were activated. In general, activation requirements were not met; only 18 of the 71 activations were ready on time. Of the 32 ships that were late or failed to activate in Phase I, mechanical failures were a contributing factor in at least 24 cases. Six ships incurred short delays because of a lack of available shipyard workers or crew members. Once activated, RRF ships performed as expected.

Chartered Ships

During Operation Desert Shield, MSC made extensive use of chartered ships to move military cargo. There were two basic reasons why chartered ships were used in addition to RRF. First, RO/RO ships were preferred because of larger size and better loading efficiency, but there are only 17 RRF RO/RO ships. Second, relative to the cost of activating, operating, and then deactivating RRF ships, charters were much less expensive. Even though MSC afforded preference to US ships, most chartered ships were foreign flagged because the types of cargo ships required by MSC were more available in foreign fleets.

MSC negotiated the SMESA with US flag commercial container carriers to ship 40-foot containers, the preferred means to move sustainment cargo to the AOR. The vessel capacity of US flag carriers participating in SMESA was 3,400 containers a week. The estimated DOD requirement was 1,200 containers per week but the system successfully surged to more than 2,000 per week in February 1991.

Sealift Express

Much like the requirement for air delivery of high value parts and supplies, there was a need to move containerized cargo to the theater as rapidly as possible. Normal over-ocean shipping time to SWA is 30 to 35 days for containers. Sealift Express was established to improve on those times for priority containerized surface cargo. At TRANSCOM's direction, MTMC and MSC, in coordination with the ocean shipping lines, established and managed Desert Storm Sealift Express. Using commercial shipping procedures, containers were not shipped directly to Saudi

Arabia, but were interlined (transshipped) to smaller feeder vessels in the Mediterranean Sea and then shuttled to SWA. Sealift Express had a 23-day goal for shipment from the last CONUS port of embarkation to the SWA port of debarkation. Actual Sealift Express shipping times averaged 25 to 27 days, reducing over-ocean time by approximately one week. The initial six sealift express sailings departed intermittently during a 35-day interval, before weekly sailings were established to support sustainment requirements. Sealift Express proved a valuable transportation tool for moving priority cargo.

Importance of Forward Deployed Assets

Prepositioned stocks played a crucial role in sustaining of the forces deployed to SWA. The MPS that brought USMC equipment ashore provided the initial sustainment effort for the bulk of the first arriving ground forces, the 7th MEB and the 82nd Airborne Division. The ship's stockage stabilized the most immediate requirements for the initial wave of forces. In the 1980s, DOD established a Near-Term Prepositioning Force in support of SWA. This program began the storing of cargo on four ships which were be strategically positioned and moved to support CENTCOM contingencies. These ships proved to be indispensable during the first days of Operations Desert Shield and Desert Storm by providing a readily available source of crucial supplies to the AOR.

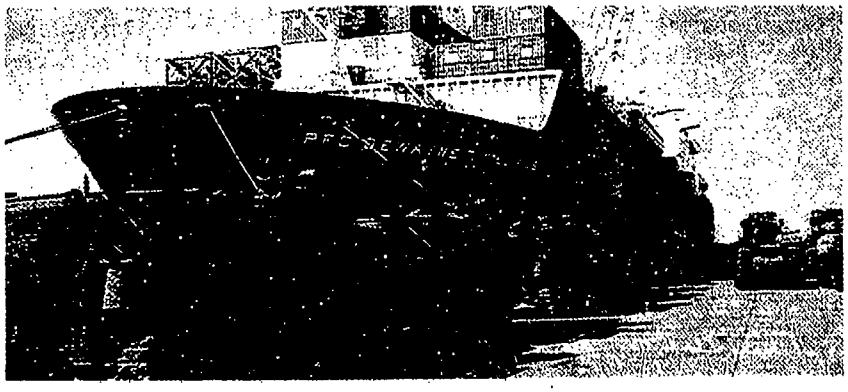


Figure F-5
MPS Unloading USMC Equipment in Saudi Arabia

The war reserve cargo on these ships included rations, general supplies and equipment, packaged fuel, construction and barrier equipment, munitions, and medical supplies. One semi-submersible HLPS carried port operating equipment including tugboats, floating cranes, forklifts, and utility landing craft. Those ships allowed CENTCOM to give priority to combat units in the deployment sequence. Together, the MPS, the Army and USAF's APS, and the USAF Harvest Falcon and Harvest Bare equipment that was maintained in theater, were crucial to the initial sustainment effort.

The Importance of Lift to Sustainment

In theory, deployment operations and sustainment occur sequentially and are distinguishable. During Desert Shield and Desert Storm, however, they occurred simultaneously. Units deployed with some limited organic sustainment, such as munitions, food, and fuel. But the scope of the effort demanded initial emphasis on deployment of forces and the sustainment of those forces already in or about to be in theater. Several features of the operation, such as the lack of ongoing hostilities impeding the flow of materiel, and the robustness of the receiving port facilities, allowed shifting emphasis between deployment and sustainment. During the early movement period, more than 25 percent of the cargo delivered by air was outsized, deliverable today only on C-5s. Another 60 percent was oversize, and, while not requiring a C-5, had to be delivered by C-141 or C-130 aircraft because it could not fit into civilian aircraft.

Additional cargo requirements during Phase II of Operation Desert Shield deployments required implementing CRAF II on 17 January, providing access to another 59 long range international (LRI) passenger aircraft and 17 more LRI cargo aircraft. Because of the number of volunteer aircraft, only nine additional cargo aircraft became available when Stage II activated. With the activation of CRAF Stage II, commercial aircraft operations grew to an average of 25 missions a day and represented substantial capability to meet deployment and sustainment needs. However, CRAF aircraft are less able to handle effectively the more demanding unit equipment that must be deployed and specialized loading equipment may be necessary for the most useful CRAF aircraft (wide-body cargo aircraft). Additionally, many civil air carriers frequently do not handle many of the large items or hazardous materials common to military deployments and special escorts or procedures are required to minimize the effect of this situation. Overall, airlift transported about 15 percent of all dry cargo and nearly 544,000 passengers in support of Operations Desert Shield and Desert Storm. Of this airlift total, CRAF and chartered volunteer civil carriers delivered 27 percent of the air cargo and 64 percent of the air passengers. Organic MAC aircraft delivered the remainder.

As was discussed previously, European staging bases were crucial to efficient strategic airlift. The forward basing in Europe of combat and CSS elements also speeded deployment. Despite the substantial Saudi infrastructure, another factor

initially limiting airlift effectiveness was the lack of adequate ground equipment at some Saudi airfields. At the beginning of the deployment, Saudi sensitivities limited MAC to two main deployment bases. These limitations illustrate the importance of maintaining adequate overseas support bases as part of a forward basing structure. They also serve to highlight the need to give priority to pre-crisis agreements on the development and use of host nation infrastructure assets.

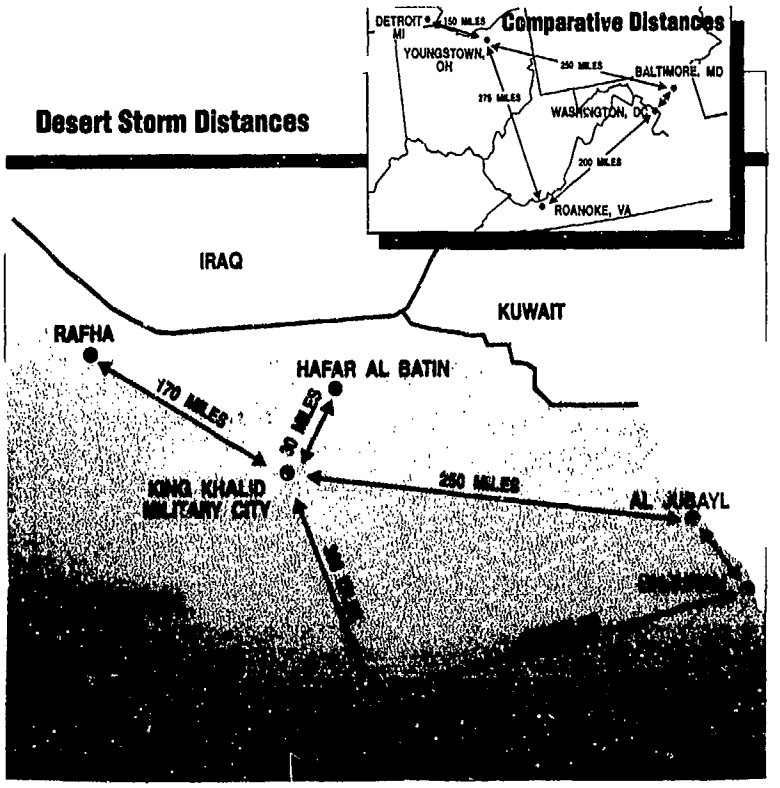
Throughout the logistics sustainment effort, early and accurate identification of lift requirements was difficult and logistics requirements were very dynamic. Close coordination by TRANSCOM, MAC, MSC, and the MTMC kept cargo moving. Overall, the APF response to the crisis was excellent, partly because the ships were so well positioned. The RRF responsiveness was slower than planned, but its reliability after activation exceeded 93 percent. The FSSs' large size and high speed allowed them to lift more cargo relative to their numbers than any other type of sealift. Problems encountered during some RRF ships' activation reflected shortfalls in maintenance and exercise funding in previous years. Improved maintenance and more frequent activations would improve RRF readiness. Because of the absence of a maritime threat, foreign-flagged ship owners were not reluctant to charter their ships to MSC to support Operations Desert Shield and Desert Storm. This reduced the need to activate the Sealift Readiness Program or to resort to ship requisitioning, which would have adversely affected the US maritime industry in the world shipping market. Finally, the extraordinary speed and efficiency of the entire strategic lift operation was aided considerably by the modern condition and large size of the Saudi Arabian ports, airfields, and contingency bases, discussed previously under HNS.

A discussion of the value of sealift in Operations Desert Shield and Desert Storm is incomplete without a comment on the status of the US Merchant Marine. Past traditional US focus on NATO has brought a feeling of comfort relative to sealift capability. NATO agreements make some 400 NATO merchant vessels available in support of a NATO contingency. However, in a non-NATO environment, the United States found itself depending on the merchant fleet (which had dwindled from 578 ships in 1978 to 367 in 1990), Coalition shipping, and the world market. Foreign-flagged shipping provided more than 20 percent of the dry cargo lifted.

The FSS concept to improve force movement was validated during Operations Desert Shield and Desert Storm, and this validation makes clear the need to review Government-controlled strategic sealift composition. The focus of US strategy on rapid response to crises mandates rapid movement of heavy forces and sustainment supplies by sea. In turn, this requirement for speed requires reduction in time allocated for every aspect of movement including: movement to sea ports of embarkation (SPOE); loading merchant vessels; steaming time; unloading times; and movement to depots and forward assembly areas. Because of ease in loading and unloading, RO/RO ships provide a means to reduce transit times. The fleet is heavily oriented toward the break-bulk type ships. In this context, it may be advisable to change the composition of the RRF by increasing the number of RO/RO ships. Similarly, planners need to explore positioning RRF vessels at ports most advantageous to rapid deployment of key forces.

INTRATHEATER TRANSPORTATION

The intratheater transportation requirements that existed from the beginning of Operation Desert Shield were extraordinary, and with the initial deployment of combat forces, seemed overwhelming. The combination of an austere highway system beyond the main routes, and a requirement for massive amounts of inland cargo line haul, presented one of the operation's major logistical challenges, compounded by several factors. The first was the decision to delay the flow of CSS into theater until after combat forces arrived. The adverse conditions in the extensive geographic AOR was a second factor, while the change in mission in November was a third



Map F-2
Operations Desert Shield and Desert Storm Area Distances

The flow of troops, aircraft, and equipment into the theater increased steadily. As each increment arrived, the demands on the intratheater transportation system increased disproportionally. More than 600 shiploads were discharged at the SPODs and more than 10,500 aircraft loads were received at APODs during Operation Desert Shield. Movement of these forces, their supplies and equipment from the APODs and SPODs to their positions in the field was instrumental in achieving combat capability. As distances from the port facilities increased, however, existing supporting infrastructure rapidly dissolved. This complicated an already difficult transportation problem. Essentially, two modes of transportation – airlift and overland – were available to move personnel, equipment and sustainment supplies and were not adequate to meet all requirements. Some commodities, such as mail, were delayed due to higher priority requirements for food, water, and ammunition.

Intratheater Airlift

Simultaneously with the deployment of troops from Fort Bragg, N C, C-130 transport aircraft of the 317th TAW from neighboring Pope AFB, deployed to the Arabian peninsula. This unit established the first intratheater transportation network in SWA on 11 August. Initially deployed to the prepositioned equipment bases in the AOR, the C-130s began immediate flight operations. They transported crucial equipment, ammunition, tents, supplies and construction materials from prepositioned stocks to the beddown locations, or initial operating bases, of the arriving forces. Within a few days, four additional squadrons of C-130s began arriving in theater to fly support missions. By the end of December, the 96 C-130s deployed before November had flown more than 8,000 sorties, amounting to more than 19,400 flying hours, transferring cargo and passengers throughout the theater.

It is important to note the limitations to the rapid movement of personnel and supplies through the aerial ports. Throughput capacity – the rate at which personnel and cargo could be received and processed – depended on several factors. First, personnel, MHE, and the supporting structure had to be in place to cope with the massive quantity of arriving material and passengers. This task was accomplished by mission support teams from aerial port units deployed to the theater with the first airlifters. These units served the dual function of acting as the advance party in many areas, as well as providing service to arriving strategic airlift and the turnaround of intratheater airlift.

Another important factor for throughput efficiency was reduction of ground time for the transports. Ramp space was extremely limited, which severely reduced efficiency in terms of aircraft turn around times. Sometimes C-130s were forced to unload without shutting down engines, or to park off the ramp. It was crucial that cargo and passengers be moved away from the APOD as rapidly as possible to free the facilities for new arrivals. To get the forces away from the APODs, many host

nation buses and trucks were contracted to supplement the available but overtaxed organic land transportation assets. (Details of the land transportation problems are covered below in the section on building the land transportation network.)

In the theater of operations, C-130s flew two generic types of CENTCOM support missions known as STAR and Camel. STAR (Scheduled Theater Airlift Route), a joint intratheater airlift operation, had the primary mission of moving people and mail among the operating bases on the Arabian peninsula. The Camel missions, in contrast to STAR, provided a daily cargo transport service throughout the theater of operations. C-130s committed to Camel airlifted cargo to destinations throughout the peninsula, according to regular airlift schedules similar to those MAC uses for its worldwide peacetime strategic airlift missions. Passengers were transported on a space-available basis. Camel schedules were planned to align the movement of cargo in theater with the arrival of airlift Express missions at the principal APODs, Dhahran and Riyadh. At the height of the buildup, 147 USAF C-130s were in theater. Of these, as many as 25 were used daily for Camel and STAR support at the peak of offensive operations.

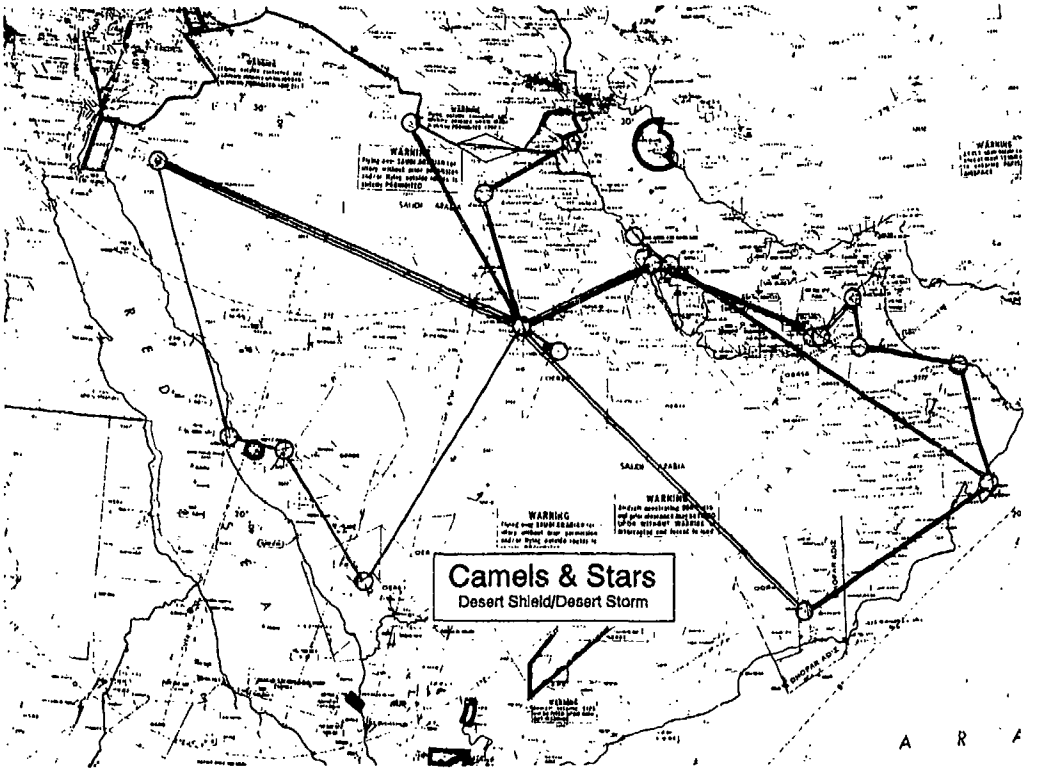


Figure (Map) F-6
Camel and STAR routes

The Navy operated its own Navy-unique Fleet-essential airlift. With five C-130s, seven C-2s, two US-3s, five C-12s, and CH-53 and H-46 helicopters, these airlift assets were used primarily for Service-unique support missions within the theater. In conjunction with four Naval Reserve C-9 squadrons (a total of 12 aircraft) mobilized in December and based at Bitburg and Sembach Air Bases, Germany, and Naples, Italy, these aircraft linked with the scheduled MAC supply APODs, the Camel and STAR delivery routes, and the carrier on-board delivery and vertical on-board delivery pick up points. Pick up points were in Bahrain, Jiddah, Saudi Arabia, and Hurghada, Egypt, to serve the Persian Gulf and Red Sea Fleet activities for shipboard delivery. Navy airlift assets also provided some service to support virtually all major logistics sites along the coast.

The 20 USMC active and Reserve C-130s also linked the principal MAC supply APODs and the USMC units. Based at Bahrain International and at Al-Jubayl, Saudi Arabia, these aircraft flew between theater logistics bases and the forward logistics bases in northeastern Saudi Arabia. CH-46s and CH-53s were links to the theater logistics bases, forward logistics bases, and the USMC forces deployed forward serving as the internal USMC distribution.

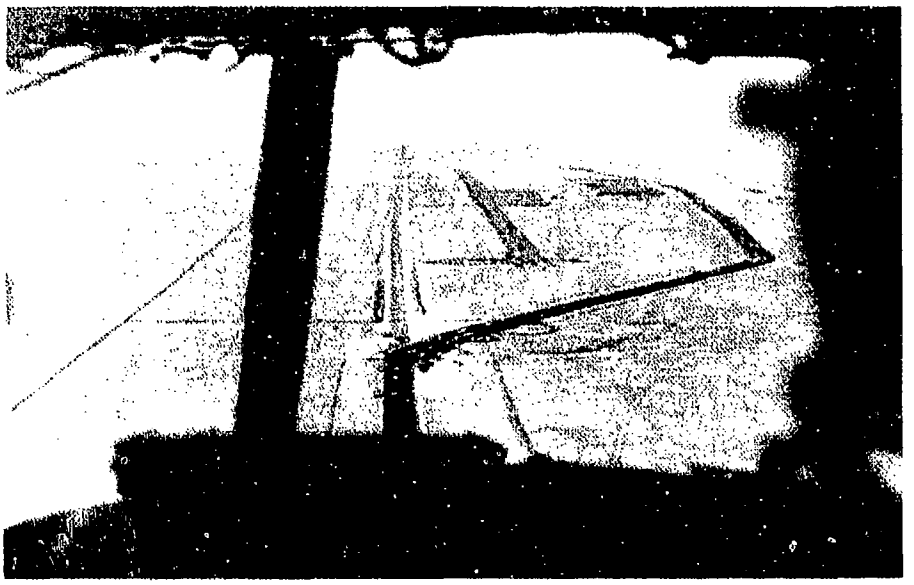


Figure F-7
View of Tapline Road Landing Strip From a C-130 on Final Approach

An episode that illustrates the importance of the intratheater airlift role throughout the operation is the forward resupply and movement of forces within the theater. USAF C-130s ran shuttle missions between staging areas and the

logistics base along Tapline Road; aircraft used part of this narrow road as an airstrip. During the movement of the XVIII Airborne Corps after the air campaign began, C-130s at one point were averaging a takeoff and landing every seven minutes, 24 hours a day, for the first 13 days of the move from one of the rear staging areas near King Fahd airport delivering troops, fuel, and ammunition to the forward logistics base.

Building the Land Transportation Network

The movement of massive amounts of military equipment and supplies across the long distances was accomplished by coordinated land and airlift transportation assets. Throughout the operation, however, vehicle requirements far exceeded capabilities. The initial ground transport assets were provided from preposition sites in theater and the preposition ship, *Advantage*. In addition to vehicles deployed with the units, nearly 2,600 vehicles were distributed from prepositioned supply to support the first phase of arriving forces. But the realization the available assets were being overwhelmed called for innovation by the small logistics staff. The oil industry uses large vehicles to transport heavy equipment to various well sites, and many heavy equipment transporters (HETs) and tractor trailer cargo trucks were available in Saudi Arabia. Many passenger buses also were available because of increased urban population and an expanding pool of expatriate workers. Efforts to increase quickly the ability to move troops and equipment from the port facilities involved on-the-spot contracting of buses and trucks. These contracting efforts helped fill the void experienced by the fledgling movement infrastructure.

The arrival of the Army's 7th Transportation Group to the theater provided some relief. Quickly folded into the provisional SUPCOM, some personnel were assigned SUPCOM staff duties while the remainder ran airport and seaport operations. The more robust staff was able to satisfy the immediate requirement of buses and trucks to get the equipment moved out of the port areas.

Good off-road mobility is required to move large forces and to keep them supplied over great distances with limited road networks common to many third world countries. To meet this challenge, Army combat units and their support elements were pure-fleeted (all vehicles from the same series) with the latest and highest mobility tactical wheeled vehicles. High mobility multi-purpose wheeled vehicles (HMMWVs), which could negotiate the desert terrain easily, replaced the older commercial utility cargo vehicle (CUCV). The older medium tactical 5-ton trucks were replaced with the newer M939A2 series truck with a central tire inflation system. Heavy expanded mobility tactical trucks (HEMTTs), with excellent off-road mobility, also were shipped to supplement 5-ton truck/trailer combinations. The HEMTTs were critical to the resupply of combat units with fuel, ammunition, rations and other critical supplies. The most efficient means to move armored vehicles over long distances is either by rail or by HETs. This reduces the number of mechanical breakdowns and ensures that crews arrive rested and prepared to conduct tactical

operations. More than 1,200 HETs were required to support US operations during Operations Desert Shield and Desert Storm. In addition to Army assets, HETs came from sources ranging from former Warsaw Pact members to leases from the US trucking industry. More than 4,000 trucks including HETs, flatbeds, lowboys, water and POL tankers, refrigeration trucks, and trailers were provided by other countries to Coalition forces in Saudi Arabia. These vehicles equated to saving the equivalent of 67 Army truck companies.

HET Contributions to Operation DS/DS

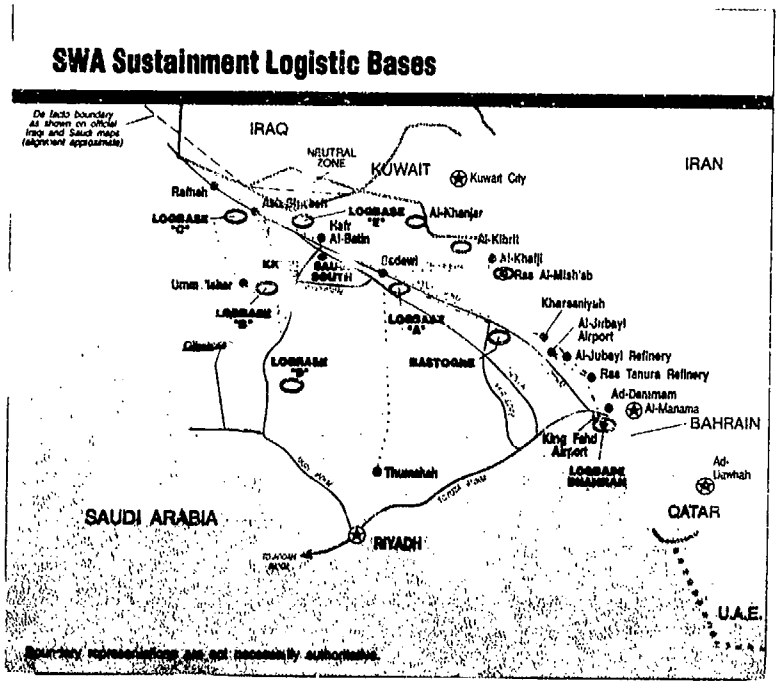
US Deploying	497
Commercial	18
US Trucking Industry	51
HNS - Commercial	333
Egypt	100
Italy - Military	60
Germany	181
Czechoslovakia	40
Total	1,310

Table F-4
Coalition Partners' HET Contributions

The magnitude of the transportation mission can be seen in statistics from COSCOMs on the movement of material by truck during the 21 days before the ground campaign began. More than 3,500 truck convoys – involving 1,400 Army and 2,100 Saudi vehicles – traveled more than 2,700 miles of MSR. These convoys logged more than 35 million miles and included more than 1,700 moves by HET; 5,800 moves by other equipment transporters (sometimes referred to as low boys); and 10,100 trips by flatbed trucks hauling bulk cargo. The figures convey only a partial idea of the nature of the transportation requirements. The fact most moves occurred on relatively unimproved dirt roads underscores further the nature of the Operation Desert Storm logistics challenges.

The newly introduced HEMTT and the USMC Logistics Vehicle System performed well in this mission, but there were not enough of them. Other trucks, especially those originally designed for long-haul, improved-surface use and without a true off-road capability, such as HETs and petroleum tankers, did not fare as well. Once the ground offensive began, many types of trucks struggled to keep up with the speed of the maneuver forces. While they were able to keep pace with the

requirements – largely through the efforts of drivers and mechanics – the experience clearly demonstrated the need for more vehicles with off road capabilities.



Map F-3
Theater Main Supply Routes and Log Bases

In addition to the thousands of civilian heavy trucks, more than 2,000 civilian drivers were employed. The civilian drivers and commercial vehicles were organized into battalions with cadres of American soldiers. Concern about the reliability of civilian drivers when the war started prompted the SUPCOM to acquire from other US units within the AOR more than 3,000 US soldiers as backup drivers.

A similar problem the USMC encountered involved the large numbers of civilian trucks and HETs Saudi Arabia provided. As the USMC deployed close to the Kuwaiti border, civilian drivers became reluctant. The Marines assumed control of the vehicles, provided drivers, performed maintenance (learning as they went along), and developed a system in which repair parts were obtained directly from the Saudi government. Necessity and innovation enabled the Marines to keep this civilian truck fleet operational throughout Operation Desert Storm.

In transportation planning for conflict in other parts of the world, rail and inland waterways are crucial because of the large tonnage of materiel they can move. Ideally, railroad movement would play a major role in the movement of equipment

and supplies. But because the only railroad was a single track between Riyadh and Ad-Dammam, rail transportation played a relatively minor role initially. Later during the operation, the rail line was used to move ammunition and containers from the ports to inland ammunition storage sites. Army water craft used coastal waterways to transport cargo from the primary seaports to other ports on the Persian Gulf coast of Saudi Arabia, moving prepositioned munitions and equipment or repositioning cargo for storage.

Because the deployment flow emphasized the early arrival of combat forces, ARCENT could not meet the demands for common-user land transportation. In particular, delay in munitions movements caused an excessive backlog at the ports. As previously mentioned, contracting and HNS solved much of the transportation problem. Eventually, more than half of the heavy transportation assets were either contracted commercial trucks or trucks provided by other nations. Japan contributed almost 2,000 4x4s, water trucks, refrigerator vans, and fuel vehicles. The commercial vehicles added crucial mobility assets to US vehicles and increased the flexibility and C2 of many units. A large part of the initial HET shortage was nearly satisfied by HETs obtained from many sources mentioned earlier. These were crucial to moving forces from Saudi ports to desert tactical assembly areas, many of which were more than 300 miles away. Without these assets, it would have been very difficult to move forces quickly across the vast distances.

CENTAF also created a land transportation network to satisfy its requirements for support, dubbed the Blueball Express. In the early deployment stages, common-user land transportation shortfalls required CENTAF to let its own commercial long-haul contracts to support its operating locations. During this operation, CENTAF established an organic long-haul capability consisting of 200 USAF drivers and 100 leased tractor trailers and tankers. This system moved cargo, such as jet aircraft engines and aerospace ground support equipment, and repositioned some munitions and fuel resupply.

Naval Component, Central Command's) inland transportation needs were satisfied using established air and land transportation networks, and leased host nation trucks with Navy personnel escorting local national drivers.

Theater transportation was a success story. Though difficulties highlighted shortfalls in organic transportation for a deployment of this magnitude, the contracting efforts of the logisticians in the theater, the contributions of Saudi Arabian government and the contributions of many allies helped to create success. But while transportation was successful, the material distribution system did have some problems.

MATERIEL DISTRIBUTION SYSTEM

The materiel distribution system in support of Operations Desert Shield and Desert Storm, in general, performed satisfactorily. The systematic distribution of material involves a close connection between supply and transportation systems. However, as noted elsewhere in this report, the adequacy of material distribution performance was attributable largely to extended deployment time and large amounts of HNS that may not necessarily be available in other contingency operations. It also relied heavily on innovation of all Services' logisticians. This section identifies some problems which, while manageable in Operation Desert Shield, could have been more serious under other circumstances. Among these problems were the lack of item visibility, ineffective use of containers, abuse of prioritization, and less-than-desirable effectiveness of providing some common support functions.

Item Visibility

Asset visibility means knowing the status of requested materiel at every stage of the process from requisition to delivery. It includes informing the requesting authority when the requisition has been received, the disposition of the request (e.g., filled or back ordered), and shipment status (e.g., date and mode of transportation).

During Operations Desert Shield and Desert Storm, asset visibility in the US wholesale system generally was adequate. However, visibility of assets while in-transit and in-theater was poor. This lack of visibility resulted in considerable confusion and reordering (sometimes multiple reordering), of the same items by field units concerned about existing or projected shortages of crucial items.

The problem can appear at any point in the distribution system. In the United States, vendor shipments – especially containerized and palletized cargo – made directly to the port of embarkation quite often were inadequately marked or documented. Shipments arrived at ports of debarkation with the destination classified or marked as Operation Desert Shield. Even if adequately documented, frequently pallets that contained material for several units were broken down on arrival in theater and reconsolidated into shipments by destination unit. This almost always destroyed any visibility that may have existed, pertaining to the pallet's contents. As a result, in-transit visibility was virtually nonexistent for some munitions, chemical warfare defense equipment, repair parts, and food shipments once they arrived in SWA. There were several reasons for this problem.

First, the materiel distribution system involved thousands of people around the globe in many different organizations, inventory control points, depots, vendors, and transportation agencies. This diverse system fed through air and sea

ports of debarkation to the enormously complex and rapidly changing in-theater distribution system. The distribution system was confronted with units spread across great distances, constantly changing unit locations, often marginal communications, and early saturation of the ground transportation system.

Second, there was a lack of discipline in the use of the military's standard supply and transportation system. This resulted in a lack of status information, either through supply activity error, or a lack of necessary communications and automation capability. In the case of Operation Desert Shield, there were inadequate communications and automation capabilities in theater to receive and process status and transportation manifest information.

Another reason contributing to the asset visibility problem was that manifest data received at water terminals was not shared quickly with materiel management centers because of the backlog that accumulated. Thus, there was a lack of visibility of materiel scheduled to arrive in theater.

Finally, RC port units and their MHE, including heavy fork lifts, were not among the early-deploying elements for reasons discussed elsewhere. This led to large materiel accumulations at the ports, adding to the visibility problem and delaying delivery to already anxious users.

Use of Containers

The improved efficiency available through the use of containerized shipments rather than break-bulk shipments is well documented. In Operations Desert Shield and Desert Storm, most ammunition was moved by break-bulk shipping because of limited availability of containers to carry ammunition, lack of containerized ammunition capability at the West Coast ammunition port, delayed deployment of ammunition units, lack of container handling equipment at the units in the field and ports of debarkation, and availability of RC CSS units to unload. Also there was inadequate container handling and unloading capability at some ports along the transshipment route. Inability to use containers delayed ammunition delivery to theater users because of extended loading and unloading times at the ports. It also resulted in increased use of inadequate land transportation assets.

Priority System

Abuse of the supply prioritization system (the system designed to give priority to crucial supplies, spares and equipment) was a problem. The Uniform Material Movement and Issue Priority System provided guidance on the shipping priority of parts as that priority applied to customer requests. The system was excellent in

treating individual items but not quite as good in discriminating among large amounts of material. Further, the priority system requires review because it did not adequately recognize the need to return critical unserviceable items to the depot or intermediate repair facilities for repair. *Ad hoc* procedures were established to ensure high priority items were moved first. The return of reparable spares became important because support procedures depend on the repair and return of recoverable assets. Retrograde of these items moved well from the AOR to consolidation ports. However, bottlenecks occurred at Rhein Main Air Base, Germany; Dover AFB, DE; and, Charleston AFB, SC as pallets had to be broken down to move property to end destinations. The Pacer Return program was developed to alert transportation personnel of priority retrograde items. Pallets with cargo containing this project code were broken down ahead of other pallets. The end effect of the prioritization system used in Operations Desert Shield and Desert Storm was the abuse of high-priority requests, inability to discriminate among these requests, and subsequent movements of mis-prioritized items.

The current distribution system was designed to work under normal conditions using an established infrastructure such as that in NATO. The need to respond quickly to crises requires a distribution system responsive to requirements and fits well into regional crises' infrastructure; provides visibility of high-demand, crucial supply items; and allows for the expeditious movement to satisfy these needs.

CONSUMABLES STORAGE

The storage of consumable items posed another challenge for logisticians. The initial requirement was to provide storage for the large amounts of consumables entering the theater. The storage problem became particularly acute as the CENTCOM mission changed, the force and stockage objectives increased, and the ground distances expanded, requiring additional storage sites.

When the ground offensive began, 300,000 soldiers, 12,400 tracked vehicles, 114,000 wheeled vehicles and more than 1,800 helicopters required support. The development of the theater logistics support plan was integral to sustaining of these forces. A key feature of this support plan and its execution were provisions to ensure CSS assets were maintained well forward and positioned to sustain the attack's momentum. Chief among these provisions were the establishment of logistics bases. The logistics bases had to be able both to sustain the forces in their initial deployment areas and serve as intermediate storage areas for supplies destined to be forwarded to additional logistics sites, which were to be constructed as the ground offensive progressed.

In October, ARCENT SUPCOM established two forward logistics bases as supply depots and sites for crucial items including medical materiel, maintenance activities, fuel, and ammunition. These support bases were large by any standard, with perimeters as much as 80 miles long. The bases, Bastogne and Pulaski, provided

storage sites for arriving materiel and allowed terminal service units to clear ports for incoming shipments. In December, ARCENT SUPCOM established additional logistics bases near KKMC. These bases were designated Alpha, Bravo, and Delta, and were to contain all classes of supply to support the XVIII Airborne Corps, VII Corps, and echelons above corps. Upon movement of both Corps from tactical assembly areas to attack positions, the COSCOMs and ARCENT SUPCOM established two new logistics bases, Echo and Charlie, to provide support during the ground campaign.

The plan for logistics support and sustainment envisioned forward movement of all classes of supply, but especially fuel, ammunition, food, and water. In preparation for G-Day, more than 29 million meals, 36 million gallons of fuel, and almost 115 thousand short tons of ammunition were transported forward to be in place 14 days after the air campaign started.

Initial XVIII Airborne Corps support was based at logistics base Charlie. As the tactical objectives were seized, support was echeloned forward to temporary logistics bases. Once the tactical operation allowed, logistics base Mars was established to support the remainder of the offensive, with the temporary logistics bases, now to the rear, allowed to dry up.

Initial VII Corps support was from logistics base Echo. Logistics base Nellingen also supported VII Corps through the end of the offensive. The maneuver of US ground combat units was successfully sustained from the preestablished logistics bases during the ground offensive.

The USMC placed a combat service support area (CSSA) at Al-Kibrit, close enough to the southern border of Kuwait to support an attack at any point along that border. The CSSA was fully stocked by 4 February with several day's worth of all classes of supply. The decision to move the USMC attack to the west required the movement of the USMC and its supplies approximately 80 miles to the northwest from Al-Kibrit. Within two weeks, a CSSA was created at Al-Khanjar. Al-Khanjar covered 11,000 acres with 24 miles of berms, and included almost 800 acres of munitions storage, five million gallons of fuel, one million gallons of water, a hospital with 14 operating rooms, and two C-130 capable airfields.

These logistics bases stored everything needed to supply the fighting force, from food, fuel, and water to bombs, bullets, and spare parts. The vastness of the area across which such a large force was deployed required large amounts of consumables to be stored at Army and USMC logistics bases throughout the theater, as well as aboard MPS off the coast. Millions of gallons of fuel were stored in anticipation of the ground offensive. The forward logistics bases stored tons of ammunition, and acted as forward ammunition supply points with numerous clusters of several dozen ammunition boxes dispersed across many thousands of square yards. Also tons of munitions were stored at air bases throughout the theater. Munitions supply ships also were used as floating ammunition dumps.

The logistics bases also contained another commodity crucial to the sustainment of forces – food. The increase of the sustainment requirement to 60

DOS and the influx of additional forces after November placed a tremendous strain on the ability to feed the troops. SUPCOM's plan for feeding personnel involved a mix of two MREs and one T-ration, or one MRE and two T-rations, each day. The rapid increase in the number of personnel severely strained the the system's ability to supply MREs and T-rations. Troops never missed a meal. Sufficient supplies were in theater, including perishable foods for special Thanksgiving and Christmas meals.

CREATION OF THE "WOLF BURGER." An Army chief warrant officer, handpicked as theater food service advisor, improvised from the beginning. The feeding plans involved contracting for Saudi operated mess halls with American-trained cooks in large troop concentrations. While adequate, the meals were not quite American; the chicken was cut differently, the seasonings were strange, and the general method of preparation was different. A short-order grill was created to serve hamburgers and hotdogs; to increase availability, barbecue grills were made from cut-up 55-gallon oil drums. Another ambitious solution was using a mobile food truck. The Saudis helped by providing a mobile kitchen on a recreational vehicle chassis – it was an instant success. The troops began calling it the Wolfmobile (named for the warrant officer), and the burgers became Wolfburgers. Both names stuck; soon more than 20 Wolfmobiles, some self contained and some towed, were institutions in the theater.

At one time, however, inventory records showed supplies down to less than one DOS. Although adequate meals were on hand, there was no system that could maintain accurate inventory control or accurate visibility of available meals on hand. Innovative host nation arrangements to include contract kitchen support ensured enough meals were available. Other measures included contract meals in theater, and substitutes of off-the-shelf meals. DLA provided large amounts of provisions, peaking at approximately 20 million meals a month. These included bulk and unitized B-rations. DLA also arranged for substitutes of a commercial, shelf-stable meal called the meal, ordered-ready-to-eat (MORE). To further ensure sufficient meals were available, DLA depots assembled more than 48,000 pallets of tray packs. The tray pack consists of 12 to 36 serving meal modules of breakfast and lunch or dinner entrees, including accessory packets. As supplies increased, there was a 60-DOS of food in-theater by the time Operation Desert Storm began, including 29 DOS of MRE.

Fuel was another concern for logisticians. The overall stockage objective was 30 DOS. During Phase I of the deployment, the 30-DOS objective included five DOS stored by the Services at forward locations. An additional 10 DOS were held in reserve in each country at various depots, bases and refineries, and 15 DOS were maintained by the DFSC at DFSPs in Bahrain, UAE, Oman, Djibouti, Somalia, and aboard tankers under way in the Arabian Sea and Red Sea. However, additional requirements were generated by the increase of forces and the anticipated OPTEMPO increase as CENTCOM prepared for offensive operations. Against these

additional requirements, the fuel storage capacity was inadequate. Therefore, several additional actions were taken to satisfy the 30 DOS objective.

To store the increased quantities of fuel, additional portable fuel storage bladders were deployed to ensure that Services could continue to store five DOS in forward locations. DFSC increased its number of afloat storage tankers in the AOR to increase capacity to the 15-DOS level. US negotiations with the Saudis resulted in an agreement for the Saudis to increase their reserves. Because all onshore facilities were filled to capacity, this agreement required the Saudis to position an additional one DOS aboard tankers afloat in the AOR.

Before the ground campaign began, DFSC stocks rose to 17 DOS. As a result, combined with the other stored fuel in theater, the 30-DOS stockage objective was exceeded. This provided a cushion and would have done much to sustain operations had storage or reception sites been subject to attack. This level was maintained throughout the war. For the most part, fuel was distributed to DFSP, air bases, and logistics bases by host nation commercial assets. Army, USMC, and USAF vehicles distributed fuel from the logistics bases to units in the forward areas. C-130 and CH-47 aircraft also were used to move more than 300,000 gallons of fuel to sites as far north as Kuwait in support of allied forces.

Although the review of the fuel distribution and storage system provides an understanding of the complexity of the logistics sustainment base for the theater, other commodities such as potable water also posed unique sustainment challenges. Requirements for potable water were filled either through procurement of commercial bottled water or by the use of municipal potable water systems in various Saudi cities and military installations. These sources were to be supplemented by the arrival of ROWPUs. (Army ROWPUs were drawn from stocks on prepositioned ships, while the USMC used ROWPUs from MPS assets and follow-on shipping. Also, the afloat MEBs had additional ROWPUs that could have been placed in service, if needed.)

Upon arrival of the prepositioning ships in the AOR, both Services began to produce and to distribute bulk potable water. However, when the Army's prepositioned ships arrived, some reverse osmosis elements were unserviceable. This fact and the delayed arrival of CSS water production personnel caused an Army (and later an USAF) decision to continue to use the abundant supply of bottled water and keep the ROWPUs in reserve. As the ground campaign progressed and the forward displacement of Army forces continued, ROWPUs provided potable water in forward locations using water from inland wells.

The Army was tasked to provide six million gallons of potable water a day. As Executive Agent to provide backup water support to the USAF, Navy, and the USMC ashore, the Army used a combination of host nation water sources, prepositioned water equipment, barge-mounted ROWPUs, unit equipment, foreign donated equipment, and prototype 3,000 gallon-an-hour ROWPUs. To make the water palatable, the Army provided water chillers which, when attached to water trailers,

could cool 800 gallons of water a day to 60 degrees F. The USAF also began to use ROWPU-produced water at bases that had no capability to provide potable water.

Operations Desert Shield and Desert Storm also posed some unique munitions problems. Storage requirements were extensive and facilities were almost nonexistent in Saudi Arabia. Although studies during the previous decade had identified the need for covered munitions storage, such sites were not available during Operations Desert Shield and Desert Storm. Therefore, field expedients were developed. In many instances, large caches of munitions were kept in their containers and covered with sand to provide protection. In some larger munitions storage areas, containers were dispersed and protected with berms. As the quantities of munitions continued to arrive during the later phases of Operation Desert Storm, large quantities of munitions were kept aboard ships anchored in relatively safe ports.

Throughout the operation, consumables storage was a challenge. The quantities required to sustain a fighting force and the austere infrastructure for storage and distribution created unique problems. Limitations on refinery facilities for fuel storage required a great amount of HNS. Innovative procedures for both fuel and munitions ensured enough was available at forward locations in the theater. Contributions from the industrial base were significant to this buildup of the sustainment effort.

INDUSTRIAL BASE

Forces deployed to the theater relied on the ability of industry and DOD depot facilities to respond to new and increased demands. AMC let more than 23,000 contracts involving more than 1,500 contractors for nearly $4 billion dollars to accelerate production of crucial items and services to include munitions, water systems, repair parts, chemical and environmental protection systems, generators, maintenance and support services. Additionally, DLA placed more than 94,000 contracts valued at nearly $5 billion with more than 1,000 prime contractors to accelerate production and delivery of such crucial items as desert battle dress uniforms, chemical defense clothing, desert boots, MREs, T-rations, repair parts, equipment, weapons, and fuel. The Services also let millions of dollars worth of contracts to support forces deployed to SWA. Items procured included containers, batteries, medical supplies, repair parts, refabrication kits, nuclear/biological/chemical (NBC) suits and electronic equipment.

Literally thousands of items were accelerated to meet increased CENTCOM requirements. From weapons systems to individual supply items, a tremendous demand was placed on part of the nation's industrial base. Items such as chemical protective clothing were surged from 33,000 a month to 200,000 a month, desert combat boots went from zero to 157,000 pair a month, and desert camouflage uniforms went from zero to 376,000 a month in six months. Many contractors were

still ramping toward maximum capability at the end of February. In some cases, the production rate increase was the direct result of government action to accelerate an individual contractor's performance on an existing contract; in other cases, sources were identified and new contracts executed.

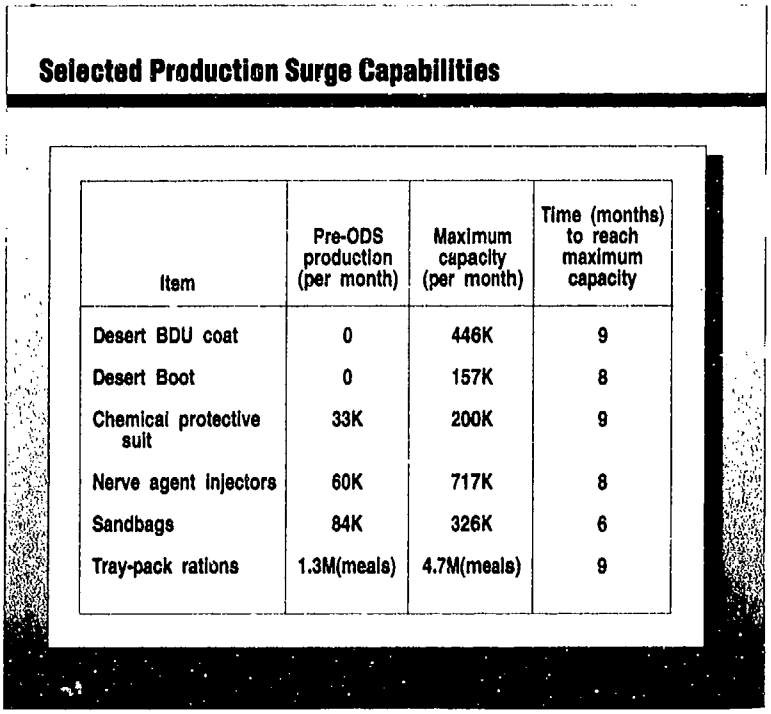
The phased buildup of support and short duration of the war meant few items were unavailable. Nevertheless, there were instances where some items were not available in the desired quantities. Demands for some things increased 20 to 30 times the peacetime rate. The industrial base generally performed well for emergency and accelerated procurements, but there were instances where industry was strained to the limits to meet minimum production needs. Not withstanding the remarkable production increases achieved during Operation Desert Storm, substantial time was required to achieve maximum production rates, even for some common, relatively inexpensive items. Table F-5 shows that six to nine months was required to achieve maximum production capacity for a variety of items. The time required to increase production rates of major items is greater still. For example, it would take 19 months to increase the AH-64 production rate from six to eight a month.

One example of industry's surge limitations is T-rations. The Army's field feeding plan relied on ample supplies of T-rations, which require only heating before serving. Although T-rations are the preferred ration, they were not in war reserve stocks in large numbers due to shelf-life limitations and low peacetime demand. Industry was unable to gear up production quickly enough to meet the Army's increased requirements. War reserve stocks of MRE and additional procurement of B-rations filled the gap until industry could increase production. Substitutes such as the MORE-CT also were used to conserve MREs and T-rations. Although contractors invested in additional production equipment to expand capacity further, requirements still exceeded this expanded capacity. DLA acted to expand MRE and T-ration capacity even further through government investment in production equipment.

Industry's response to increased demand for desert camouflage clothing and boots also was delayed because the cloth had to be produced before the uniforms could be made. There was no specific requirement for these items until September, and no purchases had been made of desert pattern uniforms since 1986. Thus, a substantial part of the force deployed with woodland pattern uniforms. Within 30 days, more than three million desert camouflage uniforms were on contract.

Certain preferred munitions could not be provided in desired quantities because the industrial base was not able to respond quickly enough. This was the result of many factors, some of which include: the size of the industrial base for defense manufacturing; inability to reprogram emergency funds for munitions; and the difficulty of changing industrial priorities.

Among the more remarkable surge performances were those of the DOD organic depot facilities in accelerating the overhaul and repair of major items and components such as critical spare parts. These organic depots also installed major



Selected Production Surge Capabilities

Item	Pre-ODS production (per month)	Maximum capacity (per month)	Time (months) to reach maximum capacity
Desert BDU coat	0	446K	9
Desert Boot	0	157K	8
Chemical protective suit	33K	200K	9
Nerve agent injectors	60K	717K	8
Sandbags	84K	326K	6
Tray-pack rations	1.3M(meals)	4.7M(meals)	9

Table F-5
Industrial Production Rates for Representative Equipment

modifications to fielded equipment. USAF Air Logistics Center (ALC) at San Antonio, TX, accelerated 12 C-5 aircraft through its depot repair facility. This figure represented nearly 10 percent of the entire C-5 fleet. The ALC at Warner-Robins AFB, GA, accelerated depot level repair on 41 C-141 aircraft. Thirty-five of these were repaired in the ALC facility and six were repaired by contractor. By the end of the war, 70 aircraft had been accelerated through the depot repair facilities, providing the operating commands the equivalent of nearly 1,000 additional flying days.

In addition to complete aircraft, the ALC also increased repair of aircraft engines and engine components. The ALCs at San Antonio and Oklahoma City, OK, accelerated repair on more than 260 complete engines and more than 550 major engine sections. These overhauls involved procurement of more than half a million individual parts, in addition to the normal workload. To meet crucial wartime requirements, these engines were rebuilt 20 to 60 days faster than in peacetime by working longer shifts and accelerating parts deliveries.

Perhaps even more important than aircraft and engines, in terms of the effect on mission was the repair of spare parts and assemblies. To complete WRSK and provide resupply of crucial parts, the AFLC expedited maintenance on thousands of parts throughout Operations Desert Shield and Desert Storm, supporting the combat aircraft, ensuring no shortages would occur for combat systems. AFLC also continued to support the routine requirement of an average of more than 60,000 parts a month.

The Army Depot System Command (DESCOM) dispatched more than 430 employees as members of materiel fielding teams to help inspect, repair, and issue equipment to deploying military personnel. Support was provided to units at Fort Hood, TX; Fort Benning, GA; Fort Drum, NY; Fort Sill, OK; Fort Campbell, KY; Fort Knox, KY; and many other sites. DESCOM personnel were at all deployment sites to help units achieve the highest possible combat readiness before deployment.

DESCOM's maintenance depots accelerated to meet expanded requirements and to ensure there were few shortages for deploying combat forces. One thousand temporary employees were hired and overtime was increased from seven percent to 20 percent. A few examples of this surge effort include the manufacture of 59 mine rakes for M1 tanks, in anticipation of the need to breach Iraqi defenses. Also, 800 replacement tracks for M1A1 tanks were assembled within two weeks; this required connecting 67,000 individual track shoes. Another major task was the retrofit of 70 M551A1 airborne assault reconnaissance vehicles with thermal imaging systems to give the vehicles advanced night vision capabilities and the fabrication of more than 200 M60 machine gun mounting kits.

Depot level overhaul of other items also was improved by increased overtime. For example, overhaul of AH-1F expanded from five to 30 a month. Also, the depots increased overhaul of VRC-12 radios. The normal program of 350 radios a month was expanded to 1,350. And finally, the depots increased overhaul of Patriot power generation units from 40 to 60.

DESCOM's supply operations also expanded substantially to meet Operations Desert Shield and Desert Storm requirements. Total ammunition shipments from August through March were 523,000 short tons, 3.5 times the amount of ammunition shipped during a normal eight-month peacetime period. Shipments of other supplies also were expedited. To accomplish this increased supply workload, DESCOM hired approximately 900 temporary personnel and rehired 800 previously released through a reduction in force.

Ship depot maintenance facilities also accelerated activities to support Fleet operations during the crisis. The facilities conducted pre-voyage repairs to ships to allow the vessels to arrive in theater in a high state of readiness. Contractor-operated depot facilities were called on for rapid work on deploying ships. On the East Coast, the Norfolk area was the most active, conducting unscheduled repairs to three battle groups, consisting of 25 ships, including three aircraft carriers; providing technical, material and on-site support for *USS Biddle* (CG 34) rudder

replacement in Toulon, France; and normal support for two additional carrier battle groups in August.

The USMC depot maintenance activities at Marine Corps Logistics Bases (MCLBs) Albany, GA, and Barstow, CA, significantly increased their supply and maintenance activities to meet the needs of the forces deployed to SWA. More than 33,000 items were processed to support the USMC and other Services. These included the design, fabrication and shipment of armor protection kits for the D7G dozer and its operator, applique armor kits for M60A1 tanks, and bracket assemblies and cables to attach night sight equipment to the Light Armored Vehicle. The depots dispatched teams of Marines and civilians to SWA to support retrofit modifications to TOW-2A missile guidance systems and install tank applique armor. Also, the traffic management office, Barstow, CA, maintained an airlift challenge program that resulted in a cost avoidance of about $8 million.

The availability of sufficient war reserve stocks of principal items such as tanks meant there was no requirement to increase planned production of them during the crisis. Relatively low loss rates and the planned reductions in the size of the armed forces indicate there will be no post-crisis requirement for increased production to replace battle damaged or lost items.

A most noteworthy accomplishment by industry for the war effort was the design, testing, and employment of the GBU-28 deep penetrating bomb which was accomplished jointly by the Air Force and industry. From the initial proposal for the bomb to the air campaign planners on 30 January, the bomb was designed, produced, tested, deployed and dropped on 27 February. Four GBU-28s were used during the war, two during testing and two against hardened underground Iraqi bunkers.

Another indication of the innovative use of contractor and industrial base assets is the Joint Surveillance Target Attack Radar System (JSTARS) aircraft. Designed to support the AirLand Battle in central Europe, JSTARS was contractor controlled and had been used as a test bed in Europe during Exercise Deep Strike in the fall of 1989. Based on that performance, the decision was made to deploy JSTARS to Operations Desert Shield and Desert Storm even though the system had not completed developmental test and evaluation. The two available aircraft (a Boeing 707 airframe, designated an E-8A) flew 54 combat sorties with a system availability exceeding 80 percent. JSTARS detected and tracked everything that moved and some things that did not, including Iraqi concertina wire erected as a barrier across highways. The systems located, identified, and targeted assembly areas, POL storage sites, Scud assembly areas and missiles, convoys, trucks, tanks, and even surface to air missile sites and artillery. Linked with AWACS aircraft by the Joint Tactical Information Distribution System, and teamed with the F-15Es, F-16s, and

F-111s, JSTARS denied the enemy its night sanctuary. JSTARS is scheduled to complete development and be fully operational in 1997.

WAR RESERVE STOCKS

War reserves are those stocks of materiel amassed in peacetime to meet wartime increases in military requirements until industrial production can meet demand. War reserves provide interim support to sustain operations until resupply began; stockage objectives are a function of, among other things, the threat and industrial base dynamics. WRM actually procured is a function of funding priorities. These materials are geographically located as strategically as possible, and at the beginning of Operation Desert Shield could be found in CONUS, Europe, the Pacific, and SWA, both ashore and afloat.

Use of WRM began when deployment started. APS with WRM were shifted to the Gulf area, and deploying USAF squadrons carried 30-day WRSK. Navy battle groups routinely carry enough material to sustain operations for 60 days (90 days for aviation spares). For USAFE and SAC units that would normally fight from their home base, WRSK support was not planned or procured.

Another impact of low WRM in the form of WRSK was the initial response by logistics depots. In cases where deploying squadrons lacked crucial components to fill out WRSK, parts were removed from another non-deploying squadron's WRSK. This was most apparent with the initial deployment of the F-15Es from Seymour Johnson AFB, NC Twenty-four aircraft made the journey and all were ready for combat only hours after arriving in theater. Some F-15E components even were removed from new, unfinished aircraft on the McDonnell-Douglas production lines. This early shortfall occurred because the aircraft was new and a complete stock of spare parts did not yet exist. However, the additional 24 F-15Es from Seymour deployed on schedule 60 days later, fully ready for combat missions.

Eventually, all classes of WRM were provided from other theater (Pacific Command, Atlantic Command, and EUCOM) and CONUS stocks. Issues of POMCUS stocks from six division sets in Germany began in August with the shipment of 10 laundry trailers. Further issues remained limited until a decision was made as to whether these sets also would support unit rotations then under consideration. When the decision was made to leave deployed units in theater for the duration of the operation and to modernize them in the field, more extensive POMCUS issues began. For example, all 865 M1A1 Abrams tanks were shipped complete with machine guns and radios. Residual equipment was used to establish theater reserves. More than 1,000 HMMWVs were shipped, as well as HET and MHE not required in Europe to move the VII Corps and additional supplies to port. The air campaign was especially dependent on war reserve munitions stocks, particularly PGMs.

During Operations Desert Shield and Desert Storm the Army received stocks from 22 (43 percent) of its 52 operational storage sites, from every major command except Southern Command. These supplies included life support materiel, hot weather clothing and equipment, water support equipment, POL pipeline systems, desert clothing, rations, aluminum airfield matting, bridging equipment, aerial delivery equipment, and special operations equipment.

Operations Desert Shield and Desert Storm demonstrated the need for modernized theater reserves. The Army used six of its 14 prepositioned theater reserve stockpiles outside of CONUS and two of its three CONUS theater reserve stockpiles to provide Coalition forces with preferred warfighting equipment and munitions, such as tanks, trucks, chemical protective clothing, 155-mm munitions, TOW missiles, Multiple Launch Rocker Systems and Stingers. More than $469 million worth of clothing, packaged fuel products and repair parts was issued from US reserves. A major part of the T-Rations, MRE, and B-rations were drawn from theater reserve stocks.

The USMC withdrew approximately $345 million in prepositioned war reserve stocks from logistics bases at Albany, GA, and Barstow, CA, to support Marines in SWA. Responding in as little as two days, the logistics bases filled requirements for vehicles, armor, spare parts, clothing and more. Fill rates were greater than 90 percent for preplanned requirements and more than 75 percent for new requests.

Other types of war reserve material proved equally effective and necessary. These included the USAF Harvest programs (Harvest Eagle, Harvest Bare, and Harvest Falcon) for converting unimproved air bases into functional operating air bases; a Navy program that provides a capability for developing an austere forward logistics support base; and air and sea transportable Army, USAF, and Navy hospitals (in addition to the two MSC-operated, Navy-staffed hospital ships that also were deployed from war reserves). All of these systems make heavy demands on the transportation system and on engineering services for construction and support. (Engineering functions to establish bases are performed by Army Engineers, USAF RED HORSE, and Navy Seabees.) Often overlooked, but of crucial importance, were map and chart products to support deployed forces during Operations Desert Shield and Desert Storm. Operational requirements confirmed the need to review and update stocks of mapping, charting, and geodesy products. In addition to type and quantity, the usefulness of any WRM material is based upon its location.

The redistribution of WRM stocks during the crisis was a carefully managed process. High-level attention was necessary because the ability to respond to other possible regional contingencies was affected by the redistribution of WRM. Since the end of hostilities, much attention has also been accorded the redeployment and reconstitution of these war reserve assets. US ability to respond effectively to future regional contingencies rests in part on maintaining adequate levels of war reserve stocks.

EQUIPMENT MAINTENANCE STRATEGY

Equipment maintenance was especially important in Operations Desert Shield and Desert Storm because of the duration and intensity of the operations and the adverse environmental conditions. The diverse weapon systems which were deployed, the degree to which the Services depend on the RC and civil sector for maintenance skills, and the Services' varied missions and respective maintenance strategies, required considerable diversity in how maintenance was performed. Crucial to the success of the maintenance effort in SWA was the support provided by EUCOM for both the Army and USAF.

Army

Recognizing the necessity to reduce repair and maintenance times, the Army created two maintenance activities in theater: one for ground elements and one for aviation components. The Army's maintenance strategy in SWA was in line with the doctrine of forward support maintenance, the goal of which is to maximize combat system availability by shortening the distance between the failure and repair points. This was accomplished by performing required maintenance at all levels according to unit capabilities. The current philosophy for ground units is to perform maintenance at four levels of increasing complexity: unit, direct support, general support, and depot. This structure was adhered to for ground assets in the AOR. Aviation maintenance, however, is performed at three levels: unit; a combination of unit and direct support; and intermediate, a combination of the remaining direct support and limited general support maintenance, and depot. Each division had unit and intermediate level maintenance capability, while each COSCOM had an intermediate capability to support corps and divisional aviation units. Intermediate-level maintenance also was provided at echelons above corps for aviation assets in or passing through the area. The Aviation Support Command established a Theater Aircraft Maintenance Program (TAMP) for all aviation units in the AOR.

The TAMP in SWA consisted of 47 military, 62 DOD civilians and 655 aviation contractors. It provided wholesale level maintenance and supply for unit level maintenance activities, contract maintenance, and backup aviation intermediate maintenance support. Contract field service representatives and AMC logistics assistance representatives were assigned to help units down to the aviation unit level. These representatives were in the field with the troops and provided invaluable technical expertise.

To augment established intermediate- and depot-level repair facilities, and to support crucial systems such as aviation, communications, intelligence, electronic warfare (EW), tracked and wheeled vehicles, missile, and tactical Army CSS systems, AMC deployed and operated several specialized repair activities. These organizations employed more than 850 AMC depot government civilians and more

than 1,000 civilians representing 60 contractors. Specialized repair activities performed equipment modernization upgrades increasing the unit's mobility, survivability, lethality, and supportability.

AMC established the US Army Support Group (USASG) to provide a wholesale-level maintenance and supply system within the theater and to manage contract maintenance support. The USASG was tailored to provide selected general support and depot level repair. In terms of supply, the USASG managed high-dollar, high-tech, low-density items such as avionics; reduced the amount of materiel in the supply pipeline; and, provided retrograde management. The USASG began operations 17 November, with the objective to repair 70 percent of the major assemblies in theater, to expedite return of repaired items to the supply system, and minimize the evacuation of crucial materiel from the theater. During its operation, the USASG repaired more than 34,000 components.

Air Force

USAF maintenance strategy is a modified three-level system. Most organizations perform organizational (unit)-level maintenance and selected intermediate-level maintenance based on ease of repair, or mean time between failure at the base level. Above the unit, depot-level maintenance (those repairs beyond unit level capability or economically unfeasible) is performed.

The maintenance strategy for units deployed to the AOR was based on this model. Units deployed with an organizational maintenance capability and a WRSK designed to sustain the unit for 30 days. Some intermediate maintenance capability was deployed to a few bases in the AOR earlier than planned. Though not available at all bases, all units had access to the capability through arrangements with a similarly equipped unit at another base. For instance, if an F-16 unit required intermediate repair service, parts needing repair were sent to a more robust F-16 maintenance unit elsewhere in the theater. Also, links to European maintenance facilities through European Desert Express enabled less robust maintenance units to acquire needed capabilities. For this reason, together with an initial lower-than-planned sortie rate and rapid resupply of parts, WRSK assets of many deployed fighter units were not used as much as anticipated.

Following the initial flurry to get combat aircraft, personnel, and basic material into the AOR, the USAF began assembling the assets and dispatching supplies to sustain prolonged training and combat operations. Complex aircraft require equally complex test equipment to remain operational. Accordingly, dozens of aircraft test equipment sets were sent to the region. To augment deployed units, depots sent specialized teams to support units and bases with enhanced repair capabilities.

Depot combat logistics support squadrons (CLSSs) provided aircraft battle damage repair (ABDR) capability. Forty-two ABDR teams (39 active and three Reserve) were deployed to the theater to provide combat maintenance before the war and battle damage repair services after hostilities began. These CLSS personnel performed battle damage repair on 30 aircraft including an F-15, F-16s, and A-10s.

Also, to avoid sending sophisticated electronic aircraft components back to CONUS for periodic calibration, the Aerospace Guidance and Metrology Center deployed a mobile calibration laboratory (the recently acquired field assistance support team for calibration (FASTCAL) unit) to Saudi Arabia in September. FASTCAL measured the accuracy of repairs performed on the guidance systems used by almost every type aircraft in theater as well as many precision guided weapons, including the Army's Patriot missile.

Each Service used European maintenance facilities, and each augmented those facilities with uniformed maintenance personnel from CONUS. For example, the USAF designated certain USAFE bases as principal intermediate-level maintenance sites for particular types of aircraft. The largest of these was the intermediate repair facility at Rhein Main Air Base, Germany. At this facility, all major repair work for the C-130 engines was done. For SAC, a Contingency Intermediate Level Maintenance Center (CILMC) operation was established at Moron Air Base, Spain. The CILMC provided full avionics and intermediate-level maintenance capabilities. The Army relied on EUCOM to provide intermediate and depot-level maintenance on many crucial parts and systems. USMC participation was limited to the temporary assignment of aviation maintenance personnel to augment the engine repair capability of the Naval Aviation Maintenance Facility at Naval Air Station, Sigonella, Italy. The USMC was able to draw on the pool of available engines to support fixed wing and helicopter assets in SWA.

Sand and dust affected operations, but did not stop them. Jet engine manufacturers helped define inspection points to detect calcium-based buildup in the engines' hot section. Experience showed this to be a very gradual process; however, it was not necessary to remove a single fighter engine for this problem. Nevertheless, due principally to sand induced erosion, the T-64 engines powering the MH-53 *Pave Low* helicopters had to be removed at the 100-to-200 hour point as opposed to the normal 700-to-1,200-hour point. Together with the Army and Navy facilities that repair these engines for the USAF, an interim solution was developed to ensure serviceable spares were available ahead of time. Increased activity at Navy North Island, San Diego, CA, the Army's establishment of an in-theater T700 engine depot; and MAC's dedicated transportation arrangements, kept on-hand spares ahead of needs.

Each deployed tactical fighter squadron also had a US Government civilian technician. This individual was assigned to a billet and served as an on-site technical expert, as well as performing liaison functions between the deployed squadron and the AFLC depot system.

Computer-dependent aircraft systems also required constant software updates to adjust to changing threats. Initially, updating aircraft software required the shuttling of magnetic tape and punched computer tapes between CONUS and the theater. However, 162 early production units of the Digital Computer System were rushed to the field. When linked to terminals in CONUS by a secure communications network, CONUS computer programmers could update software in theater through computer link. During Operations Desert Shield and Desert Storm, software changes were engineered, tested, and transmitted to tailor EW system information against the Iraqi threat environment. With this system, EW reprogramming elements in the United States could perform the reprogramming and incorporate changed mission data shortly after the receipt of new information for the USAF and Navy aircraft operating in the Gulf.

Navy

Operations Desert Shield and Desert Storm validated the Navy's ship maintenance policy and practice. Ships on scene initially and those that arrived later were ready for combat immediately. The maintenance system sustained this readiness while deployed and repaired two battle damaged vessels. Navy ship maintenance policy and execution supports its expeditionary mission to conduct sustained combat operations at sea. The Navy's mission is realistically and routinely practiced through local operations and deployments and self-sufficiency is a principle which threads its way through all ships' maintenance plans.

Maintenance actions are planned and accomplished within the broad Navy mission. These actions are conducted by a three-tiered hierarchy: first, each ship at the unit or organizational level; second, afloat and ashore intermediate maintenance activities; and third, shipyards for depot level. All three levels accomplish planned and corrective maintenance. Maintenance requirements are progressively assigned from each level as determined by ability and capacity.

The units and respective chains-of-command participate in all three levels of maintenance. Operations Desert Shield and Desert Storm required use of all three levels. Ships and submarines perform their own organizational level actions. Since operators of ships and submarines also perform the unit level actions, a fixed unit level maintenance capability is inherent in every class of ship. On larger ships such as aircraft carriers and amphibious assault ships, the capabilities to perform maintenance is considerably larger than the smaller ships. These assets contributed measurably to the Navy's ability to carry out the operation continuously.

Intermediate level is tailored for the size and length of deployment. Tenders and repair ships formed the backbone for ship maintenance during Operations Desert Shield and Desert Storm, as they do for more routine deployments. They moored near or moved with the warships to minimize the transit times to assist with or perform maintenance. The crews are military; they carried out the everyday tasks

of repairs beyond the capability or capacity of individual ships, both on-board the tenders and on-board the ships. The tenders performed tasks such as rebuilding electric motors and pumps, and troubleshooting and repairing printed circuit boards.

These ships were manned and equipped to perform ship battle damage repair, but fortunately were not required to use it. Tenders also performed corrective maintenance on-board individual ships, which provided greater convenience for the operational commander. This was done by means of fly-away teams, or by traveling to the ship in need. These teams performed maintenance on a variety of systems from ice-making machines to guided missile fire control radars. One tender, *USS Yellowstone* (AD 41), based in the Red Sea for most of her deployment, completed more than 10,000 maintenance actions on 30 Coalition ships. These tenders were augmented by a unit ashore in Bahrain that consisted of a group of civil servants who were specialists in unique weapons and weapons support (hull structure, communication, electric and propulsion power) systems. These people moved to the individual ships to help and train sailors maintain these unique systems; people in this group rotated from CONUS; this ship support group averaged 30 people.

Planned depot maintenance cycles depend on the type of ship. Maintenance is scheduled at intervals that average 18 to 24 months. Depot work estimated to require less than six months is accomplished in or near the ship's homeport, if possible. Deviations from schedules are kept to a minimum to maintain program integrity and avoid workload disruption and associated additional costs. Only unplanned depot maintenance associated with the dry docking and repair of the two mine damaged ships was accomplished in the theater. These repairs were accomplished by Master Ship Repair Agreement contractors (private shipyards) in theater. In addition other, less complex voyage repair maintenance was accomplished by these contractors when the ships' crews or tenders were not immediately available.

In addition, Naval Aircraft Depots, shipyards, and Systems Command Field Activities sent teams, composed of US government civilian employees tasked for aircraft and ship repair. Those repair teams, with agreements to support other Services, also were available to provide aircraft engineering, inspection, and repair services to Army and USAF units. On average, the Navy had 500 to 600 US government civilian employees ashore or afloat in Operations Desert Shield and Desert Storm.

Naval aircraft maintenance varied little from peacetime procedures. Aircraft deployed with carrier battle groups underwent normal maintenance schedules and activities. Depot maintenance requirements were deferred, as long as deferred requirements did not prevent mission completion.

Aircraft Damage Repair (ADR) teams were formed and sent to SWA. There were 23 civilian engineers from the Navy depots and 108 contract workers at various locations both in country and aboard carriers to conduct routine depot-level

maintenance and to repair battle damaged aircraft. Additionally, one ADR training team with equipment was sent to Bahrain to augment fleet ADR personnel. Each carrier/wing/squadron had a cadre of ADR-trained Fleet personnel to support repair requirements when needed. USMC aviation, however, requires both shipboard and ashore maintenance capability.

USMC

USMC aviation maintenance is conducted using Navy procedures, since USMC and Navy aircraft are intended to be interchangeable. Shipboard maintenance for aircraft aboard amphibious ships, such as helicopters and AV-8Bs, is accomplished with an intermediate maintenance block aboard amphibious assault ships. Some elements are a permanent part of the ship, while other elements are brought on board ship by Marines. USMC aircraft operating from Navy carriers are incorporated into existing Navy facilities.

USMC aircraft maintenance procedures functioned as designed during Operations Desert Shield and Desert Storm. Primary intermediate maintenance facilities were established at Jubayl and in Bahrain. Two TAVBs were deployed and arrived in theater in September. The origin of the TAVB concept was an innovation technique developed during the early MPS implementation planning as a means to deploy USMC aviation maintenance capability without placing a heavy demand on strategic airlift. Fixed wing intermediate maintenance facilities subsequently were unloaded to provide ashore capabilities. Rotary wing maintenance facilities were retained aboard the ships, which operated as intermediate maintenance activities while pierside at Al-Jubayl. To improve aircraft maintenance, the USMC also used an experimental Defense Advanced Research Projects Agency small communications satellite known as the Multiple Access Communications Satellite (MACSAT). Spare parts requirements and other administrative information were relayed by MACSAT to the 2nd Marine Air Wing (MAW) at Cherry Point, NC.

USMC ground maintenance is organized with five echelons of repair. First- and second-echelon maintenance is conducted at the unit level. Third- and some fourth-echelon maintenance is conducted at the force service support group level. Fifth-echelon depot maintenance is conducted at MCLB Barstow, CA, or Albany, GA.

Parts needed for maintenance are obtained from the USMC Intermediate Supply Activity (ISA) which links with an automated services center to order parts not on hand. During Operations Desert Shield and Desert Storm, the ISA was established at Al-Jubayl. As units deployed farther from Al-Jubayl, repair of essential combat equipment slowed due to ground transportation limitations. Rations, water, fuel and ammunition were the first priority for ground transportation. According to existing USMC doctrine, mobile combat service support detachments were sent forward to support regimental-sized maneuver elements. The parts delivery problem eased only when CH-53s began making several parts deliveries a

day to support the ground equipment maintenance effort. Though the system was unresponsive at times, work arounds and innovation kept equipment running.

Each Service used maintenance capabilities appropriate to support its mission. The high operational readiness rates indicate long-term DOD investments in training, reliability and maintainability, war reserve stocks of repair parts and components, and deployable maintenance facilities were prudent. Equally important is the fact that high levels of combat readiness and effectiveness could not have been achieved without the experience and teamwork and contribution of the Active, Reserve, and Government civilians, and support from civilian defense contractors.

Engineering Services

The CENTCOM decision to adopt austere construction standards, the minimum required to sustain the forces in the field and support the operation, limited construction requirements and minimized the effect on host nation construction capabilities. As mentioned previously, construction support capability also was constrained by lack of adequate authority for quick accomplishment with O&M and military construction appropriations. Further, military troop construction capability was late developing in theater. Engineers were delayed in arriving since combat units received the lift priority. Facility requirements generally were satisfied through the use of existing host nation or leased facilities as first priority before turning to host nation contractor, or troop unit construction. Fortunately, the governments of Japan and Saudi Arabia were willing to provide contract construction support to US forces on an in-kind or HNS basis. Each Service provided crucial organic engineering capability that became the foundation for the ability to receive and process forces rapidly into theater.

The Air Force's Prime BEEF (Base Emergency Engineering Force) teams, RED HORSE (Rapid Engineer Deployable, Heavy Operations Repair Squadrons, Engineer), and Prime RIBS (Readiness in Base Services) teams were the key elements of base support that bedded down more than 1,200 aircraft and 55,000 USAF personnel at 21 airfields and a total of more than 25 locations. These locations ranged from bare bases to fully operational host nation bases. Approximately 3,700 engineers and 1,450 service personnel erected air conditioned tents, dining facilities, showers, and latrines; established water and electrical systems; constructed air traffic flow control units and aircraft shelters in addition to extending runways, ramps, and aprons; and provided feeding, billeting, laundry, and mortuary services. During Operations Desert Shield and Desert Storm, the Air Force's Prime BEEF, RED HORSE, and Prime RIBS teams erected more than 5,000 tents; paved more than two million square feet to expand aircraft parking areas; constructed 39 facilities with to 192,000 square feet for munitions storage, maintenance, and warehouse space; paved roads; built more than 200 aircraft revetments; erected fencing; and built berms to protect high value assets that included Patriot missile batteries. This effort was equivalent to

building a complex the size of Moody AFB, GA, complete with buildings, runways, parking aprons and all necessary facilities to support a wing of aircraft and associated personnel. Their most notable success story was the construction of Al-Kharj, the largest bare base ever built by USAF combat engineers. Working around the clock, forces built a fully operational combat base from the ground up in less than 40 days; it housed more than 5,000 personnel and five fighter squadrons.

Since some Saudi airfields were little more than runways in the sand, major construction had to be done to prepare them to receive modern combat aircraft. LANDSAT (a civilian multi-spectral imagery satellite) imagery of the area around a runway was converted into engineering drawings of the airfield sites. These drawings then were used to plan and build some of the larger air bases in the world.

Navy Seabees played a major role in expanding the infrastructure to support US force deployment. These units expanded airfields, set up berthing facilities, built ammunition storage bunkers, roads and defensive barriers. The Seabees also were responsible for building a 500-bed Fleet hospital and a 400-bed Army field hospital. More than 5,000 Seabees, including 1,000 from the RC, participated in Operations Desert Shield and Desert Storm. In all, the Naval construction force built 14 mess facilities capable of feeding 75,000 people; an Enemy Prisoner of War (EPW) camp capable of housing up to 40,000 personnel; six million square feet of aircraft parking aprons; four ammunition supply centers; and 4,750 other buildings. They also improved and maintained 200 miles of unpaved desert four-lane highways which were used as MSRs. These roads played a vital role in the Coalition's flanking movement.

MARCENT used two FSSG Engineer Support Battalions. Their most notable accomplishments were at Al-Khanjar and Al-Kibrit. At Al-Khanjar, engineers built 24 miles of berms in seven days; built the largest ammunition supply point in USMC history (768 acres containing 150 cells); built a fuel farm with a 4.8 million gallon capacity in 10 days; completed 26 miles of LOC to the Kuwait border; and built an EPW camp with a capacity of 4,000. At Al Kibrit, they built more than 2,000 bunkers and fighting positions; transformed a one-lane desert track into an eight lane MSR and upgraded an abandoned airstrip to handle C-130 aircraft.

Army engineers, both military and civilian, established and expanded the facilities to receive, lodge, and sustain US forces. One early deploying unit, the Middle East/Africa Projects office, Army Corps of Engineers, acted as the DOD construction agent. The organization provided in-country engineering planning, facilities design, construction contract administration, and real estate services for the theater. The unit included Army officers and civilian engineers, real estate specialists, contract administrators and construction inspectors. It leased facilities, designed and awarded construction contracts, and contracted for engineering services and supplies.

Leases totaling approximately $110 million provided: sleeping accommodations for more than 45,000 troops; maintenance facilities; supply warehouses; cold storage buildings; and, medical facilities. Contracts were let for

construction and for services and supplies including field latrines, field showers, helicopter facility sunshades, solid and human waste disposal, and construction equipment rental. Between the mid-October arrival of the first heavy engineer construction battalion and the beginning of the ground offensive, 11,000 military engineers worked in Saudi Arabia. In large part commanded and controlled by the 416th Engineer Command, Army Reserve (USAR), this force of active, USAR, and Army National Guard units built, upgraded and maintained more than 2,000 miles of roads; installed approximately 200 miles of coupled pipeline to move bulk petroleum; developed seven major logistical support bases in the desert; provided large scale electrical power to critical facilities; and, within 30 days, constructed four camps together capable of housing as many as 100,000 EPW.

As mentioned previously, development of theater infrastructure was constrained. Available host nation construction and assistance-in-kind from Japan helped relieve construction limitations US law imposed; however, it remained difficult to improve the infrastructure needed to receive and sustain a large force. This inadequacy emphasizes the need for procedures to trigger access to higher O&M limits and early activation of Section 2808, Title 10 USC, to ensure responsiveness of construction funding support to the combatant commander.

Construction management also required innovation. CENTCOM chose not to use the traditional construction management process and executed a new concept for regional contingencies. The result of discussions the weeks before the Iraqi invasion, the process, called Regional Contingency Construction Management (RCCM), provided a joint team of engineers with representatives from each component to help CENTCOM set theater-wide construction policy, priorities, standards, and allocate crucial construction support. The RCCM concept worked well during Operations Desert Shield and Desert Storm, and is one model for construction management in future contingencies.

US forces' success in engineering services, supply, transportation, and maintenance, can be attributed to planning and flexibility. While existing logistics concepts were followed where practical, they were modified when needed to provide the most capable, complete, and responsive support for combat forces in the theater. Combat engineers built bases in some of the more demanding terrain on earth. Transporters moved many thousands of tons of supplies across great distances to ensure Coalition forces had what they needed, where they needed it, when they needed it. Maintenance kept the forces on the move, ensuring the pressure on Iraq never faltered even though the environment conspired to clog filters, contaminate fuel, and erode crucial parts on an around-the-clock basis. These accomplishments alone do not tell the whole story. Had it not been for the additional support Coalition partners provided, US forces would not have been as logistically well prepared to prosecute the offensive.

OTHER ALLIED SUPPORT

Another factor that multiplied the effectiveness of the logistics effort was the support provided by other nations. In fact this support was absolutely crucial to the rapid deployment of forces to the theater and it allowed the flexibility of deploying substantial amounts of combat power early in the sequence when risks were greatest. Had support in the form of host nation or assistance in-kind not been provided by Coalition partners and other responsible allies and friends, some combat units would have had to have been displaced by support units when that did not seem prudent. This sort of support was essential to US efforts throughout the operation. Food supplements, fuel and services provided by the Gulf Cooperation Council states were invaluable. Assistance in-kind provided by other nations was similarly important. An example is the 60 Fuchs NBC reconnaissance vehicles, provided by Germany, which filled an equipment shortfall that might have been crucial had things gone differently. Another example of support from other nations as well as an indication of NATO interoperability was the provision of 120-mm tank gun ammunition to US forces by Germany.

Other operations, such as those by KC-135 tanker squadrons, were supported from United Kingdom (UK), Italy, France, Greece, Egypt, and Spain. Fuel consumption in Spain increased 300 percent from peacetime rates. This resulted in a demand on the Spanish-owned pipeline system, which provides resupply to US bases and the Spanish private sector, that could not be met. USAFE officials negotiated with Spanish authorities and augmented fuel deliveries with tank trucks. At one time, as many as 60 tank trucks were delivering jet fuel, some of which came from refineries several hundred miles away. Additional mission requirements prompted a request by US officials for more fuel. Based on this request more Spanish pipeline time was made available for fuel deliveries at the expense of civil requirements.

Overall, however, the support received by the Coalition within the theater from out-of-theater countries presented a two-edged situation. No other nation had enough lift to deploy its forces or material rapidly, and only the United States had outsize airlift capability. This prompted numerous requests from Coalition partners for rapid deployment using US airlift. An example of this was the movement of the Dutch Patriot Batteries to Incirlik, Turkey, by US C-5s. However, adjustments to the airlift flow to support allied requests generally had a one-for-one impact on the delivery of US units or sustainment cargo. Although ammunition expenditures were low during the ground war, air munition expenditures were higher than most participating allies had anticipated, resulting in shipments of US munitions' to UK air forces. But even without the large ammunition requirements during the ground war, high mobility still incurred great POL and maintenance resource requirements unanticipated by some Egyptian, Syrian and French units. The US-established supply networks to provide replenishment for these as well.

Foreign Military Sales

The need for US supplies and equipment highlighted another aspect of allied and Coalition support. This was the first time the US was involved in a conflict that required both the US and Foreign Military Sales (FMS) customers to be supported through the US supply system. While host nations and Coalition partners were helped and greatly influenced US ability to sustain forces throughout the area, their participation also placed additional demands on the US military supply system.

Participation by Coalition forces resulted in a tremendous increase in provisioning requirements which, for the most part, the US was prepared to meet. Since many Coalition partners had peacetime security assistance relationships with the United States, the United States had a military and political commitment to continue to help these countries. Peacetime US security assistance arrangements with Coalition partners, particularly Saudi Arabia, and with other non-coalition countries in the region, formed the basis to move military assets and helped build Coalition members' preparedness. In response, US military departments, in conjunction with the Defense Security Assistance Agency, activated a contingency team for expediting FMS cases. Working within the guidelines of the Arms Export Control Act, the security assistance community processed more than 350 FMS cases worth more than $12 billion for Coalition partners.

After Iraq's invasion of Kuwait, the Saudis' requested and received an emergency FMS package that included F-15 aircraft, M-60 tanks, and Stinger missiles, and was valued at more than $950 million. US ability to respond to these requests added credibility to the pledge of support to the region. Existing open-ended FMS supply cases were used to provide non-sensitive defense articles on a priority basis to numerous Coalition, NATO and other allied countries. The Special Defense Acquisition Fund (established to buy defense items in anticipation of FMS and to avoid diversion from US military inventories) provided approximately $130 million for defense equipment to Coalition partners. Under FMS terms, US stockpiles were drawn down to provide priority shipments of chemical protective gear for Coalition forces. Dutch-owned Patriot fire units purchased through FMS were deployed to Turkey and Israel to address Iraqi Scud threats. The Germans offered Patriot batteries to the Israelis. The German offer was never consummated because Patriot units ultimately were provided by the United States to Israel under emergency authority. However, the willingness of US allies to divert their FMS orders to the Persian Gulf Coalition was not unique to the Netherlands, Germany, and other NATO allies. In one case, Colombia contributed an FMS purchase of aviation parts, diverted to US military inventory, to be replaced after the war.

These relationships were supported by using security assistance and maintaining international cooperation agreements. Under the Foreign Assistance Act, Section 506 emergency authority, crucial Patriot units were provided to Israel and AIM-9M missiles and misceilaneous ammunition were provided to Turkey. Under Section 61 of the Arms Export Control Act, M548 cargo carriers, howitzers and Pave Spike targeting pods were leased to the UK for Operation Desert Storm support

activities. Finally, reobligation-deobligation authority relating to foreign military credit financing was exercised to provide an additional $50 million of credit funds to Turkey. With this increase, Turkey purchased TOW 2/2A and Stinger missiles.

The security assistance program and the FMS process worked well in providing essential support to Coalition, NATO and allied members. Peacetime cooperation through the US FMS system formed the basis for crucial military infrastructure development in Saudi Arabia and ensured most Coalition partners were equipped and trained on US-origin equipment, bringing a high level of interoperability to Coalition forces.

SUMMARY

Success does not preclude lessons to be learned, and the difficulties which beset the logistics support of the Gulf War should not be allowed to diminish the magnitude of the achievement – perhaps the most impressive short-term buildup of people and materiel in the history of warfare. It was an ambitious undertaking, and its complexity assured that, however well done, it could have been done better. The most important criticisms of the effort stem from the fact that more time was required to overcome the emergent difficulties than may be available in future crises. The most significant successes are attributable to the foresight of policymakers and planners, and the creativity and flexibility of logisticians on scene.

Most of the major aspects of Gulf War logistics included both strengths and shortcomings. Saudi infrastructure was invaluable as far as it had been developed, but was limited to a few major sites; highways were excellent where they had been built, but over two thousand miles of road construction was required where they had not. The tactical advantage of first deploying combat versus support forces, as well as the decision to stock 60 rather than 30 days of supply, had a price: they created backlogs which strained the supply system and contributed to the breakdown of user confidence. As a result, new procedures have been developed which will improve item visibility in the future and obviate the inflation of requester priorities.

The large number of participants complicated the operation, but the assistance of host nations and supporting CINCs was invaluable. The extraordinary distances involved in transportation and supply tested the Coalition's resources, but the foresight of forward deployed assets and innovations in the approach to strategic lift got the job done.

Thanks in large part to the prudence of previous years, there were sufficient supplies on hand to fight the war, and the US industrial base responded with imagination and alacrity to meet accelerated delivery dates for numerous specific requirements. On the whole, however, there was no requirement for a major

industrial surge, and there were some indications that industry's ability to respond to a more protracted crisis might not match its enthusiasm to assist.

In short, the victorious participants in Operations Desert Shield and Desert Storm should congratulate themselves on the unqualified success of the outcome. They should also redouble their efforts to support the logistics of a longer war fought at shorter notice.

OBSERVATIONS

Accomplishments

- The Coalition's logistics effort was unprecedented. Operations Desert Shield and Desert Storm used virtually every facet of the US military and civilian transportation system. The first-ever CRAF and RRF activation worked well; and the activation of elements of sealift, though not without problems, carried the sustainment effort due to its bulk delivery ability. And the wisdom of the previous decade to fund and develop a prepositioning program for the region proved to be a valuable means to improve combat capability half a world away.

- To acknowledge the strengths and weaknesses of the logistics effort, one must first comprehend the scope of that effort. Despite organizational and systemic flaws, the innovative and dedicated people, both civilian and military, were the key ingredients that made the operation a success. The Services' logistics forces met all essential requirements without experiencing any shortfalls that turned into war stoppers. In those cases where established procedures and systems proved inadequate, logisticians developed effective solutions. This was accomplished for a combat force exceeding half a million people in the harsh, vast, distant environment of the Arabian peninsula.

- Logisticians provided continuous support, despite the challenges of a distant theater half a world away; an expansive operational area with limited roads; demanding environmental and operational conditions; and a very complex force structure characterized by Coalition, Joint Service, Active, and RC forces.

Shortcomings

- This operation highlighted some significant limitations. The decision to sequence the deployment of the service support units later in the deployment flow severely affected the ability of the Army to provide the common-user requirements for the other services. In some cases, even those logistics forces that did arrive were unable to meet all requirements, and CENTCOM had to rely on HNS to make up the shortages. There were not sufficient heavy equipment and petroleum transport, water supply units, graves registration, and theater material management units, even though virtually all in the Total Force were deployed to the theater. For example, 73 out of 108 (68 percent) of the medium truck companies in the Army's Total Force was in the theater; also, 28 out of 31 (90 percent) petroleum truck companies, and 17 out of 17 (100 percent) heavy truck companies (operating the HET) were deployed. Of more than 1,200 HETs in theater, only 497 were US government owned; the balance came from host nations and other countries. As force reductions are undertaken, the balance

between support units and combat units must be closely monitored and controlled to ensure the national security strategy is supportable.

- Operations Desert Shield and Desert Storm clearly demonstrated the Army had not yet fielded adequate numbers of high mobility tactical wheeled vehicles to support its armored and mechanized divisions. The new Heavy Equipment Transporter System, the Palletized Load System and the family of medium tactical vehicles had not yet entered production. The M939A2 5-ton trucks were in production, but did not arrive in sufficient numbers before the end of the war. The pure-fleeting initiative to replace CUCVs with HMMWVs in divisions, armored cavalry regiments and units operating in the division area had not been fully implemented at the start of the war. Current procurement programs will do much to correct this problem.

- Wartime HNS was essential for rapid force sustainment and was a force multiplier. However, very few support agreements had been negotiated with governments in the region before 2 August. A concentrated effort resulted in completion of the necessary agreements. Early support of the troops would have been improved if effective HNS programs had been in place before the conflict. HNS may become even more crucial as US forward-deployed forces decrease worldwide.

- Arriving personnel found a wide spectrum of facilities, from exceptionally well developed to extremely austere. It is widely recognized how the key APODs and SPODs facilitated the operation. While the ports were important to the flow of personnel and materiel, the limited initial ability to move troops and equipment away from the ports to their preliminary combat positions became a weak link in the logistics chain. Inadequate numbers of US organic trucks, especially those with good off-road capability, and a limited MSR network became severe challenges that had to be overcome.

- Assistance in-kind made up for crucial shortfalls of equipment, especially HETs provided by other nations. There also were other items provided to US forces during deployment and Operations Desert Shield and Desert Storm that were essential to success, such as fuel from some regional Coalition partners.

- The effectiveness of Army logistics automation during Operations Desert Shield and Desert Storm was substantially degraded by the lack of tactical communications support below corps level. Due to the limited availability of tactical communications support, CSS units have become dependent on commercial telecommunications to augment C2 tactical communications.

- The Gulf War did not (with some exceptions) provide a strenuous test of production surge capabilities. A general mobilization was not necessary, in large measure due to the existence of some war reserves for most items. There were some valuable insights, however, from surging in the production of those items which were (or potentially were) in short supply. The greatest demand for increased production was for secondary items such as engines, transmissions,

spare parts, and troop support items, rather than major end items (e.g., tanks, aircraft, etc.). The need was for quick surge capability to overcome deficiencies in war reserves of those secondary items. The response by industry was overwhelmingly supportive and enthusiastic. However, in some cases, industry's ability to meet surge demands was marginal and could have had serious consequences had the offensive begun sooner, lasted longer, or been more demanding. For many items, the time required for industry to surge to maximum production capacity was six to nine months, even for relatively inexpensive, low-technology items, such as clothing, sandbags, and barbed wire.

- In the context of the new national military strategy which emphasizes the ability to respond quickly to regional crises, coupled an anticipated decline in defense procurement, even warm production lines are limited in the ability to respond to a short warning or short duration contingency. Response to short warning scenarios must be made with war reserves, plus what can be quickly produced by warm production lines. This suggests a need for balancing procurement of war reserve stocks with industrial surge capability, and making investments in industrial preparedness that would enable a quick production surge.

- The present makeup of government-controlled shipping is not conducive to early force movement. The relative high number of break-bulk ships in the RRF, the rapidly diminishing number of merchant marine vessels and the merchant mariners available for manning the RRF, and the focus on rapid response to crisis situations require certain actions be taken. These actions include: evaluate the need for additional RO/ROs in the RRF and FSS; enhancement of the readiness of RRF vessels; increase containerizable materiel and equipment in Army heavy divisions; increase the overall ability of the force to move sustainment tonnage (particularly munitions) in containers; increase the availability of mariner crews; and finally, achieve the capability to provide visibility of what is in each vessel or container.

Issues

- It is necessary to ensure that sustainment stocks meet requirements. An assumption should not be made that in future contingencies shortfalls in one AOR can, or should be, alleviated by redistributing assets from another theater.

- Operations Desert Shield and Desert Storm acquisition and procurement experience indicates a requirement for additional study on the appropriate balance between war reserve programs and industrial base capability, and on the need to identify and fund surge capabilities, especially for crucial secondary items. Again, draw down of the force will have a significant negative effect on the responsiveness of the defense industrial base.

- Prepositioned equipment proved itself invaluable. But improvement in the types of equipment and consumables stored, as well as increasing the quantities, would improve forces capabilities significantly.

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APPENDIX G

MEDICAL SUPPORT

"It was the fastest mobilization of medical assets in history – we did in three months what took us three years in Korea."

Lieutenant General Frank F. Ledford, Jr.
Army Surgeon General

INTRODUCTION

Operations Desert Shield and Desert Storm were supported by medical organizations in Central Command (CENTCOM), European Command (EUCOM), Pacific Command and the Continental United States (CONUS). The medical support structure was tailored to meet the command's needs based on the number of troops in the theater and the Commander-in-Chief, Central Command's (CINCCENT) casualty estimates for various types of combat operations.

Medical units from all Services began deployment to Southwest Asia (SWA) on 8 August. As the deployed force's mission evolved from deterrence to offensive operations, medical support requirements expanded. Beds also were provided by EUCOM and through host nation support (HNS) agreements with Saudi Arabia, Bahrain, United Arab Emirates (UAE), Qatar, and Oman. Additionally, requirements for extensive health services in the United States emerged with the decision to retain full medical care for military members and their dependents worldwide.

Immediately after Operation Desert Shield began, Forces Command was directed to develop a concept of operations to execute the Integrated CONUS Medical Mobilization Plan (ICMMP), which would ensure the Services were prepared to care for casualties evacuated from the Theater to the CONUS. Had it been necessary, the Department of Veterans Affairs (VA) and Department of Defense (DOD) Health Resources Sharing and Emergency Operations Act could have been implemented. DOD also was prepared to request activation of the National Disaster Medical System (NDMS) to augment DOD and VA capacity.

Although the actual operational situation ultimately required the use of only a small part of the available assets, a detailed description of how the medical system was organized to meet the medical needs of the forces is, nevertheless, instructive. This appendix discusses the doctrine for and the application of health care in support of Operations Desert Shield and Desert Storm.

Overview of Health Service Support Concept

The joint health service support (HSS) mission is to minimize the effects of disease, injuries, and wounds on unit readiness, effectiveness, and morale. The HSS system used in Operations Desert Shield and Desert Storm was an outgrowth of existing Service and joint operations procedures. While the SWA environment and operational requirements were unique, medical care nonetheless was planned, arranged, and delivered through optimum use and integration of component command HSS resources, along the lines established by each Service for health service support. This mission was accomplished using a phased health-care system that begins with those measures taken near where initial disability occurs and extends through evacuation from the theater for treatment at a CONUS hospital. The system's effectiveness is measured by its ability to return patients to duty quickly and as far forward in the theater as possible, while minimizing morbidity and mortality. Through application of HSS principles and use of the levels of care, requirements for replacement personnel, patient evacuation, and logistics support were minimized.

Patient Care and Movement

Progression through the health care system is determined by the nature of the disability. For example, patients with minor wounds may not be evacuated through all levels of health care and are returned to duty after treatment at the lowest level that meets the patient's needs. The patient's condition, threat, time, distance, and terrain are considered when the evacuation mode is selected. Centralized evacuation management procedures match the patient's condition and urgency of movement with the transport method. In the forward area, treatment facilities are not bypassed unless the patient has been treated at a medical treatment facility (MTF) and stabilized for flight or ground transportation. These facilities also provide the opportunity to refine further and designate the transportation mode for evacuation to the rear.

Movement of casualties from one level of care to the next in the forward area usually is done within hours. Distances and times vary with the tactical situation, but casualties quickly travel between the battlefront and hospitals. Modern concepts of increased mobility, as well as the vulnerability of rear areas to aerial or missile attacks, require all medical units, wherever located, be prepared to receive and treat casualties.

The health care operations described below for the Army outline the Joint doctrinal health service concept all Services use. While the concept highlights the Army's theater health service operations, it also provides a description of the levels,

or echelons, of care each Service used. In their inception, care levels and HSS principles did not specifically address joint or combined operations as experienced during Operations Desert Shield and Desert Storm. Their implementation, however, is common among the Services and applies to HSS planning and execution by joint force commanders. Joint operation HSS is continuous planning, coordination, and training by the Services to achieve unified health care. While each Service brings unique capabilities and requirements to a theater, the single joint doctrine provides for more effective HSS application. The Army operations section below describes the joint HSS care levels and principles; it is typical of the entire theater HSS concept. Each Service's unique HSS aspects are described separately.

Army Health Services Operations

HSS within a theater is organized into levels which extend throughout the theater. Each level is designed to meet the needs of the operational environment and play a specific part in the progressive, phased treatment, hospitalization, and evacuation of casualties. Each succeeding support level has the same treatment capabilities as those levels more forward, and adds a new level, or increment, of treatment which sets it apart from the previous level. (Echelon of care can be used interchangeably with the term level of care.) Medical resources are tailored to provide the greatest benefit to the largest number of persons within the theater.

Joint Services health care is provided in five levels. This system treats and evacuates patients from forward theater areas to hospitals that match patient treatment needs. Level I medical support is provided by individual soldiers; by specifically trained individuals; or by elements organic to combat, combat support (CS), and designated medical units. Emphasis is placed on emergency lifesaving measures to stabilize and allow evacuation of the patient to the next level of care. Level I medical support also includes medical evacuation from supported units to a higher level of medical treatment.

Level II care is given at division or Corps clearing stations. Level II functions are performed typically by company-sized medical units at brigades, in divisions, and by similar units in the corps and theater rear area. These Level II units are located in the Brigade Support Area (BSA), Division Support Area (DSA), Corps Support Area, and the Theater rear area. An initial surgical capability is organic to these units in airborne and air assault divisions. Other types of divisions are augmented with surgical capability as the combat situation requires. At this level, the casualty is more closely examined. Wounds and general status are evaluated to determine priority for further care or evacuation. Emergency care, including basic resuscitation and stabilization, is continued. If necessary, additional emergency measures are instituted; however, these measures generally do not go beyond immediate treatment.

In Level III care, the casualty is treated in a MTF staffed and equipped to provide resuscitation, initial wound surgery, and postoperative treatment. Casualties whose wounds are life-threatening receive surgical care in a hospital close to the clearing station. Those whose injuries permit additional transportation without detriment receive surgical care in a hospital farther to the rear. Hospitalization at this level is provided by the Mobile Army Surgical Hospital (MASH), the Combat Support Hospital (CSH), and the Evacuation (EVAC) Hospital. The MASH provides intensive care for up to 60 patients. The CSH provides intensive, intermediate, and minimal care for up to 200 patients (40 intensive care, 80 intermediate care, and 80 minimal care). The EVAC hospital provides intensive, intermediate, and minimal care for up to 400 patients (40 intensive care, 160 intermediate care, and 200 minimal care).

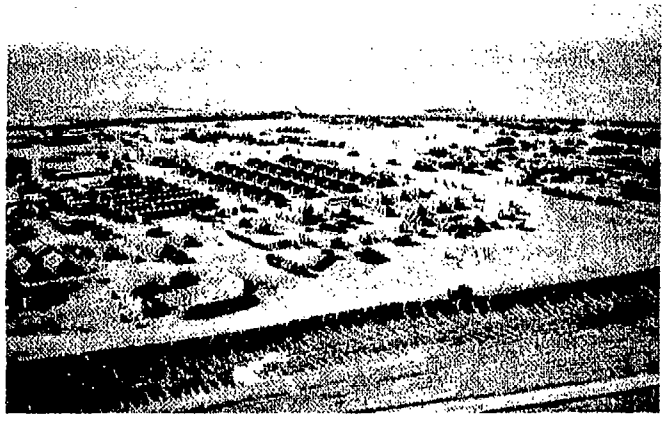


Figure G-1
Army Deployable Medical Systems
Hospital

In Level IV medical care, the casualty is treated in a MTF staffed and equipped for general , specialty, and surgical care and reconditioning rehabilitation for return to duty. Hospitalization at this level is provided by the field hospital (which also may be part of Level III treatment facilities if the situation warrants), the station hospital, and the general hospital. To provide flexibility, the field hospital can be divided into three hospital units, which can operate at separate locations for a limited time. The field hospital can accommodate up to 400 patients, or each hospital unit up to 100 at a time. Station and general hospitals have no fixed size.

In Level V, further HSS is found in CONUS, and available for this crisis, EUCOM hospitals. Normally, mobilization requires the expansion of peacetime military hospital capacities, but does not include the peacetime level of care for all eligible, non-active duty beneficiaries. It also includes VA and civilian hospital beds to meet

the increased specialized requirements (e.g. burns and spinal injury) of patients evacuated from the theater. This level is usually associated with long term reconstructive, rehabilitative, or more definitive care.

Some medical care facilities have the ability to relocate, should this be necessary. These units can move relatively rapidly to sustain the force. In some cases, small HSS units operate independently. In other cases, HSS units shift to react to the flow of the battle or to meet requirements for unit reconstitution.

Forward combat unit reconstitution is accomplished in part through the return to duty rate of casualties. Should medical units require reconstitution, resources normally come from the next higher HSS level. Each level is designed to reconstitute, within limits, the next lower level. Cross-leveling of medical assets, or the supplementing of one unit that is short personnel or equipment with that of another unit, also may permit reconstitution and reinforcement. Cross-leveling actions are done with every expectation that the units will be replenished as soon as additional personnel or equipment is made available.

Patient Movement

To speed the movement of casualties to the more comprehensive medical care available back from the forward line of troops, ground ambulance capability is supplemented by aeromedical evacuation assets. The Air Ambulance Company has 15 helicopters, each able to evacuate litter and ambulatory patients and is a Corps medical asset. Its main role is to provide aeromedical evacuation support within the Corps area and in direct support of divisions. Aeromedical evacuation elements locate with medical companies in the BSA and DSA to evacuate patients to Corps hospitals. These aircraft operate as far forward as the tactical situation permits. (Individual aircraft may operate beyond friendly lines in support of special operations or unique mission requirements.) The Air Ambulance Detachment, another aeromedical evacuation unit, is a small, flexible aeromedical organization with six helicopters, each able to evacuate litter and ambulatory patients. It can be used in the Corps area in a role similar to the Air Ambulance Company, or in the theater rear area to transfer patients between hospitals or to Air Force Aeromedical Staging Facilities.

Navy Health Service Operations

While subscribing to joint concepts, the Navy maintains the capability to provide medical care on board each ship. HSS operations during hostilities are much the same as peacetime procedures. As a combat theater is established, the Navy component commander determines additional requirements for health care based

on the theater commander-in-chief's (CINC's) operational plan and the population at risk. Factors which are considered include the requirement for higher levels of care to support combat operations, size of the Marine Corps (USMC) forces deployed in theater, size of the fleet, and operating tempo. The CINC staff then designates the Primary Casualty Receiving and Treatment Ships (PCRTS), deployable fleet hospitals, hospital ships, and coordinates the manning and transportation of the medical and dental treatment units. The Navy also augments USMC Level I and II medical units as required. All Navy PCRTSs are Level II medical support capable and their beds are considered flow-through beds. Simultaneously, the Navy staff coordinates the movement of the required equipment sets, such as Fleet Hospitals, with the supporting Navy component command for deployment to the theater.

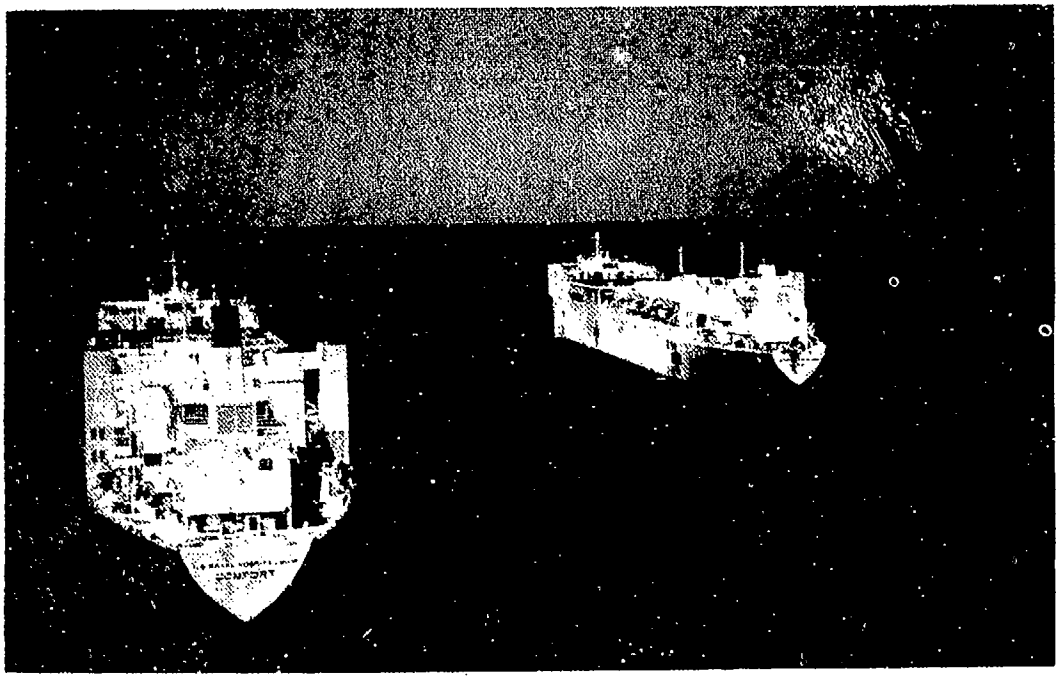


Figure G-2
USNS Mercy and USNS Comfort

Navy medical platforms and units deployed to SWA with a full complement of capabilities. The hospital ships *USNS Comfort* and *USNS Mercy* are dedicated afloat MTFs, providing Level III care. The hospital ships each have 1,000 beds; of these, 500 are acute care and 500 are minimal care. The acute care beds consist of 80 intensive care units, 20 recovery, 280 intermediate, and 120 light-care beds. The minimal care beds generally are for post-treatment wound care, follow-up diagnostic procedures, and minimal nursing care. The shore-based Fleet hospitals are transportable medical

facilities designed for rapid deployment and assembly in the field. They each have 500 beds; of these 80 are intensive care and 420 are acute care. The amphibious assault ships have a secondary role to the Fleet as Casualty Receiving and Treatment Ships. During an amphibious assault, these ships perform the PCRTS role for the combat troops.

In the USMC, as in each of the Services, Level I care is provided by individual hospital corpsmen and medical elements organic to combat and combat support units, such as battalion-level aid stations. Level II care is provided by units of the Medical Battalion of the Force Service Support Group. Within each medical battalion are surgical support companies and collection and clearing companies. The mission of the surgical support company is to provide general medical support to the Marine Expeditionary Force (MEF). Each company has five operating rooms and 150 flow-through beds. The mission of the collecting and clearing company is to provide direct medical support to the MEF and has two operating rooms and 60 flow-through beds. The USMC is dependent on the Navy for medical care above Echelon II.

Air Force Health Service Operations

The Air Force (USAF) concept of operations for deployed medical support also conforms with joint doctrine and closely parallels the methodology used for peacetime health care. Initial medical support (Level I and II treatment) at deployment locations is provided by air transportable clinics (ATC) and preexisting medical facilities. Each ATC contains first aid and emergency medical supplies and is staffed by a squadron medical element consisting of a flight surgeon and three technicians. An ATC is assigned to and supports each combat flying squadron and is an integral part of the deployment package. Level III and higher care for combat or prolonged deployment in an underdeveloped region requires the more sophisticated medical services of an air transportable hospital (ATH), or large contingency hospital.

A complete ATH is capable of delivering surgical, X-ray, and laboratory services; blood storage; medical and dental outpatient services; and beds for 50 patients. Each hospital is designed to meet the medical needs of a deployed fighter wing with more than 4,000 people. Most ATHs are attached to CONUS-based fighter wings for rapid deployment where needed. Expansion packages are available to increase the ATH's surgical capability. Patient decontamination teams often deploy with ATHs to manage chemical casualties.

Preestablished medical facilities in theater (active or warm bases) also can be expanded and staffed by host nation support (HNS) or manpower packages from CONUS to provide increased medical capability. Contingency hospitals, ranging from 250 to 1,500 beds, are prepositioned primarily in the European and Pacific theaters and are prepared for rapid activation. They offer a wide range of

Figure G-3
This 50-bed Air Transportable Hospital was Assembled and Fully Operational Within 24 hours of Arrival in Saudi Arabia

sophisticated medical services and represent the final provider of medical care before evacuation to CONUS.

The Military Airlift Command, assisted by USAF aeromedical evacuation and staging teams, and medical evacuation units from the Army and Navy, establishes a coordinated, multi-theater aeromedical evacuation system for casualties. Medically configured C-130 aircraft normally are used for dedicated evacuation flights within the theater, while both dedicated and other available C-141s evacuate patients to facilities outside the theater and to CONUS. (The theater evacuation policy, established in planning guidance, determines whether patients are retained for treatment in theater or evacuated to CONUS.)

In CONUS, active duty and Air Reserve Component units and personnel provide support to deploying medical units and expand CONUS hospitals identified for casualty reception. According to current planning concepts, medical care at most CONUS facilities normally would be scaled back to serve principally active duty personnel. VA and NDMS facilities also are available on call to treat patients returning from theater.

Veterinary Services

Another important part of HSS is the veterinary service. It provides for control of zoonotic diseases, care and control of local and DOD-owned animals (e.g. working dogs), veterinary laboratory support, and inspection and laboratory examination of subsistence items for wholesomeness and quality. A key contribution of veterinary services for fielded combat forces is inspecting facilities that supply, store, and issue subsistence items. This, in conjunction with the responsibility for inspection of all subsistence items after exposure to chemical or biological warfare (CW/BW), is a crucial role in a theater of operations.

OPERATIONS DESERT SHIELD AND DESERT STORM

During the early phases of Operation Desert Shield, the CENTCOM Surgeon established a requirement for 7,350 hospital beds in theater with an additional 5,500 beds in EUCOM, a requirement that remained constant until offensive operations planning began. CENTCOM also identified a requirement for 17,000-to-22,000 beds in CONUS.

The deployment of the medical infrastructure to CENTCOM occurred according to the schedule in Table G-1. When the decision was made to augment the forces in theater to provide an offensive capability, medical requirements were adjusted accordingly. In-theater bed requirements increased to 18,530, of which 4,600 were to be provided by host nations with staffing or augmentation provided by US military personnel. When the air campaign began on 17 January, 7,680 fully staffed beds were in the CENTCOM AOR and 6,160 were operational. (Fully staffed beds means all required personnel are in place, but not all equipment is set up; operational means all personnel are in place and facilities fully set up.) The full complement of beds was available in EUCOM, but they awaited augmentation of selected medical providers to become fully operational. When the land campaign began on 24 February, all assets to support the 18,530-bed requirement were in-theater and 15,430 beds were operational. To retain an appropriate degree of flexibility, however, the remaining beds were kept loaded in containers on trucks to follow the combat forces forward.

EUCOM's 5,500 bed requirement was provided by both the USAF and Army. EUCOM identified the personnel from the United States that would be required to augment their staff, and those required to activate EUCOM's prepositioned contingency hospitals in order to support CENTCOM requirements. CINCCENT decided to delay until January the full manning of facilities in EUCOM for CENTCOM support. Deployment of the medical infrastructure to EUCOM occurred according to the schedule in Table G-2.

	Aug 15	Sep 15	Oct 15	Nov 15	Dec 15	Jan 15	Feb 15
USAF	100	300	450	450	450	750	950
USN	0	1,500	1,500	1,500	1,500	1,500	3,500
USA	0	600	660	1,460	1,860	4,460	9,480[2]
HNS	350	350	350	500	500	500	4,600[3]
Total	450	2,750	2,960	3,910	4,310	7,210	18,530

Notes: [1]These figures represent fully staffed and equipped beds in theater, but are not necessarily total operational beds.

[2]Containerized equivalent of more than 3,100 beds were loaded on trucks to deploy to casualty concentrations as required. On 26 February, Day 3 of the ground war, several hospitals still were enroute to their objectives when the cease fire was issued. At that time, there were enough hospital beds operational in theater to support the workload. 1,933 beds remained uploaded to support contingency operations.

[3]After extensive negotiations, 4,100 were HNS beds staffed by Army personnel and 500 were provided by host nations with staffing augmentation provided by the Navy.

Table G-1
Bed Capacity of Medical Assets in CENTCOM by Month[1]

In addition to mobilization to support CENTCOM, medical personnel were mobilized to support CONUS facilities. Some of these personnel were used to expand capacity to treat casualties returned to the United States. Primary receiving hospitals were designated and received priority for augmentation. Other medical personnel were used to maintain peacetime levels of health care for non-deployed personnel and military dependents (including those of activated reservists). The latter requirement was unanticipated. Before the crisis, DOD planning guidance for contingencies assumed that civilians and CHAMPUS would provide care when mobilization occurred. When the crisis began, however, the Department decided to maintain full peacetime levels of service at military medical facilities for service members and their families (including families of activated reservists) as one means of providing the maximum degree of support possible for their efforts; but not all RC beneficiaries are near military facilities and many did not understand CHAMPUS. Both factors hindered the rapid filing and settlement of claims.

	Aug 15	Sep 15	Oct 15	Nov 15	Dec 15	Jan 15	Feb 15
USAF	490	490	490	490	490	490	3,740
USA	622	622	622	622	622	622	1,760
Total	1,112	1,112	1,112	1,112	1,112	1,112	5,500

Table G-2
Bed Capacity of Medical Assets in EUCOM by Month

In some instances, units were tailored so only direct care personnel (i.e. physicians, nurses, dentists) were called up for this purpose, while the augmentation units for hospitals as a whole were not always activated. Generally, units were not aware their personnel would be recalled incrementally and the procedure led to some morale problems. (A discussion of the mobilization of Reservists is contained in Appendix E.)

CONUS OPERATIONS

Acting for the National Command Authorities, the Chairman of the Joint Chiefs of Staff directed the Commander-in-Chief, Forces Command (CINCFOR) to prepare for possible implementation of the ICMMP. This plan integrates the existing Service medical mobilization plans, which govern use of CONUS medical resources to care for returning casualties. Difficulties in the planning process resulted in some confusion and demonstrated the need for closer coordination between CINCFOR and the Services.

To avoid premature activation of the NDMS, arrangements were made for small numbers of patients requiring specialized medical care primarily available in the civil sector (e.g. burn and spinal cord injury beds) to be sent to a military medical facility, which would then obtain care at nearby civilian hospitals, using established procedures. Current agreements with the VA and the military's ability to place

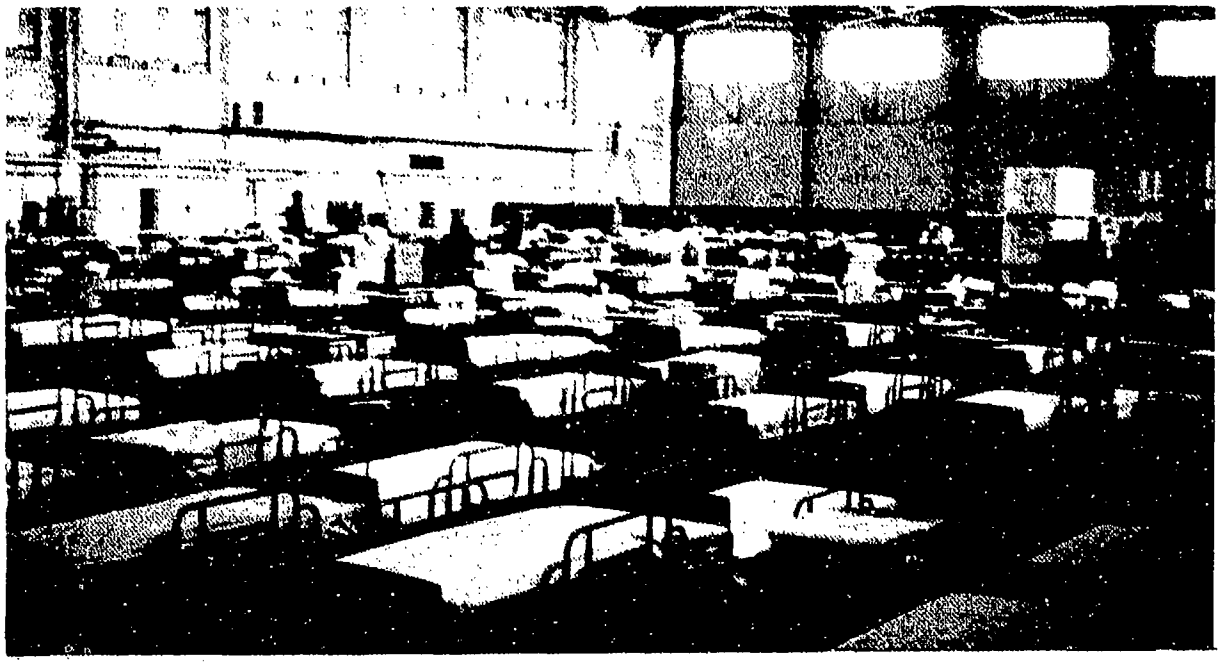


Figure G-4
This Aircraft Hangar Doubles as a Ward in a Contingency Hospital

active duty patients in civilian hospitals using the supplemental care program provide access to specialty care not normally provided in DOD facilities.

The USAF used approximately 6,600 Reserve Component (RC) personnel to backfill CONUS medical facilities to meet the overall demand for CONUS support. The requirement was met through the use of volunteers, reserve units on active duty for annual training, manning assistance by temporary duty assigned personnel, gains resulting from the Stop Loss program, and activation of RC units and personnel. The individual mobilization augmentation program afforded valuable support with flexibility to match specific provider requirements in RC units and CONUS casualty receiving hospitals.

The Army called up more than 4,200 RC personnel to replace deployed active duty medical personnel. In many cases, the active duty personnel went with the units deployed to the area of operations (AOR), while RC replacements maintained the peacetime medical support and expanded the CONUS based hospital capacity to continue health care delivery at near normal peacetime capability. Primary receiving hospitals, such as Walter Reed Army Medical Center in Washington, DC, were given priority. In some instances, derivative units were created so only specific direct care personnel (e.g. thoracic surgeons, cardiologists) were called up, not entire RC

organizations. Eventually, 199 Army medical units were called to serve in SWA, or to support medical operations in Europe or in CONUS.

The Navy activated more than 10,500 medical and non-medical support RC personnel to support Operations Desert Shield and Desert Storm, and for CONUS backfill requirements. There were plans to call-up 6,000 more RC personnel when the war ended. Included in the call-up were reserve medical personnel required to augment two hospital ships, to meet mission requirements for the Fleet Marine Force, two reserve Fleet hospitals, and additional theater driven requirements. The need to expand CONUS medical facilities rapidly to receive potentially large numbers of casualties from SWA required an increase of medical RC augmentation. Maintaining the peacetime level of health care to beneficiaries in CONUS also required RC call-up and a Stop Loss Initiative for active duty personnel.

DEPLOYMENT

Deployment of medical assets occurred according to a CENTCOM established schedule. This schedule was consistent with CINCCENT's prioritization of movement for combat, CS, and combat service support (CSS) units. Preparation for deployment of medical units and personnel provided challenges, however. For example, current law requires an equivalent of 12 weeks military training for personnel before deployment. Army RC medical officers who did not meet the criteria were awarded constructive credit for their professional training and were taught field skills in a special two-week orientation course. About 2,000 RC officers were trained in this program. This requirement not only taxed the training base, but also identified a training shortfall. Alternatives will be examined to eliminate this shortfall and ensure RC personnel are ready for operational deployment.

The Army used existing regional medical training sites, and deployed mobile training teams in the theater to conduct new equipment training for active and RC units being modernized with Deployable Medical Systems (DEPMEDS) equipment. Selected RC units also received refresher training at the regional sites before deployment.

Another example of an expanding training requirement occurred upon activation of the two Fleet Hospitals to be staffed with RC personnel. Some additional training for staffs was necessary to ensure peak efficiency with field equipment. This training was conducted at Fort Dix, NJ, to provide a single training center that also permitted development of unit cohesiveness.

The USAF deployed ATHs and ATCs which travel with their flying squadrons and wings. USAF equipment identified for deployment was complete. However, because the FY91 Revolving Funds were not fully funded for War Reserve Material, many dated and limited shelf-life items had expired and had to be replaced using peacetime operations and maintenance funds and supplies. The USAF also

accelerated deployable medical unit training for selected active and RC units to improve proficiency with equipment employed in SWA. In response to a CINCCENT theater requirement, the USAF increased active and RC unit participation in the Tri-Service Field Medical Management of Chemical Casualties Course before deployment.

Personnel

Although programs were in place to compensate RC health care providers, many endured severe financial hardships because of Operations Desert Shield and Desert Storm. Legislation was enacted to provide special pay for activated health care practitioners. Also, an amendment to the Soldiers' and Sailors' Civil Relief Act provided important relief in professional liability protection for health care providers. Even with these positive actions, many reserve physicians called to active duty suffered financially.

Many RC practitioners sustain their skills by actively practicing the medical profession. However, others whose interests may have been redirected into teaching or administrative roles may not be as proficient as they once were. Existing policies must be enforced to ensure practitioners' abilities are current for their wartime position and the personnel classification systems accurately reflect the current area of expertise. This is particularly true of physicians whose specialty allows them to be placed in a substitutable position, and medical enlisted service members.

The quantity of dental care assets deployed to the theater was less than doctrine would have required. However, dental problems were minimal. This was due in part to the efforts of both active and RC dental personnel to prepare personnel for deployment. Clinics worked to ensure that personnel did not deploy with conditions likely to produce dental emergencies. As an example, by the outset of Desert Storm, DOD had sent to the Gulf approximately 150,000 RC personnel. Nearly 22 percent reported with dental conditions likely to produce an emergency problem, but only eight personnel were not deployed due to dental disease.

HEALTH CARE PLANNING AND SUPPORT IN CENTCOM

Medical plans were refined continually as the mission in the theater evolved from defense and deterrence to an offensive role. Contingency plans developed in support of Operation Desert Storm and for reaction to other events proved to be adequate. As with any plan, fine tuning was required as exemplified by the periodic relocation of medical assets to provide better support to the forces. There also was a

reallocation of aeromedical lift to link the tactical and strategic airflow better as the theater matured.

Planned medical staffing of the CENTCOM and EUCOM Surgeons' offices was adequate for the initial defense phase, but as the mission changed to an offensive role, the operational population of units and personnel more than doubled, and additional staff was required. Areas requiring augmentation included operations, logistics, administration, the Joint Medical Regulating Office (JMRO), the Joint Blood Program Office, special consultants for nuclear, biological and chemical warfare, and aeromedical evacuation.

CENTCOM identified requirements for medical support as missions evolved. The Services provided the assets CINCCENT requested, and they were combined to form a comprehensive health care delivery system within the theater. Ultimately, this system consisted of 65 hospitals (two Navy hospital ships, three Navy Fleet hospitals, 44 Army hospitals, and 16 USAF hospitals), and organic medical assets supporting the USMC.

Early-arriving USAF ATHs were the primary source of medical care for forward deployed USAF units and nearby units from the other services until the arrival of more comprehensive medical resources.

The Navy provided immediate staffing for 350 host nation beds in Bahrain and later increased the HNS number to 500 beds with the addition of 150 beds in Qatar (see Table G-3). Additional staffing for host nation hospitals was provided by nine Army RC hospital units. These units deployed without unit equipment and staffed 4,100 beds in nine permanent hospitals in Saudi Arabia, Oman and UAE. These hospitals were assigned to echelons above corps and represented the highest level of fixed medical treatment capability available in the AOR.

The five early-deploying Active Army units were equipped with Medical Unit Self-Contained Transportable or conventional hospital sets. Following DOD guidance, these units had not been modernized with DEPMEDS equipment because the Service fielding policy gave priority to unequipped units (primarily the RC) to expand the the Army's total bed capability. When it became apparent that early deploying units could not provide satisfactory care because of equipment failures from environmental causes, the Army quickly developed and executed a modernization program to equip these units with DEPMEDS equipment.

This program was completed before the air campaign began. In addition, all follow-on deploying hospitals were provided DEPMEDS equipment from storage, such as from prepositioned stocks in Europe, or Primary Mobilization Stocks stored in Ogden UT. All of the stored hospital sets had known shortages, including potency items and dated material that was not available when the set originally was fielded. These shortages were documented before the crisis by the specific set and module to which the shortage applied. An automated system, called Ship Short, built unit-specific packages of supplies and equipment, and became operational during the

Inpatient Care in CENTCOM by Month (Cumulative Inpatient Days)

	Sep 15	Oct 15	Nov 15	Dec 15	Jan 15	Feb 15	Mar 15
USA	474	2,930	8,376	7,775	11,934	10,766	11,279
USN	197	961	1,448	1,430	1,492	1,507	1,189
USMC	438	2,247	3,005	2,410	3,241	2,032	1,688
USAF	364	901	1,211	1,280	1,572	1,693	1,111
EPW	0	0	0	0	0	295	9,942
USC	9	17	14	52	47	55	92
OC	0	6	35	21	40	8,693	15,622
Other	25	41	166	113	92	3,317	4,156
Total	1,507	7,103	14,255	13,081	18,418	28,358	45,079

Table G-3
Inpatient Care in CENTCOM by Month

early phase of Operation Desert Shield. As a result, each hospital was provided a tailored package to fill critical shortages before the ground offensive began.

Medical intelligence and forward laboratory support from the Navy, assisted by Army personnel, aided in identification and verification of biological and chemical agents in the theater. In addition, the environment presented a number of endemic diseases for which there was no proven treatment. An *ad hoc* tri-Service working group worked with the Office of the Assistant Secretary of Defense for Health Affairs and the Food and Drug Administration (FDA) to field a number of investigational drugs. The use of these drugs afforded the best available protection quickly and provided the only possible treatment for certain specific endemic diseases.

Disease, non-battle injury (DNBI) rates were markedly lower than expected. This is attributable to several factors: strong command emphasis on preventive medicine, especially regarding environmental threats to health such as prevention of heat injuries; well-trained preventive medicine, environmental health, and bio-

Outpatient Care in CENTCOM by Month (30 Day Increments)

	Sep 15	Oct 15	Nov 15	Dec 15	Jan 15	Feb 15	Mar 15
USA	5,038	13,713	30,331	35,198	34,318	20,495	23,985
USN	690	2,974	4,025	4,103	4,979	7,125	7,595
USMC	1,983	4,021	5,152	4,635	5,052	4,381	3,775
USAF	6,986	16,869	15,600	15,917	18,530	23,503	15,233
EPW	0	0	0	0	0	94	373
USC	60	215	201	176	227	446	346
OC	2	42	117	81	121	1,188	1,272
Other	61	238	761	695	753	2,883	4,904
Total	14,820	38,072	56,187	60,805	63,980	60,115	57,483

Table G-4
Outpatient Care in CENTCOM by Month

environmental engineering officers and specially trained enlisted personnel; a very strong veterinary presence for food inspection; an adequate supply of potable water; a lower than predicted threat from infectious diseases; and, minimal contact with indigenous personnel. The Gulf War marks the first time a comprehensive DNBI program was used throughout a combat theater to monitor health. It provided commanders and medical personnel with a weekly summary of those injuries and illnesses that affected deployed units. However, not all Services participated equally in this program. During future deployments, DNBI surveillance programs will receive continued emphasis and include the entire force structure.

The number of combat casualties experienced during Operation Desert Storm did not test the capabilities of the medical units supporting forces in the theater. However, the speed and distances covered by maneuvering combat elements tested the ability of forward support medical units to keep up with advancing units. MASHs and CSHs were loaded on trucks, ready to deploy to casualty concentration sites in a rapidly changing tactical situation and in anticipation of a ground transportation shortfall. Surface transportation was a problem because of the competing demands for heavy trucks and transportation assets. This problem,

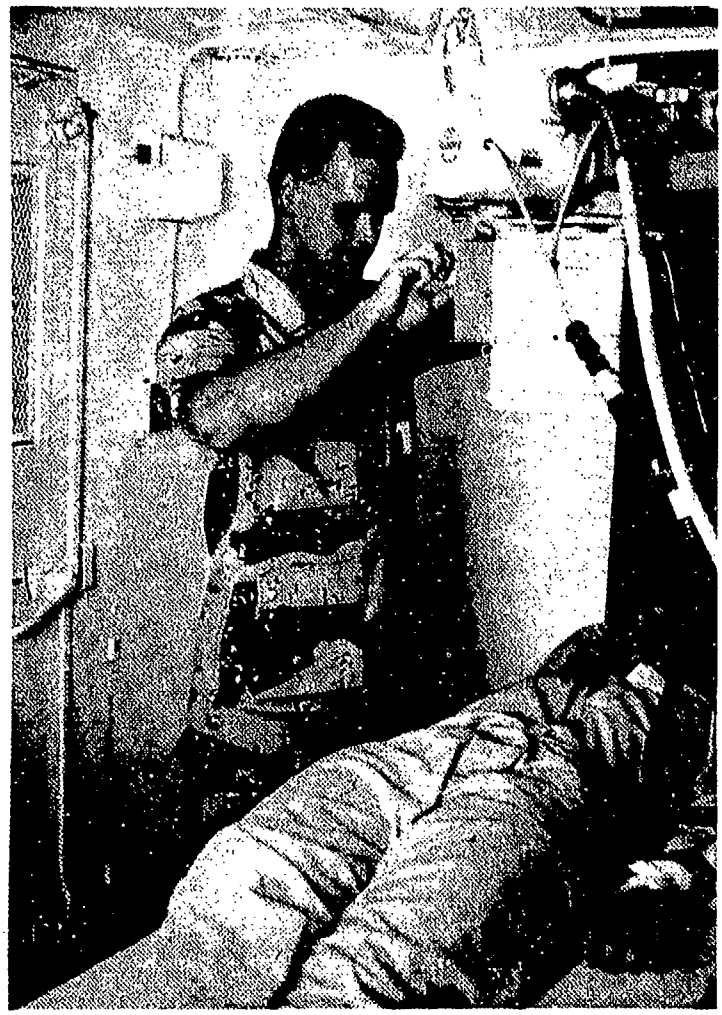


Figure G-5
This Medical Technician Operates the X-Ray Unit in a Deployable Hospital

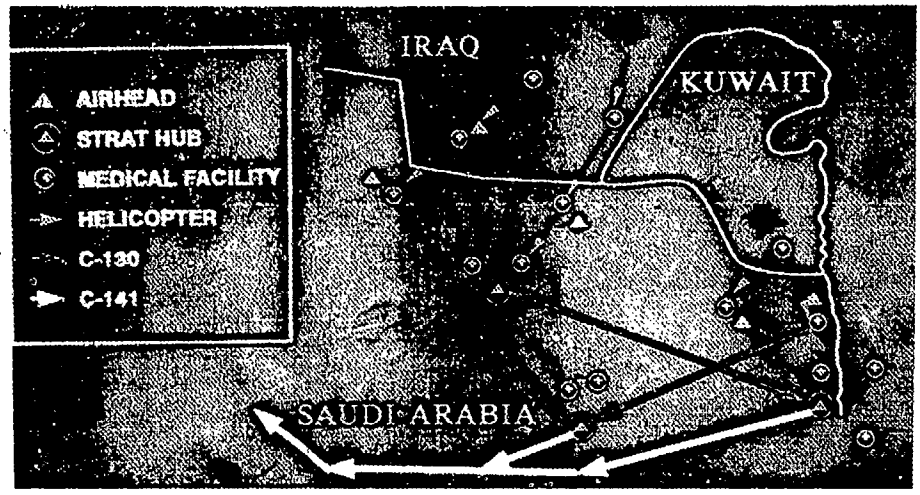
coupled with the size of the container requirement to move a MASH or CSH, left some medical assets with limited mobility. (The transportation shortfall is discussed in greater detail in Appendix F, Logistics.)

Patient Evacuation

The elements of the health care system in CENTCOM, EUCOM and CONUS were linked by the patient evacuation system. The CENTCOM AOR offered unique challenges for patient evacuation, which required innovative solutions. Some tactical evacuation legs were too long for Army medical evacuation (MEDEVAC) helicopters. USAF C-130s were prepared to fly into the Corps areas (including Iraq) to satisfy this requirement. In addition, 12 Army MEDEVAC helicopters were used to transport patients to and from the Navy hospital ships in the Persian Gulf.

Figure G-6
UH-60 MEDEVAC Helicopter

The rapid movement of ground forces to the west stretched the medical evacuation lines considerably. During Operation Desert Storm, CENTCOM used more than 220 dedicated medical helicopters and more than 1,000 ground



Map G-1
Operation Desert Storm Aeromedical Evacuation Routes

Operation Desert Shield/Storm
Aeromedical Evacuation Workload

(12 August 1990 - 31 March 1991)

	Litter	Ambulatory	Total	Missions
Intratheater	1,816	2,695	4,511	415
Intertheater	3,283	4,838	8,121	256
Total	5,099	7,533	12,632	671

Table G-5
Operations Desert Shield and Desert Storm Aeromedical Evacuation Workload (12 August 1990 - 31 March 1991)

ambulances (including 60 German ambulances and 100 medical evacuation buses). During the ground campaign, more than 30 C-130 missions a day were committed to aeromedical evacuation support, if needed, and an additional 74 C-130 missions a day were available. USAF Aeromedical Evacuation assets in the CENTCOM AOR, EUCOM, and CONUS included 18 aeromedical staging facilities, 13 mobile

aeromedical staging facilities, 31 aeromedical evacuation liaison teams, 18 aeromedical evacuation control elements, and three theater aeromedical evacuation control centers.

The aeromedical evacuation system performance can be illustrated by the missions flown in support of CENTCOM. During Operation Desert Shield, 242 C-130 aeromedical evacuation missions were flown, transporting 2,136 patients. During Operation Desert Storm, 173 C-130 missions were flown which transported 2,375 patients, including Coalition and Iraqi casualties.

Figure G-7
C-130 MEDEVAC with patients

In order to provide strategic patient evacuation between SWA, EUCOM and CONUS, Transportation Command (TRANSCOM) considered using aircraft in the dedicated aeromedical segment in Stage III of the Civil Reserve Air Fleet (CRAF) to reduce competition for C-141s. At TRANSCOM's request, the USAF contractor prepared to speed production of 10 sets designed to convert CRAF III Boeing 767 interiors for aeromedical use. Delivery was scheduled for April 1991; however, with the end of hostilities, accelerated production was no longer necessary.

While the MEDEVAC system was not taxed in this operation, operational considerations may affect future requirements for all Services. The JMRO would have been significantly busier had casualties been higher, and JMRO joint staffing was too austere to manage a heavier workload effectively. Future deployments should increase JMRO staffing. In addition, tracking patients in the entire health care delivery system, including the aeromedical evacuation system, was ineffective. Substantial efforts are in progress to remedy this.

Logistics

While initial medical resupply support was provided by each respective Service, by the end of November, Army Component, Central Command, was designated as the single integrated medical logistics manager for the theater and assumed the total medical supply support mission. Though having experience in this role in Europe and Korea in normal peacetime operations, this was the first time the Army (or any Service Component) served in this role during a contingency. There were some difficulties, including obtaining access to host nation warehousing and insufficient joint logistical staffing for the deployed Medical Supply and Optical Maintenance (MEDSOM) Units.

The Army Medical Materiel Center Saudi Arabia (USAMMCSA) was established by colocating two Army MEDSOMs. The center served as the primary medical resupply source for all DEPMEDS equipped units in the CENTCOM AOR. Though some supply shortages occurred in some hospitals, supplies were eventually provided by the Services. At full theater maturity, USAMMCSA, with an additional three deployed MEDSOMs, provided medical resupply support to 65 hospitals, nine equivalent Army Divisions, and one MEF. USAMMCSA was able to provide only approximately 40 percent of the medical material requirements to the Navy hospital ships. This was due in part to the non-DEPMEDS material and platform specific requirements not handled by Army MEDSOMs. As a result, the hospital ships used both Army and Navy supply channels. In addition to the five Army MEDSOMs in SWA, a backfill MEDSOM was sent to Europe to replace the EUCOM MEDSOM deployed to SWA. The MEDSOM sent to EUCOM assisted the Army Medical Materiel Center Europe, which served as the primary resupply source for the USAMMCSA. The Defense Logistics Agency also provided key resupply support to both Europe and SWA. The designation of a single integrated medical logistics manager for a theater of operations was useful, and should be used in the future.

Because of short shelf life, certain drugs, to include chemical and biological defense drugs, were available only in limited quantities. DOD is investigating options for insuring future availability of these drugs in the future while at the same time minimizing the recurring costs of maintaining them in inventory.

Blood

Sufficient quantities of freshly collected liquid blood and frozen blood components were moved to and maintained in the CENTCOM and EUCOM AORs to satisfy expected requirements. The Armed Services Blood Program Office activated the US tri-Service contingency military blood resupply system. Contingency contracts with the American Red Cross and the American Association of Blood Banks were used to supplement the Armed Services Blood Program. The Persian Gulf War provided the impetus to quickly complete the CENTCOM frozen blood depot in the region. This depot can store up to 2,000 units of frozen red blood cells for more than 20 years.

Blood in CENTCOM by Month

	Sep 15	Oct 15	Nov 15	Dec 15	Jan 15	Feb 15
Liquid	2,387	3,025	2,457	2,988	12,752	28,944
Frozen	3,966	5,988	6,378	6,372	7,627	7,552
Total	6,353	9,013	8,835	9,360	20,379	36,496

Table G-6
Blood in CENTCOM by Month (Units representative of 250ml of packed red cells)

The Persian Gulf crisis underscored the value of current blood programs. In addition, for frozen blood to meet its potential as a prepositioned contingency asset, increased emphasis must be put on training those who will deglycerolize the product. There also must be increased use in peacetime medical treatment facilities of frozen blood components, and education of military physicians concerning the benefits and characteristics of using frozen blood.

Blood in EUCOM by Month

	Sep 15	Oct 15	Nov 15	Dec 15	Jan 15	Feb 15
Liquid	1,411	1,902	1,366	748	1,168	6,543
Frozen	255	298	599	924	1,363	4,439
Total	1,666	2,200	1,965	1,672	2,531	10,982

Table G-7
Blood in EUCOM by Month (Units representative of 250ml of packed red cells)

Systems Support

Automated systems and established reporting procedures were used extensively throughout Operations Desert Shield and Desert Storm to determine requirements, execute the plan, and provide information to decision makers at all levels. For example, the Medical Planning Module within the Joint Operation Planning and Execution System (JOPES) was used to develop gross bed requirements. JOPES was used to communicate requirements, determine which units could best satisfy these requirements, to schedule strategic movement, as well as to provide information to decision makers, and to monitor the flow of medical assets.

Parts of the Theater Army Medical Management and Information System (TAMMIS) were sent to the theater two years ahead of the scheduled fielding date and used to varying degrees of success by the Service components and medical units. TAMMIS has the potential to improve joint medical information management, if it can be modified to meet specific Navy, USMC and USAF requirements. These modifications are under way, and TAMMIS is the baseline for the Theater Medical Information System, being developed under the auspices of the Corporate Information Management Program.

The Defense Medical Regulating Information System (DMRIS) was used to match specialty medical care requirements and capabilities at medical treatment facilities in CENTCOM, EUCOM and CONUS. Some operational difficulties were

experienced and resolved. An interface was developed to link DMRIS and TAMMIS; however, hostilities ended before it could be fielded.

Preestablished interoperable message text formats designed for the automated system were used to pass medical information in Situation Reports. The inability of hospitals to communicate across long distances and the inability of TAMMIS to interface with DMRIS required the use of contingency regulating procedures which compounded problems with casualty reporting and tracking. Although this system worked well in isolated regions within the theater, improved theater communications are required to afford a unified patient tracking and reporting system that provides workload data to decision makers at all levels. These message text formats will be modified to include the most current functional information requirements of the joint medical community, and these requirements will be included in the Medical Planning and Execution System developed within JOPES.

C3

Clear command relationships were established and medical support concepts of operations documents were prepared. Although joint command, control and communications, together with joint use of medical resources, has advanced significantly during the past decade, there were communications problems. Communications among medical elements of the various services need to be upgraded and made more interoperable. Some emerging medical technologies, such as teleradiography, may exceed the limit of current communications systems. New communications systems, such as portable satellite communications terminals, would improve the ability to support technological advances and reduce the possibility of communications confusion. These systems must meet the tactical and the non-tactical requirements for voice and data networks. Many other problems experienced with planning and deploying of communication systems can be corrected through better JOPES planning and education of the several theater medical staffs.

Chemical and Biological Defense

Years of research and training, coupled with medical-related intelligence, enabled the Services to prepare for treatment of chemical casualties and provide the force with solutions to avoid significant loss of life had the threat materialized. There were some problems; however, the medical community was able to attain a level of medical defense unavailable before this conflict. (CW and BW defense are more fully covered in Appendix Q.)

Principles of managing chemical casualties are well described in a tri-Service publication and taught to military medical practitioners. Special training classes were provided to medical personnel to improve a chemical casualty's chance of survival. Exportable packages and teams were provided to all medical elements, hospitals, and the other Services by the Army, which is the DOD Executive Agent for CW/BW training. Training focused on patient management, decontamination, and treatment of chemical casualties. In addition, both the Army and the USAF organized special teams to support chemical decontamination at hospitals. Protocols were developed for use at casualty collection points and at medical treatment facilities. The Services are evaluating how to expand this training to health care providers during peacetime.

Dealing with the threat posed by BW was more problematic. For example, there were limited stockpiles of drugs and vaccines for biological defense before and during Operations Desert Shield and Desert Storm. The industrial base could not supply all the items needed. Long production lead times, and the legal and medical problems related to the use of these drugs delayed their fielding. Continued close coordination with the FDA is expected to resolve some major issues.

Medical management of casualties caused by biological agents received little emphasis before Operation Desert Shield began. The Army, as the DOD Executive Agent for Biological Defense, prepared a manual which addressed potential threats. The manual was distributed to theater medical personnel in November, and in January the CENTCOM Surgeon's office provided two other booklets, one classified and one unclassified, to Coalition forces.

Collective protection for medical facilities was virtually nonexistent. All serviceable M51 Collective Protective Shelters (CPS) were shipped from depots to Saudi Arabia for division Battalion Aid Stations and Medical Company use. The vehicle-mounted Chemical Biological Protection Shelter replacement for the M51 was approved for rapid production. The XM28 CPS for hospitals also was approved for rapid production. This was beneficial during the crisis, although both systems are now back on a normal development and procurement schedule with limited funding.

The USAF, Navy and USMC currently have no CW/BW protected facilities; however, there is a project under way to develop and field a medical facility which will afford protection to the medical staff and patients from airborne chemical and biological agents. During Operation Desert Shield, the USAF deployed a team of 19 medical personnel trained in chemical decontamination procedures with each ATH at risk in anticipation of the chemical threat.

Medical Force Structure

Several force structure deficiencies were identified during the crisis. An example is highlighted by the need to confirm the use of biological or chemical agents by Iraq. As mentioned previously, the Navy and the Army pieced together a theater laboratory. While the concept was sound, control of operations was difficult. Another deficiency was a potential shortfall in MEDEVAC support to Navy hospital ships. There also were shortfalls in staffing levels for theater medical management. There seems to be a need to provide joint staffing for all Theater Medical Materiel Management Centers at more robust levels.

RC policies requiring activation of entire RC units instead of selectively mobilizing individuals or tailoring manpower packages caused some problems with use of these forces to satisfy medical requirements. Examination of these policies to engender greater flexibility appear warranted.

Actions were taken to involuntarily cross-level Army RC soldiers from units not selected for activation to those identified for call-up to achieve properly staffed Army units (This expedient, which was used in combat, CS, and CSS as well as medical units, had a less than desirable effect on morale and cohesiveness.) This policy may have long-term detrimental effects on retention. An alternative to involuntary cross-leveling must be developed for future contingencies. Options might include manning Reserve units to full wartime strength levels, developing a more flexible reserve force structure or making earlier use of the Individual Ready Reserve, which exists to fill unit vacancies and to provide casualty replacements. (This issue is discussed in greater detail in Appendix H.)

OBSERVATIONS

Accomplishments

- The largest medical force since World War II was deployed to one of the harshest environments in the world. Establishing health care facilities with more than 18,500 beds in the immediate theater of operations, 5,500 beds in EUCOM (with provisions for more in host nation hospitals), up to 22,000 beds in CONUS, and an aeromedical evacuation capacity to move stabilized casualties, demonstrated an impressive combat medical capability.

- DOD provided medical care not only for a combat force of more than half a million, but maintained simultaneously its care commitments worldwide, despite the fact that no force structure provisions had been made for such an expansive requirement.

- Investments in prepositioned equipment, rapidly transportable ATHs, and the availability of *USNS Comfort* and *USNS Mercy* contributed to the readiness of health care forces deployed to the theater.

- The modernization and conversion of the Army hospitals during Operations Desert Shield and Desert Storm was successful. The Army employed the new DEPMEDS system ahead of schedule and the system proved flexible, rugged, and capable of satisfying most field medical treatment requirements.

Shortcomings

- Training of some Active and RC medical personnel may not have been optimum for rapid deployment of forward medical facilities. Current law requires 12 weeks (or its equivalent) of military training for military personnel before deployment on land overseas. Army RC medical officers who did not meet the criteria were provided a special two-week orientation course and granted 10 weeks of credit for professional education and experience. About 2,000 RC officers were trained in this program before deployment. This requirement taxed the training base. Options to eliminate this shortfall and ensure RC personnel are ready for operational deployment are under consideration.

- Ground transportation of medical facilities was a problem because of a lack of heavy trucks. Many medical assets for the support of front line units had limited mobility.

- At the beginning of the deployment, the Services were not adequately prepared to deal with the full range of CW/BW. There were limitations with

respect to drug availability, protection, detection, decontamination, prophylaxis, and therapy. Only the Army had an initial protective shelter system for decontamination and treatment of chemical casualties, although this capability was available to the other Services before hostilities began. Training was also an issue initially. By the time hostilities began, however, almost all physicians and health care providers had received chemical casualty training.

Issues

- Certain short-lived drug stocks (i.e. some drugs, including antibiotics, CW and BW vaccines) were available only in extremely limited test quantities.

- The optimum mobility of MASH and CSH assets in a rapidly changing environment may require further analysis.

- The theater offered unique tactical challenges, which required innovative solutions. While some tactical evacuation legs were too long for Army MEDEVAC helicopters, USAF C-130s were used to satisfy this requirement. In addition, Army MEDEVAC helicopters were used to transport patients to and from hospital ships. These operational considerations may affect overall requirements for the Services.

- The call up of RC personnel caused an overall increase in health care costs since family members of RC service members became service medical beneficiaries.

- Prolonged activation places a substantial financial burden on reserve medical personnel, particularly physicians.

- Further training is required in the area of crisis action system communications. Medical communications planning guidance recently has been included in the appropriate JOPES documents, and action is under way to establish a Joint Medical Planners' course.

- In August 1991, the Deputy Secretary of Defense assigned executive agency responsibilities to the Secretary of the Army for BW Defense. The Services have embarked on a long term project for an integrated DOD response to biological threats, to include protection and stockpiling necessary vaccines and antitoxins, the deployment and fielding of appropriate detection systems, and the development and fielding of appropriate protective and decontamination systems.

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APPENDIX H

RESERVE COMPONENT FORCES

"The success of the Guard and Reserve participation in Desert Shield cannot be overemphasized. Their participation has been a significant factor in affording us flexibility and balance, and reinforces the policies and decisions made over the last 10 years to strengthen the Total Force concept."

General Colin Powell, USA
Chairman, Joint Chiefs of Staff
3 December 1990

INTRODUCTION

Operations Desert Shield and Desert Storm required the largest mobilization and deployment of Reserve Component (RC) forces since the Korean Conflict and represented the first major test of the Reserve's role under the Total Force Policy that emerged after Vietnam. Two hundred forty-five thousand Reservists from all Services were ordered to active duty in support of the crisis; approximately 106,000 served in Southwest Asia (SWA). Reserve forces played a vital role, participating in all phases of the Persian Gulf crisis from the initial response through the redeployment of forces. What the Department of Defense (DOD) accomplished in resolving the Persian Gulf crisis simply could not have been done without the full integration of the capabilities of the thousands of Reservists and National Guard personnel who served in combat, combat support (CS), and combat service support (CSS) roles in the theater and elsewhere. Most importantly, the mobilization and use of Reserve Forces validated the key concepts of the Nation's Total Force Policy.

TOTAL FORCE POLICY, THE RESERVE COMPONENTS, AND PERSIAN GULF CONFLICT

The Reserve force that deployed to SWA and the Reserve force that supported that deployment, like the Active force, was created in the aftermath of Vietnam. The "Total Force" concept was conceived in 1970; the RC were equipped, manned, and trained in consonance with the 1973 decision to adopt the Total Force Policy as a cornerstone of the nation's national defense strategy. As initially developed and subsequently implemented, that policy has had two principal tenets. First, planners were to consider Reserve forces as the primary augmentation for the Active force. Second, military response would involve the integrated use of all forces available,

including Active, Reserve, civilian and allied. As the 1990 DOD Report to Congress on the Total Force Policy stated, those functions that require high levels of activity in wartime but comparatively low levels in peacetime are well-suited for Reservists. Missions that require extended peacetime deployments, on the other hand, are generally more appropriate for Active Components (AC). The objective of the Total Force policy has been to integrate the AC and RC force capabilities and strengths in the most cost-effective manner. As a result of these efforts, on 2 August, the Services, individually and collectively, had one integrated structure – the Total Force.

Reserve Component Terminology

Ready Reserve - Ready Reserve is comprised of military members of the Reserve and National Guard, organized in units, or as individuals, liable for recall to active duty to augment the active components in time of war or national emergency. (Title 10 USC 672, 673) The Ready Reserve consists of three reserve component subcategories -- the Selected Reserve, the Individual Ready Reserve (IRR), and the Inactive National Guard.

Selected Reserves - The Selected Reserve consists of those units and individuals within the Ready Reserve designated by their respective Services and approved by the Chairman, Joint Chiefs of Staff, as so essential to initial wartime missions that they have priority over all other Reserves (Title 10 USC 268[c]). All Selected Reservists are in an active status.

Individual Mobilization Augmentees (IMA) - Individual members of the Selected Reserves. Trained individuals preassigned to an active component, Selective Service System or Federal Emergency Management Agency (FEMA) organization's billet which must be filled on or shortly after mobilization. IMAs participate in training activities on a part-time basis with an active component unit in preparation for recall in a mobilization.

Individual Ready Reserve (IRR) - The IRR consists of those Ready Reservists not in the Selected Reserves. Composed of Reserve Component members not assigned to a unit. Trained individuals who previously served in the active component or Selected Reserve. Members normally have a remaining military service obligation, are subject to mobilization, and might be ordered to limited involuntary active duty for training.

RESERVE FORCES PREPAREDNESS – LEGACY OF THE '80s

During the 1980s, major improvements were made in Reserve force readiness to perform wartime missions. By the fall of 1990, modernization efforts had given the RC the ability to field approximately 84 percent (in dollar value) of the equipment they required for war. The DOD policy of "First to fight, first to equip" required resourcing both AC and RC units in the sequence in which they were required to perform their wartime missions. Successful recruiting efforts, the assignment to the RC of important peacetime and wartime responsibilities, and substantially improved training opportunities, also contributed significantly to improved Reserve force readiness.

The increase in RC readiness levels in the 1980s occurred concurrently with the largest ever expansion of the RC peacetime structure. From 1980 to the end of the decade, the number of Selected Reservists increased by 35 percent, growing from approximately 850,000 to more than 1,150,000. This growth did not come at the expense of personnel readiness. On the contrary, throughout the decade, the Services devoted considerable resources to ensure individual proficiency of Selected Reserve members. During this same period, more emphasis was placed on the Individual Ready Reserve (IRR), the pool of pre-trained individuals.

INITIAL VOLUNTEERS

Individual RC volunteers were integrated into the Active force from the start of the Persian Gulf crisis, even before the involuntary Reserve call-up. By 22 August, more than 10,500 volunteer RC members already were serving on active duty. Their contributions were essential to provide capabilities required from the first days of the crisis – particularly strategic airlift – and to perform missions almost exclusively assigned to Reserve units including, for example, water purification and port security.

Thousands of Air Reserve Component (ARC) personnel volunteered within hours of the initial US response to support the time-sensitive movement of US personnel and materiel to the Persian Gulf. ARC volunteers flew 42 percent of all strategic airlift missions and 33 percent of the aerial refueling missions. They also provided Continental United States (CONUS) base maintenance, medical, civil engineering, aerial port, and security police support to deploying Air Force (USAF) units and airlift missions. By 22 August, Air Force Reserve volunteers had moved seven million tons of cargo and 8, 150 passengers to the theater. As of 25 August, Air Force Reserve volunteers began operating Westover AFB, MA as a major eastbound staging operation on a 24-hour basis. Westover continued to operate on a volunteer basis for four months until these same volunteers were mobilized on 3 December.

US Naval Reserve (USNR) volunteers contributed medical, logistics, and cargo-handling skills to CONUS base support operations. While approximately 50 percent of all USNR volunteers were involved in health care, Naval Reservists also were deployed outside the United States for other tasks. For example, a detachment of Active Seabees at Subic Bay, Philippines, was deployed to SWA in August with their parent battalion. When a strike by 3,000 civilians of the public works center was imminent, 150 volunteers from a Reserve public works center augmented units deployed to Subic Bay and helped keep essential services in operation. As a result, the base suffered no interruption in operations, and response time to trouble calls noticeably improved. Some volunteers subsequently were deployed to Bahrain to augment the Navy Logistics Support Force's public works force.

Approximately 1,100 US Marine Corps Reserve (USMCR) volunteers supported the preparation for deployment of Marine Corps (USMC) forces to SWA. They not only provided maintenance and logistical support for deploying Active USMC units but also transport services, to include KC-130T crews who flew transatlantic refueling missions. In addition, they were assigned liaison and linguist duties with deploying Active units.

US Coast Guard (USCG) Reserve volunteers provided port security and supervised the loading of explosives and hazardous cargo at US east and Gulf Coast ports. The USCG activated Port Security Harbor Defense Units (PSHD) from its Ninth District (Cleveland) to work with US mobile inshore underwater warfare units in SWA. This marked the first extended use of USCG volunteers for this mission.

More than 5,580 Army RC personnel volunteered for temporary tours of active duty. For example, during Operation Desert Shield, Army Reserve (USAR) terminal transportation unit members volunteered to work with the Military Traffic Management Command to manage the flow of combat forces from US east and Gulf Coast ports. Other USAR and National Guard (ARNG) volunteers provided maintenance and logistics support, chemical defense training, and aviation operations assistance for AC forces. RC medical personnel also backfilled active Health Service Command professionals, who deployed during the first days of the crisis. Some volunteers deployed directly to theater. South Carolina ARNG members deployed with Third US Army to help establish strategic communications for the headquarters. Figure H-1 illustrates the total contribution of volunteer RC forces during the crisis.

The large number of RC members who volunteered during the conflict's early stages vividly demonstrates their commitment and dedication. Individual volunteers also provided essential manpower before the decision to involuntarily activate the Reserves had been made. This provided excellent support during a difficult time. However, a problem was created by the absence of those who had volunteered from their units when the units were later activated. Subsequent investigation indicates the problem was corrected by cross-leveling and other personnel actions. The general success with RC volunteers demonstrates the value of using them early in future crises before a decision is made to activate Selected Reserve units.

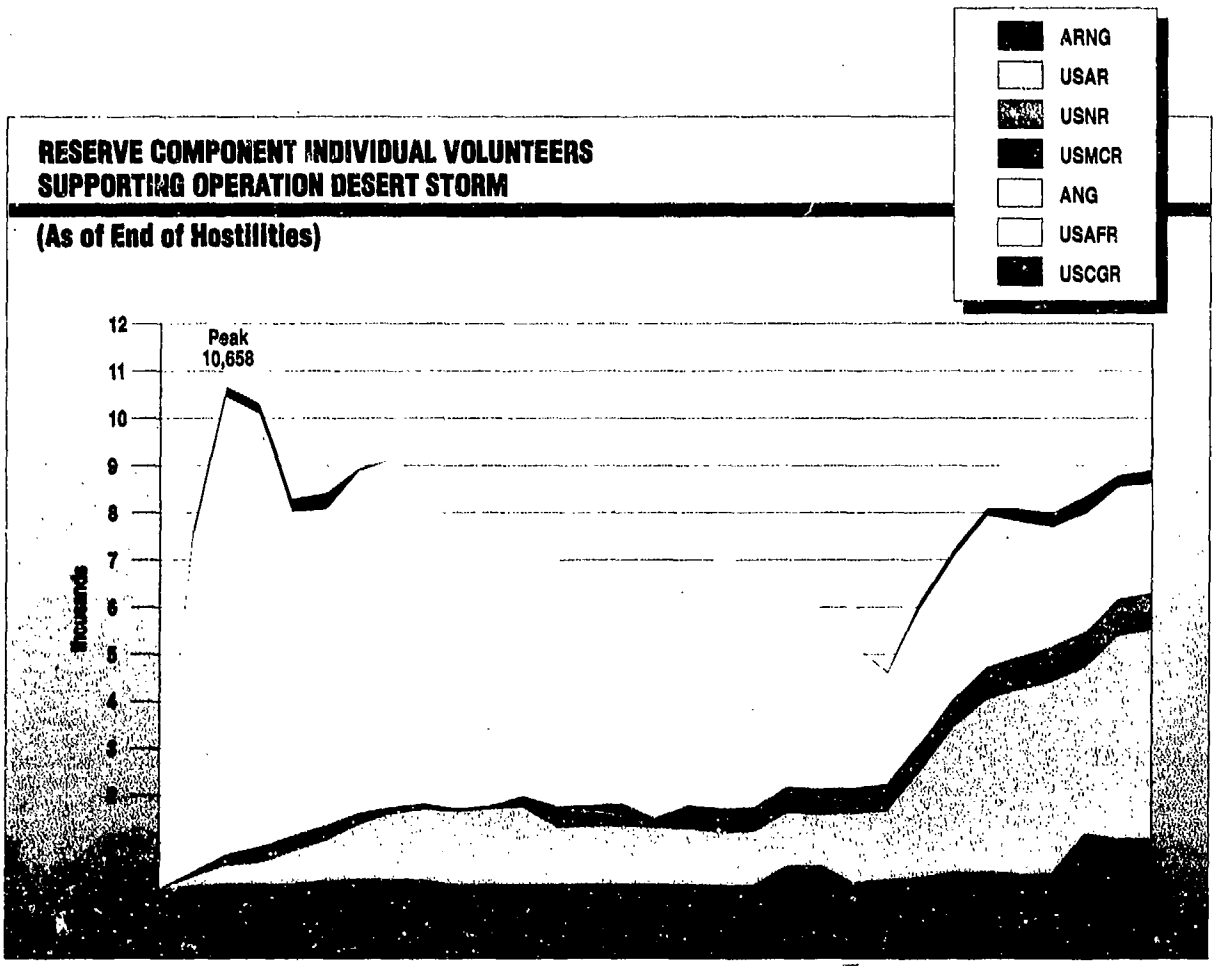


Figure H-1

DECISION TO ACTIVATE, MOBILIZE, AND DEPLOY RESERVES

By 9 August, as RC volunteers were supporting the initial phases of Operation Desert Shield, the Defense Department began planning for a possible RC call-up to support the evolving strategy. It quickly became apparent that Reserve forces would be needed for deployment to the Persian Gulf to meet Commander-in-Chief, Central Command (CINCCENT) requirements; to backfill positions in the US and other theaters vacated by AC personnel deployed to Saudi Arabia; and for essential CONUS-based missions.

The Office of the Secretary of Defense (OSD), the Joint Staff, the Services, Department of Transportation, and the USCG worked together in coordination with Central Command (CENTCOM) to ensure various policy and operational issues during the mobilization process were dealt with as quickly and efficiently as possible.

Initial Involuntary Call-Up

For the first time since it became law in 1976, the President exercised his authority under Title 10, Section 673b of the US Code, by which he may direct the involuntary activation of up to 200,000 Selected Reservists for 90 days, plus a 90-day extension in the interests of national security, to augment Active forces for any "operational mission." He signed Executive Order 12727 on 22 August. The recall began expeditiously; prior planning by OSD and the Military Departments, and JS directed mobilization exercises proved to have been extremely useful to ready DOD for efficient activation.

After the President's announcement, the Secretary of Defense delegated authority to the Service Secretaries to order Selected Reserve members to active duty. Initial authorization provided for the recall of 25,000 Army Selected Reservists (combat support and combat service support forces only); 14,500 USAF; 6,300 Navy; and 3,000 USMC reservists. Simultaneously, the Secretary of Transportation authorized the USCG to order to active duty as many as 1,250 USCG Reservists.

The first calls to active duty were announced on 24 August and, by the end of September, 26,653 Army, Navy, and USAF Reservists had reported for duty under the authority of 673b. Consistent with USMC doctrine, selected Marine Corps Reserve units were not activated until 11 October. Figure H-2 displays by Service the type of Reserve units in this initial Reserve package.

Early in the crisis, US Forces Command (FORSCOM) planned for the activation of Army Reserve forces in two parts. The first envisioned a call-up of RC units to support the deployment –to flesh out the mobilization base and support Active combat unit deployment. The second called for the activation of additional Reserve forces by the end of September that would deploy mainly to SWA to logistically support forces in theater – to provide in-country food, petroleum, oil and lubricants (POL), water, and ammunition support to the theater. RC support to meet CINCCENT's requirements, as envisioned in the FORSCOM plan, was consistent with Total Force Policy.

By the end of October, the Army had activated 235 RC units, consisting of nearly 24,000 soldiers from 44 states and Puerto Rico. Approximately 5,000 Naval Reservists and 355 units from 39 states, Puerto Rico and the District of Columbia had been ordered to active duty, as were 32 Selected Reserve units and more than 5,000 ARC personnel. The USMC activated its first unit of 157 personnel to backfill an active force deployed from Hawaii.

Initial Reserve Force Package

Service	SWA Theater Requirements	CONUS Base Requirements
USA	35 Combat Support Units 166 Combat Service Support Units	Port Operations Medical Installation Support
USN	2 Minesweeper Crews Port Security Military/Sealift Shipping Control Cargo HDLC/Logistics Support	Medical (CONUS Backfill) MSC/Shipping Control Cargo Handling/Logistics Support Intelligence
USAF	CENTCOM Staff Augmentation	Strategic Airlift 12 AFRES Squadrons 3 ANG Squadrons LOG/Maintenance
USMC	CENTCOM Staff Augmentation 5th MEB Augmentation	Headquarters Staff Augmentation Air Station Augmentation
USCG	3 Port Security Units	CONUS Port Operations

Figure H-2

Second Involuntary Call-Up

On 8 November, the President announced his intention to deploy 200,000 additional troops to SWA to provide offensive options to resolve the Persian Gulf crisis. On 14 November, the Secretary of Defense authorized the Military Departments to activate a total of 115,000 Selected Reservists. In accordance with Section 673b(i) of Title 10 US Code, the duration of service for all activated Reservists was extended to 180 days. On 1 December, the Secretary of Defense authorized the Military Departments to call to active duty as many as 188,000 Selected Reservists. (Figure H-3 illustrates Service RC allocations over time.) The additional RC forces were needed to complete the work of building a mature theater logistics base in SWA before to the start of an offensive, to sustain the CONUS logistics pipeline to the Middle East, and to ensure the readiness of US forces in Europe and the Pacific.

Title 10 US Code 673B Allocations to Military Departments and US Coast Guard during Desert Shield (1990)

Service	August 24	November 14[1]	December 1
Army	25,000[2]	80,000	115,000
Navy	6,300	10,000	30,000
Air Force	14,500	20,000	20,000
Marine Corps	3,000	15,000	23,000
Coast Guard	1,250	1,250	1,250
Total	51,050	116,250	189,250

[1] Provision of 10 USC 673B (i) executed (Selected Reservists extended on active duty to 180 days).

[2] Combat Support and Combat Service Support only.

Figure H-3

By mid-December, the Military Departments had ordered to active duty nearly 120,000 Selected Reserve members, including substantial RC combat elements. The Defense Appropriations Act for Fiscal Year 1991, which became law in November, included new authority permitting the President to retain RC combat units on active duty for as many as 360 days, but it did not become necessary for the President to exercise the new authority. When the President extended the period of activation for Selected Reservists for an additional 90 days, the Army and USMC began activating Reserve combat units. In November and early December, the Army activated three ARNG "round-out" brigades and two field artillery brigades. The USMC called key elements of its 4th (Reserve) Marine Division (MARDIV) to active duty.

Throughout December and January, many Selected Reserve units deployed to SWA. The Army deployed the two field artillery brigades – the 142nd Field Artillery (FA) Brigade from Arkansas and Oklahoma, and the 196th FA Brigade from Tennessee, West Virginia, and Kentucky. The USMC sent a substantial part of the 4th

MARDIV, the 4th Marine Aircraft Wing, and the 4th Force Service Support Group, including four infantry battalions, elements of two tank battalions, several artillery batteries, and composite attack and transport helicopter squadrons. The ARC deployed three tactical fighter squadrons, one special operations group, two special operations squadrons, and a tactical reconnaissance squadron. The Navy sent two minesweepers, two combat search and rescue detachments, one Seabee battalion, four logistics squadrons, and several mobile inshore undersea warfare detachments. The USCG continued to operate the three PSHD, which had deployed to the theater in October.

From 9 December through 15 May 1991, 19,433 Army personnel were deployed through three CONUS Replacement Centers (CRC) established by Army Training and Doctrine Command. Although most personnel deployed through the CRCs were IRR members, the number also includes active soldiers, Selected Reservists, and civilians (DOD, Red Cross and contractor personnel).

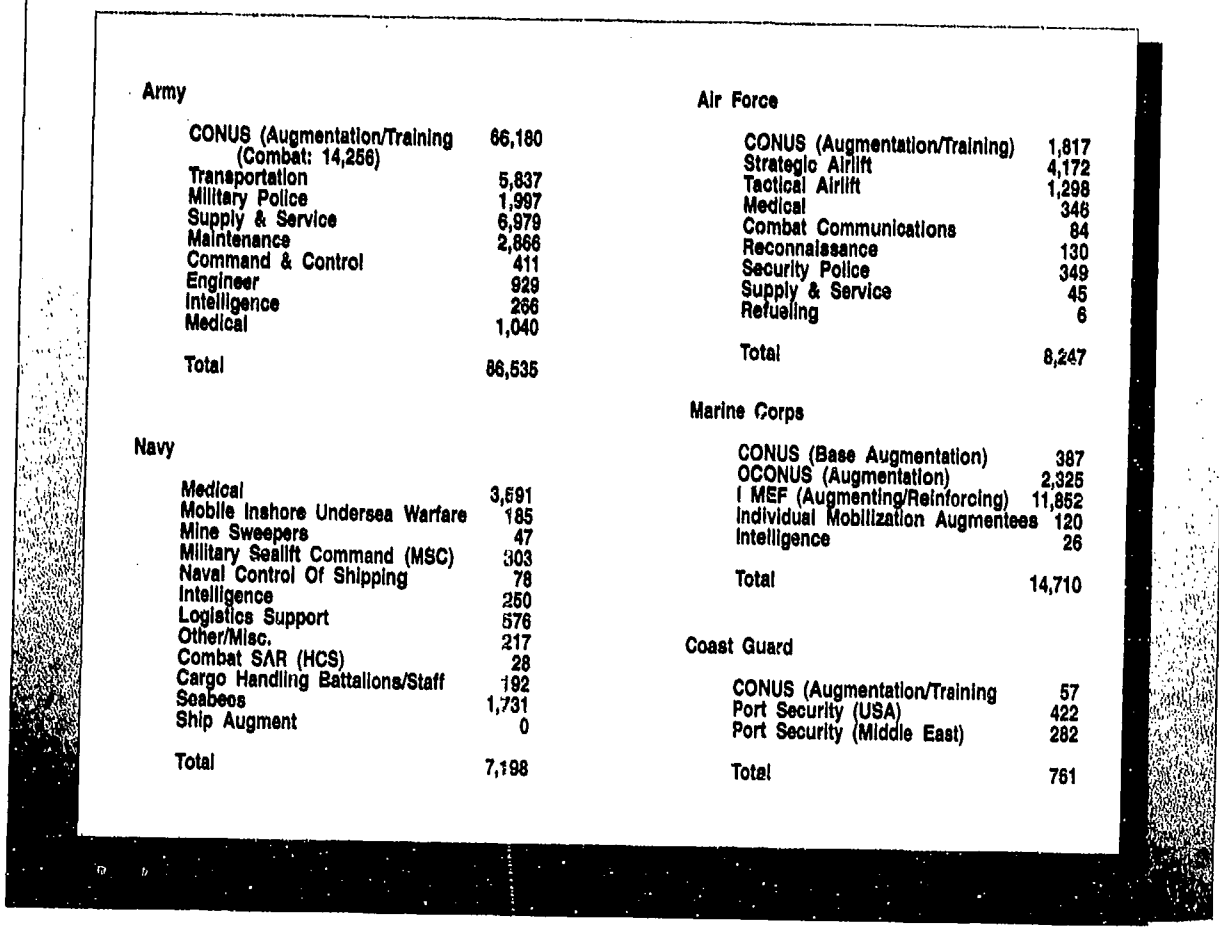
By mid-January, the size of the US force in the Persian Gulf had reached more than 400,000 personnel, including 63,998 RC members or 16 percent of the US forces in the theater. The total number activated had reached approximately 150,000 personnel. Figure H-4 indicates how each of the Services employed RC personnel.

Third Activation

On 18 January, pursuant to Section 673 of Title 10, the President authorized the departments of Defense and Transportation to order Ready Reserve members to active duty, including members of both the Selected Reserve and the IRR. This action authorized the retention of all RC personnel on active duty for as long as one year and permitted the departments to call additional RC personnel to active duty. On 19 January, the Secretary of Defense authorized the Military departments to call as many as 360,000 to active duty, including 220,000 members of the Army Ready Reserve, 44,000 members of the Naval Ready Reserve, 44,000 members of the USMC Ready Reserve, and 52,000 members of the USAF Ready Reserve. The USCG was authorized to call as many as 5,000 Ready Reservists to active duty.

The availability of members of the IRR was particularly important. During Operation Desert Shield, Reserve units earmarked for call-up experienced several difficulties. In some cases, particularly in Army CS and CSS forces, Reserve units had been organized at less than wartime strength requirements. In others, they were manned at less than peacetime approved operating levels. In addition, and like some Active units, most Selected Reserve units contained some personnel who were non-deployable because of medical disqualifications or established policies (e.g., because they had not completed basic training). Since individual Reserve filler personnel were not immediately available to Selected Reserve units activated under Section 673b, Reserve personnel were cross-leveled or cross-assigned, on both a voluntary and involuntary basis, from units not scheduled for activation. (Despite

Service Employment of Activated Reserve Component Personnel in Desert Shield as of December 16, 1990



Army

CONUS (Augmentation/Training (Combat: 14,256)	66,180
Transportation	5,837
Military Police	1,997
Supply & Service	6,979
Maintenance	2,866
Command & Control	411
Engineer	929
Intelligence	266
Medical	1,040
Total	86,535

Navy

Medical	3,691
Mobile Inshore Undersea Warfare	185
Mine Sweepers	47
Military Sealift Command (MSC)	303
Naval Control Of Shipping	78
Intelligence	250
Logistics Support	576
Other/Misc.	217
Combat SAR (HCS)	28
Cargo Handling Battalions/Staff	192
Seabees	1,731
Ship Augment	0
Total	7,198

Air Force

CONUS (Augmentation/Training)	1,817
Strategic Airlift	4,172
Tactical Airlift	1,298
Medical	346
Combat Communications	84
Reconnaissance	130
Security Police	349
Supply & Service	45
Refueling	6
Total	8,247

Marine Corps

CONUS (Base Augmentation)	387
OCONUS (Augmentation)	2,325
I MEF (Augmenting/Reinforcing)	11,852
Individual Mobilization Augmentees	120
Intelligence	26
Total	14,710

Coast Guard

CONUS (Augmentation/Training	57
Port Security (USA)	422
Port Security (Middle East)	282
Total	761

Figure H-4

these efforts, in some cases after activation, additional personnel had to be assigned to RC units to bring them up to wartime fill standards.) Cross-leveling in this fashion, while effective in the short term, reduced the readiness of non-activated or later deploying units. Thus access to the IRR at this juncture provided needed fillers to meet personnel shortages in both Active and Reserve units.

Equipment cross-leveling also occurred and involved two types of equipment transfers: those made within the RC to prepare a unit for call-up, and those made from an RC to an AC unit to correct an equipment shortfall. The cross-leveling of equipment within the RC was practical, especially for equipment unique to the RC where no other source of supply was immediately available. Under the provisions of DOD Directive 1225.6, the Army requested and received DOD authority to withdraw

specified equipment (e.g., helicopters and heavy equipment transports) from the RC to the AC for the duration of the conflict. The Army was the only Service to request this delegation of authority. As a result of these procedures, both Active and RC forces were assured of equipment to meet mission requirements.

When ground combat operations began in the Kuwait Theater of Operations (KTO) on 24 February 1991, 202,337 Selected Reservists and 20,277 IRR had been called to active duty. At the peak of the mobilization of Reserve forces (10 March 1991), a total of 231,000 Ready Reservists were serving on active duty in support of CONUS base, Operation Desert Storm, and other worldwide commitments.

ACTIVATION, MOBILIZATION, AND DEPLOYMENT PROCESS

Requests for increased authority to activate RC units throughout the mobilization process were based on both CINCCENT and Service requirements validated by CENTCOM component commands and by other Unified Commands to the Chairman, Joint Chiefs of Staff. The Military Departments, in conjunction with the JS, made the decision as to which units to deploy. For example, the Army Component Central Command (ARCENT) passed requirements to FORSCOM, which then recommended specific ARNG and USAR units to Department of the Army for approval and subsequent activation.

Army Readiness Groups (ARG) were extremely valuable during the mobilization process. They knew the units and their shortcomings. They helped unit commanders plan and conduct training. The Readiness groups did much to ensure that soldier support was provided so unit leaders could concentrate on training their soldiers. Army Mobile Training Teams (MTT) drawn from 2nd US Army, Readiness Groups, and FORSCOM (supplemented by training cadre at the National Training Center [NTC] and other training areas) helped units attain proficiency in the shortest time possible. Army Readiness Groups (ARG) verified the current state of readiness of the tentatively selected RC units. Readiness Group officials also sought to verify unit training status. Figure H-5 illustrates the contribution of the RC as a function of Service end strength.

Reserve units were called initially to provide strategic and tactical airlift, water purification and distribution, maintenance, transportation, terminal operations, movement control, law enforcement, port security, chemical defense, medical and legal. When Reserve units with these skills began to arrive at the mobilization stations, their actual status often differed considerably from their readiness reports. The readiness reports were resource status reports often completed months before the call-up, and the personnel and equipment status of units often had changed substantially in the interim. Moreover, as specific Operation Desert Shield requirements became known, even fully resourced RC units sometimes did not meet these requirements.

Reserve Component Selected Reserve Personnel Activated as of January 13, 1991

Service	Activated	FY 90 Authorized End Strength	% of Total
Army	102,828	779,700	13.2
Navy	11,390	153,400	7.4
Air Force	14,806	201,100	7.4
Marine Corps	16,558	44,000	37.6
Coast Guard	641	15,000	4.3

Figure H-5

As an example of RC personnel and force structure mismatches, some Reserve medical units contained a number of doctors who were not qualified for their assigned position, (e.g., a psychiatrist filling a surgeon's position). Cross-leveling within the Army provided mobilized units with doctors of appropriate specialties. Rather than call up an entire unit, derivative units were created to allow the call-up of only those personnel who were actually needed. In some medical units, only doctors in certain specialties were needed. Only those doctors were called while other members of the unit remained behind. This practice ensured that operational requirements were filled without exceeding mobilization quotas, but often at an inconvenience to those soldiers activated. Personnel in derivation units appear to have taken longer to integrate into the Active force and were, in general, less satisfied with terms of their service.

Some Army and USMC RC units spent several weeks at mobilization stations before deployment (as long as five or six weeks in a few cases). Because of strategic lift constraints, theater infrastructure limits, and operational security concerns, a decision was made to hold units in the United States beyond the planned training period until shortly before their equipment was scheduled to arrive in Saudi Arabia. During the pre-deployment period, units finished processing and received further training. All units received chemical and biological training that included requalification in basic skills (this training was emphasized in theater by all Services as well). As a general rule, ground combat maneuver units needed more training than CS and CSS units. In some cases, mobile training teams (MTTs) from Army service schools taught courses at mobilization stations. For example, water purification equipment operators and mechanics were trained to repair the Army's newest purification equipment, since it had not previously been issued to RC units.

One of the problems that impeded the mobilization process was the incompatibility of some AC and RC automated data processing systems. It was sometimes impossible to transfer pay and personnel data directly between systems, causing delays in pay and a variety of reporting problems. Personnel accountability surfaced as one of the major problems. The current automation infrastructure cannot capture, process, and transmit data to all echelons for management of personnel during mobilization. With the exception of the Marine Corps, automation cannot support deployment, redeployment, location, and status of mobilized personnel and units.

The activation and deployment of RC forces and their full integration into the Active structure were accomplished with no significant problems. In part, this was caused by ensuring the welfare of Reserve members, thereby allowing them to concentrate on mission assignments. Prompt action by OSD in seeking Congressional support for changes in the Soldiers' and Sailors' Civil Relief Act and the Veterans Re-employment Rights Act was necessary to ensure equal treatment of Reservists called up under Title 10 US Code 673b. Ultimate amendment of those statutes ensured the welfare of Reservists and their families. While the Services took steps to mitigate the trauma Reservists felt from family separation through a variety of family support activities, employers of activated Reserve members were generally supportive of US goals in the Persian Gulf crisis and their Reserve employees' absence from the workplace. Finally, the activation of Reservists from all walks of life and every state in the union, as well as their full integration into the plans to enforce the United Nations resolutions against Iraq, helped the American public to understand the seriousness of the Persian Gulf crisis and to ensure their support for the operation.

POST MOBILIZATION TRAINING

The nature and the amount of post-mobilization training that was required of Reserve component units depended upon several factors. The primary factors were the type of mission assigned to particular units, the training readiness condition of the units, and the levels of organization in the units that had been maintained in peacetime. The civilian job skills of individual National Guardsmen and Reservists and other factors were important to certain units depending upon the nature of the wartime mission assigned to the units. There were also instances where post-mobilization development of certain individual skills was necessary because of the use of new equipment or the unique requirements of theater-specific missions. Most units of the Reserve components were ready to be deployed on schedule and the timing and sequence of their deployment was determined by the needs of the theater commanders and similar factors, rather than by post mobilization training requirements. However, there were some notable instances where post mobilization training was a constraint.

Army National Guard Combat Brigades

On 8 November, the Secretary of Defense announced that three ARNG ground combat brigades would be ordered to active duty, including the 155th Armored Brigade from Mississippi, the 48th Infantry Brigade (Mechanized) from Georgia, and the 256th infantry Brigade (Mechanized) from Louisiana. The brigades constituted less than seven percent of the total number of Reservists called to active duty, but they were the subject of much controversy.

Some attention resulted from the fact that when the Army's 24th Infantry Division (Mechanized) was deployed to Saudi Arabia, it was not yet clear it would be necessary to order any RC forces to active duty. The division thus deployed without the 48th Infantry Brigade (Mechanized), its round-out brigade. Instead, the Army sent an available Active duty brigade from Georgia. When the President authorized the RC activation on 22 August, Section 673b of Title 10, US Code restricted activations of Reservists to an initial period of 90 days and one 90 day extension. That restriction made a call-up of such large combat units impractical. The time required to complete the post call-up training that had long been planned and to ship their equipment by sea to the war zone, meant that such reserve combat units could not have been retained in the theater as long as necessary.

When the decision to activate the three brigades was made, they received extensive training at various locations and, when the cease-fire took place on 28 February, they either had been certified or were about to be certified by the Army as ready for combat, if needed. The Secretary of Defense had made it clear from the beginning of the conflict that no military unit would be sent into combat until it was ready. Any other policy would have been irresponsible and completely disloyal to those whose lives would have otherwise been at greater risk.

The state of training and readiness of the roundout brigades and the plans for their use have often been misunderstood. Brigades are large, complex organizations. Their wartime missions require extensive synchronization, integration and coordination of high speed, continuous fire, maneuver and support operations. The complex, collective combat skills required by the commanders, staffs, and soldiers of armor and mechanized infantry brigades are difficult to achieve by RC soldiers who receive limited training each year. The challenge for the roundout brigades was made greater by the absence of extensive experience among the brigade's leadership. In one of the brigades, less than 10 percent of the officers had extended active duty experience. Such challenges were difficult to overcome, even by the high motivation and exceptional quality of the RC personnel who serve in the brigades. Premobilization training is focused on specific, critical small unit tasks, and on improving the ability of RC commanders and staffs to plan and conduct ground combat operations. Post-mobilization training was required to bring the units to required levels of combined arms proficiency before deployment.

The 1990 DOD Total Force Policy study noted that readiness of reserve units was a function not only of resource and training levels, but also of various intangible

factors, such as motivation and experience. The training experience of the three ARNG combat brigades corroborate these observations. The remarkable enthusiasm of the RC round-out brigade personnel made a significant contribution to their successful performance in strenuous combat training.

Air, Naval, and Marine Elements

USMC Reservists arrived at their stations of initial assignment (SIAs) well trained. They received additional training, however, to meet unique SWA challenges, including the Iraqi order of battle, and operations under chemical warfare conditions, obstacle breaching techniques, desert warfare, and customs and cultures of the Arabian Peninsula. USMC MTTs deployed to SWA and provided this training to both Active and RC units. Perhaps the best example of the effectiveness of this training is the performance in the Gulf War of Company C of the 4th Tank Battalion, 4th MARDIV. This unit had been equipped with M60A1 tanks, much different from the more modern M1 and M1A1. Following activation, it completed a 23-day M1 training program in 18 days. The unit arrived in Saudi Arabia 19 February and went into battle 24 February. During the next three days, it engaged and destroyed numerous enemy armored vehicles and tanks.

In most cases, some theater-unique training was necessary to familiarize deploying personnel with the Persian Gulf environment. For example, Naval Reservists, who augmented active commands, generally were well trained in basic skills but received training for specific mission requirements. Reservists assigned to Fleet Hospitals were trained in desert survival, combat trauma care, and medical management of chemical casualties. Those assigned to cargo handling battalions received training in hazardous material handling and storage, small arms, and chemical decontamination.

Air Force Reserve units, aircrews, maintenance crews and support personnel required little-to-no post-mobilization training before performing their respective missions. All mobilized Air Force Reserve flying units mobilized in 24 hours or less, and were prepared to deploy or did deploy in less than 72 hours. For example, the 926th Tactical Fighter Group (TFG), an A-10 unit, was recalled on 29 December, deployed on 1 January, and flew proficiency sorties until the unit began combat operations with the launch of the Air Campaign. Air Reserve Component (ARC) met USAF qualification standards but also received training in chemical and biological defense.

Continuous training was carried out by all units throughout the operation. Exercises, drills and rehearsals were conducted regularly by forces in SWA to keep skill levels high and increase force proficiency. This training helped the forces – AC and RC – to hold their edge in the long buildup period before the offensive.

INTEGRATION OF RESERVE COMPONENT FORCES

During the 1980s, the military Services made considerable progress integrating AC and RC forces into an effective Total Force. Many RC units, particularly those assigned missions requiring early deployment, had been modernized to the same level as the AC units with whom they were aligned. RC training plans were extracted from published Service doctrine and training material. For a several years, Reserve forces had been integrated into JCS-directed and Service training exercises, such as REFORGER, Team Spirit, Cobra Gold, Certain Sage, and many US-based joint exercises.

Therefore, integration of RC units in the Operations Desert Shield and Desert Storm force structures was very effective overall. RC units and individuals filled crucial manpower and capabilities shortfalls. The Air Force established provisional wings that consisted of both AC and RC units. For example, 86 percent of the strategic and tactical airlift assets were activated RC forces, which amounted to seven C-5, 11 C-141, and 10 C-130 units. Seventeen of 20 RC air refueling squadrons (16 KC-135E units and one KC-10 unit) were also mobilized. Army RC units also were effectively integrated with AC units. For example, the 20th Special Forces Group (SFG) (Airborne) was rapidly integrated into the Army Special Forces Command to support other worldwide operations. Figure H-6 shows the RC deployment relative to the AC deployment.

Naval Reservists augmented in-theater combat search and rescue capability, working very closely with USAF AC elements, and contributed substantively to this important task. Two USNR Ocean Mine Sweeper vessels, the *USS Adroit* (MSO 509) and the *USS Impervious,* (MSO 449) were activated and deployed to the Gulf with Reserve crews. Reserve USCG law enforcement detachments were integrated into Naval units, where their expertise in boarding operations was invaluable during maritime interception operations. The Reserve 3rd Naval Construction Regiment was called to operate as the command and control headquarters for the three active and one Reserve Seabee battalions supporting I Marine Expeditionary Force (MEF) in SWA. In addition, Reserve Cargo Handling Battalions (RCHB) 3 and 13 were called to active duty to provide cargo movement support throughout the Persian Gulf area.

The USAR's 416th Engineer Command served as the theater Army engineer command, performing tasks crucial to the sustainment of forces and the success of the operation. In this command, Active and RC units served side-by-side. Two Army National Guard (ARNG) Field Artillery (FA) brigades provided fire support to both VII Corps and XVIII Airborne Corps during Operation Desert Storm. Furthermore, the 142nd FA Brigade was assigned to support the 1st British Armoured Division. In that role, it was integrated rapidly. USAR and ARNG combat support (CS) and combat service support (CSS) units were integrated with both VII Corps and XVIII Airborne Corps, often with RC commands structured to include both Active and Reserve components. The ARNG and USAR provided considerable engineering, logistics, and military police support not only to the Army but also to other Services and allied forces.

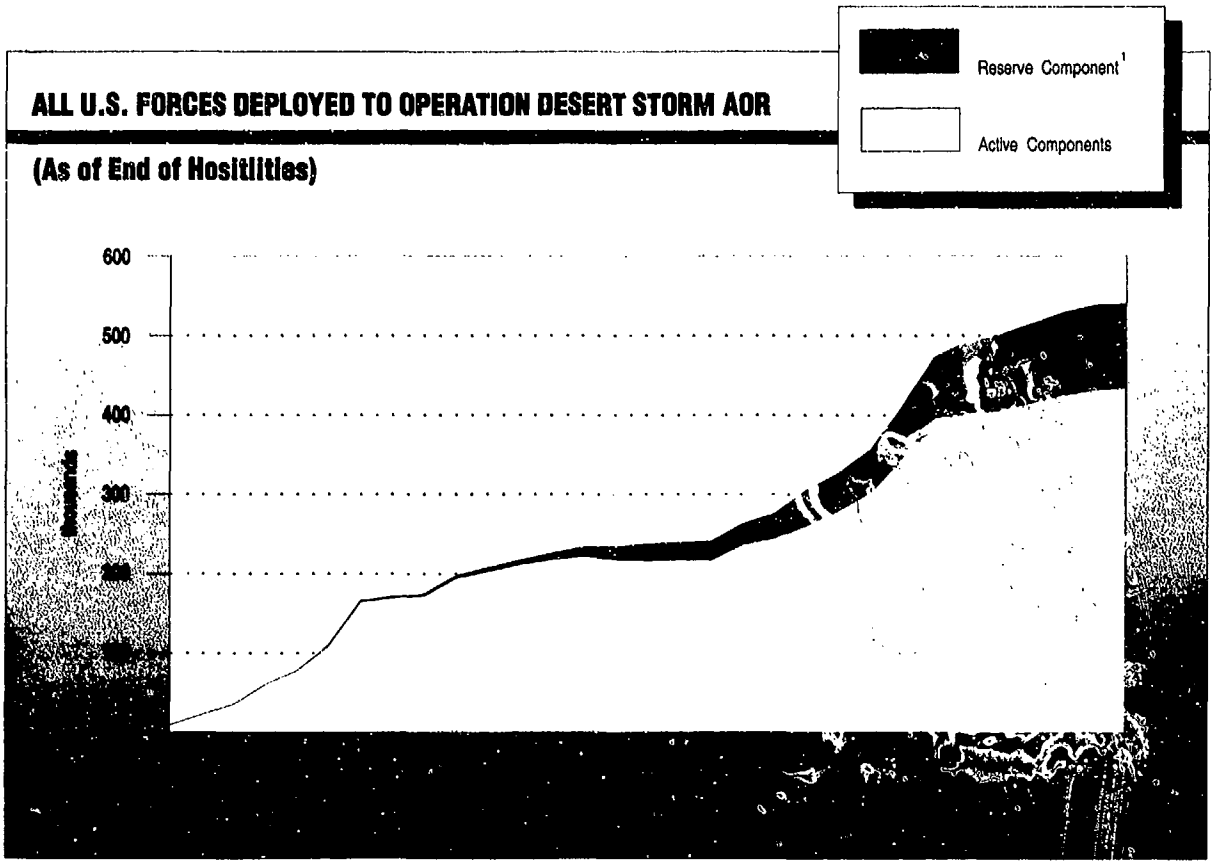


Figure H-6

USMC Reservists increased combat power by providing armor, artillery, infantry, aviation, engineer and combat service support forces to complement active USMC units. For the most part, USMCR personnel and units fought as integral components of active units. The 8th Tank Battalion, for example, fought with the 6th Marine Regiment throughout the ground offensive. In many cases, USMC artillery and armor battalions, although part of the AC, contained RC detachments and units. Artillery batteries from the 14th Marines, a Reserve regiment, were assigned to the active 10th and 11th Marines in the ground offensive.

USE AND PERFORMANCE OF RESERVE COMPONENT FORCES IN THE THEATER

RC forces performed to expected standards during Operations Desert Shield and Storm. Individual mobilization augmentees were ordered to active duty and filled key wartime positions including duty at DOD, Service, JS, Defense agency, and unified and specified command headquarters. They multiplied the existing capabilities of the force and in several cases, performed unique missions, which proved crucial to the overall success of the operation. RC air crews flew air reconnaissance, close air support, and special operations missions in support of the air and ground campaigns. The first A-10 air-to-air kill was recorded by a pilot of the 926th Tactical Fighter Group (AFR) who shot down an Iraqi helicopter. During Operations Desert Shield and Desert Storm, KC-10s flown by Reserve Associate crews and ARC KC-135s refueled more than 22,000 aircraft. ARC air crews helped move more than 525,000 tons of equipment and supplies and nearly 330,000 personnel. More than 400 Naval Intelligence and more than 70 Security Group cryptology reservists served in more than 30 commands and frequently were cited by commanders for their performance. Figure H-7 sketches the deployment of RC forces for each Service.

The 142nd FA Brigade, ARNG, providing fire support to the 4th British Armoured Brigade, moved 350 kilometers in the ground campaign's four days and fired 422 tons of ordnance. This was one of the larger amounts of ammunition expended by any Coalition FA brigade during the operation. The Navy depended upon Reserve forces for medical care, construction of beddown facilities, ammunition storage, harbor and port security, the Naval air logistics effort, countermine efforts, and the Military Sealift Command. The Marine Corps Reserve combat units success has been well publicized. B Company, 4th Tank Battalion was credited with destroying over 30 Iraqi armored vehicles during the attack into Kuwait. In addition, USMCR infantrymen, artillerymen, tank crewmen, and air crewmen acquitted themselves well.

When the cease fire was ordered on 28 February more than 105,000 RC personnel were serving in the theater of operations, including; 37,692 ARNG; 35,158 USAR; 6,625 USNR; 13,066 USMCR; 10,800 ARC; and 281 USCGR.

After the cease-fire, RC forces performed missions in support of consolidation and redeployment. Reserve Civil Affairs, engineer, Military Police, water purification, and medical assets were engaged in humanitarian missions and restoration of crucial services in Southern Iraq and Kuwait. Reserve CS and CSS units remained in theater. Much of the recovery, backhaul, preparation for shipment, and loading of the tremendous amounts of US materiel and supplies that had accumulated in the Persian Gulf were entrusted to RC combat service support forces. By the end of August 1991, 1,022 Reservists, involuntarily activated, remained in the Persian Gulf. Ancther 4,463 Reserve volunteers were also in the theater to help in the redeployment.

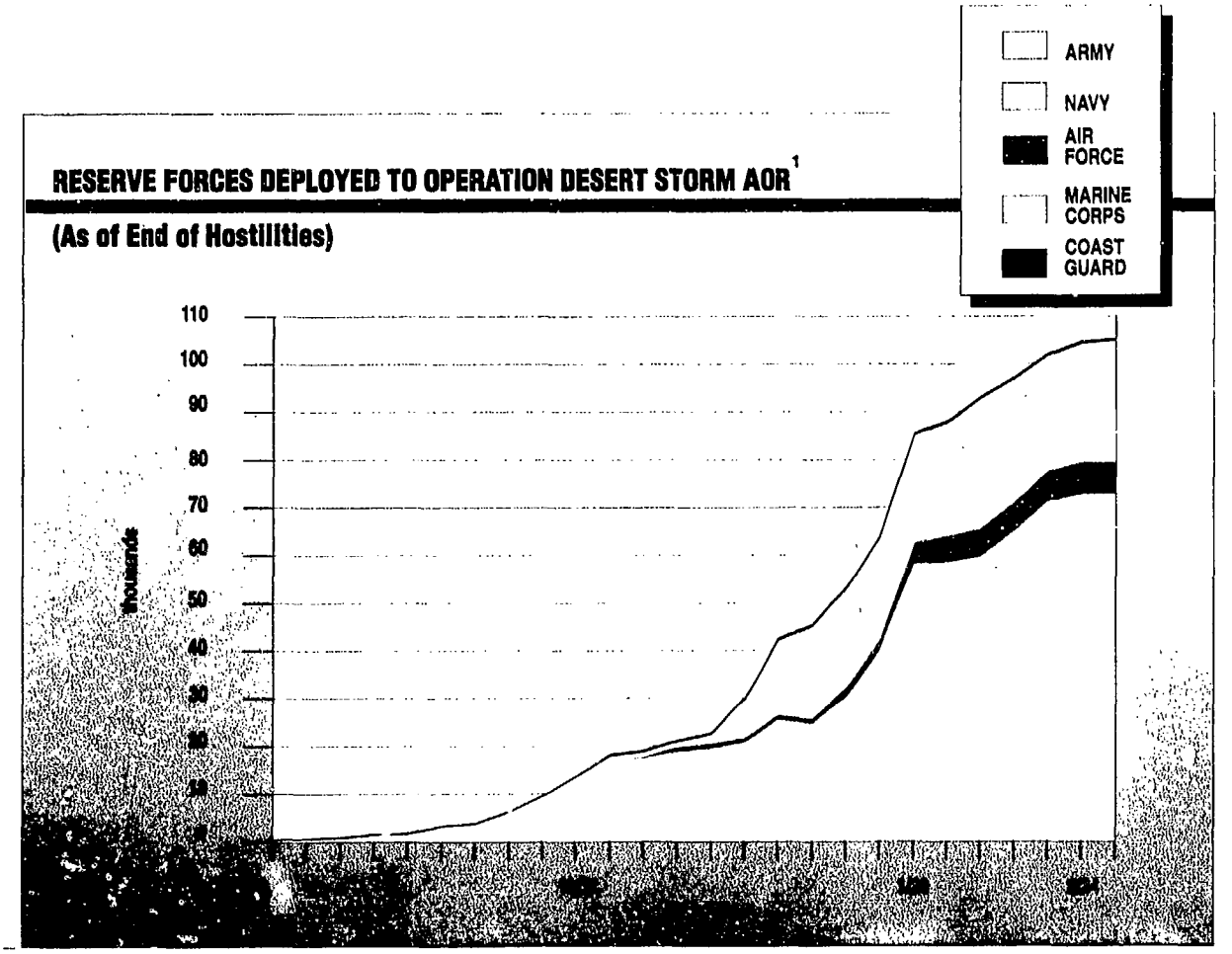


Figure H-7

USE AND PERFORMANCE OF RESERVE COMPONENT FORCES OUTSIDE THE THEATER

RC units and personnel also fulfilled important roles by backfilling units and personnel that deployed to SWA from both the US and overseas locations. USMCR stood in for Active USMC units in both II and III MEF, enabling the USMC to continue to fulfill its global commitments. Infantry battalions, artillery batteries, helicopter squadrons, and a fixed-wing squadron replaced deployed units on Okinawa and Iwakuni, thus maintaining US forward-deployed presence in the Western Pacific. The USMCR 2nd Marine Expeditionary Brigade (MEB) was activated and participated in Exercise Battle Griffin in Norway, in place of the deployed 4th MEB.

Army RC members were used to provided crucial support functions in the United States and Europe. These included terminal operations, force protection,

installation support, and sustainment of the AC medical care system. The Army also activated an USAR infantry battalion for duty in Europe and an ARNG Special Forces Group to respond to worldwide contingencies.

Naval Reservists deployed outside of the theater also provided support. For example, when the Fast Support Ship *USNS Antares* was disabled at sea, RCHB 4 mobilized and deployed to Rota, Spain, to unload the cargo within 72 hours. RCHBs 5 and 11 managed the greatly increased volume of Navy cargo at Guam and in the Philippines. Seabee battalions were recalled to replace active battalions which had deployed to SWA from Guam, Okinawa, and Puerto Rico.

ARC members provided crucial support services such as aerial refueling, aerial port and air base operations, aeromedical evacuation, and rear echelon medical support. They also provided medical support for units remaining in the United States and the dependents of deployed personnel.

Use of the RC to replace AC units deployed to the theater of operations gave the DOD considerable flexibility. It allowed US forces to deploy more rapidly and to get into place needed combat elements and their supporting activities, while maintaining commitments throughout the world. Figure H-8 summarizes the RC activations during the crisis.

ASSESSMENT

During Operations Desert Shield and Desert Storm, the Total Force Policy and the nation's reliance on Reserve forces were tested in ways unprecedented since the adoption of the policy. The call to active duty and the performance of the RC members who served in connection with the Gulf conflict were marked by extraordinary success. In his 6 March, 1991, address to the Congress, the President declared that the magnificent victory in the war "belongs...to the regulars, to the reserves, to the National Guard. This victory belongs to the finest fighting force this nation has ever known in its history."

It should be recognized, however, that Operations Desert Shield and Desert Storm took place as the nation was adopting a new military strategy, a new force structure, and a new AC/RC force mix to meet the requirements of rapidly changing geopolitical circumstances. The success of the Total Force Policy in Operations Desert Shield and Desert Storm will provide a solid foundation for the planning currently under way to ensure the future Total Force remains effective.

Reserve Components Ready Reserve Activated as of February 14, 1991

	Selected Reserve (Unit Members and IMAs)			Individual Ready Reserve		
	Activated	FY 90 Authorized End Strength	% of Total	Activated	Strength as of 30 Sep 1990	% of Total
ARNG	60,427	458,000	13	0	0	0
USAR	65,277	321,700	20	13,841	284,221	5
USNR	17,980	153,400	12	15	87,439	<1
USMCR	23,271	44,000	53	5,268	37,433	14
ANG	10,456	116,200	9	0	0	0
AFR	21,024	84,900	25	767	68,714	1
USCGR	877	15,000	6	0	5,109	0
Total	199,312	1,193,200	17	19,891	482,916	4

Figure H-8

OBSERVATIONS

Accomplishments

- Operations Desert Shield and Desert Storm required the largest mobilization and deployment of RC forces since the Korean Conflict.
- Operations Desert Shield and Desert Storm validated the key concepts underlying the DOD Total Force Policy.
- RC contributions were essential to success in the KTO and were instrumental in meeting challenges in other overseas theaters and in CONUS.
- RC volunteers were effectively used to support the early phases of the Persian Gulf contingency. Many volunteers augmented each Service. They accomplished many missions until the involuntary activation of RC units.
- The first large scale involuntary call-up of RC units and individuals was implemented in a systematic fashion in accordance with the provisions of Title 10 of the US Code, Sections 673b, 673c, and 673.
- For the most part, when RC forces were activated, their readiness levels were sufficiently high to ensure mission accomplishment with a minimum of post-mobilization training.
- The integration of AC and RC units generally was good. Reserves performed a wide range of missions including combat, combat support, and combat service support.
- Rapid DOD action in requesting Congressional assistance in updating and increasing Reserve Component entitlements was significant in providing for the welfare of Reserve personnel and their families.
- The activation of Reserve forces from thousands of communities across the nation and the full integration of their capabilities into CINCCENT's campaign plan helped to ensure the American public's support for the operation.
- Employers of activate Reservists were generally supportive of their Reserve employees, and the Services took steps to mitigate the trauma of Reservists' separation from their families.

Shortcomings

- Absence from units of those RC personnel who had volunteered earlier caused some initial difficulties which were overcome through cross-leveling and other personnel actions.

- Some RC forces, particularly large ground combat maneuver units, need some post-mobilization training, often in CONUS, to prepare them for operational missions. During Operations Desert Shield and Desert Storm, a misperception existed that the three Army RC brigades could be made ready for deployment with little or no post-mobilization training. This was never the intent.

- Incompatibility of automation systems between AC and RC, particularly in the Army, complicated the transition of RC personnel to active duty, created pay and personnel tracking problems, and hindered post mobilization training. Personnel automation support was a shortcoming in mobilization operations. Current infrastructure cannot satisfy the demands placed on it during mobilization. Current systems are not designed to meet wartime needs.

- Operations Desert Shield and Storm demonstrated the importance of premobilization family preparedness and of family support in the National Guard and Reserve. Overall, the family programs worked well and provided cross-service support to all military families. Nevertheless, DOD is reviewing the peacetime structure and is studying ways to strengthen family support as the force structure and organization changes. This review includes a survey of RC members and their spouses and field visits to National Guard and Reserve units to assess the effectiveness of family support programs.

Issue

- Operations Desert Shield and Desert Storm demonstrated the importance of timely access to the RC – both individuals and units. OSD is studying ways to improve access based upon the experience gained in the Gulf crisis.

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APPENDIX I

COALITION DEVELOPMENT, COORDINATION, AND WARFARE

We learned – and relearned – a lot of lessons from this partnership. The first was that life is a lot easier when you're not alone.

Senior US Desert Storm Participant

HISTORICAL PERSPECTIVE

One of the more important and interesting aspects of the Gulf War was the remarkable coalition of nations that joined ranks to turn back Saddam Hussein. It is useful to examine the conditions that facilitated the creation of this coalition, and to trace its evolution from the initial response to Saddam Hussein's invasion of Kuwait through the one-sided victory which Coalition efforts achieved seven months later.

Coalitions are different from alliances inasmuch as they tend to be more loosely structured and often focus on a single objective. Alliances more often are agreements to promote the allies' security in whatever situations arise for an extended period. Operations Desert Shield and Desert Storm underscored the advantages of common strategy, doctrine, tactics, and procedures developed by decades of training with North Atlantic Treaty Organization (NATO) allies. By the same token, exercises with friends in the Gulf region, where the United States has maintained a continuous military presence for more than 40 years, paid similar dividends. Still, the Gulf War underscored the need for further improvement in the ability of Coalition forces to conduct combined operations. Overall, the overwhelming success of this operation, combined with its lessons, comprises a possible model for international cooperation in future crises.

Since the 1950s, US foreign policy has included a long-term commitment to security assistance, which helped develop strong relationships with NATO and Coalition partners. Security assistance and defense sales provide compatibility of equipment; the training that comes with US hardware often leads recipients to adopt US doctrine and tactics, resulting in operational compatibility as well. The US Foreign Military Sales (FMS) system provided Saudi military infrastructure, US-origin equipment and training for most of the partners, and the foundation of peacetime cooperation and interoperability on which the Coalition was built.

FOUNDATIONS FOR MILITARY COALITION

Political Consensus

Most nations perceived Iraq's invasion of Kuwait as entirely without justification. Furthermore, Iraq's posture after the invasion would have had unacceptable political consequences in the Gulf. Many feared the brutal attack would introduce an era in which Gulf states would be intimidated by Iraq's overwhelming military superiority. There also was the possibility that Iraq would continue its aggression and attack Saudi Arabia if the conquest of Kuwait were

unopposed. Leading world powers soon formed a consensus to deny Iraq the possibility of further aggression. This widely shared view, that Iraq's aggression had created a threat to stability in an important part of the world, was the basis for formation of the Coalition to defend Saudi Arabia and eventually eject Iraq from Kuwait.

Saudi Arabia's request for military assistance to defend against the possibility of attack was a prerequisite for effective collective action against Iraq. Saudi Arabia's geographic position, wealth, and political prominence on the Arabian Peninsula meant its decision to grant access to friendly foreign military forces was indispensable to building the Coalition. Following Saudi Arabia's decision, the other Gulf states granted access to friendly military forces for their defense.

While Saudi Arabia made bilateral arrangements for assistance by friendly foreign nations, the United Nations condemned Iraq and initiated economic sanctions, isolating Iraq politically and economically.

International Environment

Internal difficulties distracted the Soviet Union from greater attention to Southwest Asia (SWA), and improved East-West relations removed many obstacles to international consensus. This central feature of the international environment made cooperation among nations easier. Unfettered by the antagonisms of the Cold War, the United Nations closed ranks, opposed Saddam Hussein's illegal occupation, and, ultimately, authorized measures necessary to expel Iraq from Kuwait.

Access and Resources

Within the Gulf Region

King Fahd's request for US help in defending the Kingdom was essential to the Coalition's success. Conscious of the need for decisive action, on 5 August President Bush sent the Secretary of Defense, the Under Secretary of Defense for Policy, the Commander-in-Chief, Central Command (CINCCENT) and the commanders of the Army and Air Force Components of Central Command (ARCENT and CENTAF) to Riyadh to see the King. The next day, the delegation and the US Ambassador to Saudi Arabia were given a royal audience, and they showed the King intelligence indicating Iraq had brought far more forces into Kuwait than were necessary to occupy it. The implication was that Saddam Hussein might commit further acts of aggression, and the obvious target was the oil fields in the Saudi Eastern Province and the other Gulf Cooperation Council (GCC) countries.

Saudi Arabia's request for assistance authorized friendly foreign nations to deploy, station, and operate large military forces on Saudi territory and in its airspace. This included authority to use telecommunications, roads, airfields, ports, bases, and buildings. Saudi Arabia also provided water, food, shelter, and fuel for friendly forces. Other Gulf states authorized similar access for friendly foreign forces.

A unique and crucial advantage to the Coalition was Saudi Arabia's creation, during the past 20 years, of an extensive and highly capable infrastructure of air and sea ports, including some roads, power generation and distribution systems, and water and petroleum production facilities. Saudi foresight in building this infrastructure greatly eased the task of receiving and supporting the deployment of large military forces. Much of the military construction in Saudi Arabia was accomplished under the US FMS program. This process is discussed in greater detail in Appendix F.

Saudi Arabia and other Gulf states also acquired military equipment from western suppliers and through the US FMS programs. They have adopted western military doctrine and tactics, modified to meet their specific needs. Some GCC nations' military officers have attended western military schools. Before the Gulf War, western military forces had participated with the GCC in limited exercises involving mainly naval and air forces. Peacetime cooperation through the FMS program, training, education, and these limited exercises formed a basis for more intensive wartime collaboration.

Security assistance emerged as a central pillar of coalition warfare, and when Operation Desert Shield began, FMS requests surged. Countries in the region found their stocks insufficient, as did distant Coalition members who had either forces participating in theater or defensive commitments to countries bordering Iraq. As both the US and its Coalition partners scrambled to meet these sudden shortfalls, stockage and production capability lagged demand, and the Diversion Decision Consideration process, developed to resolve FMS needs for scarce supplies, became necessary for more than 240 FMS crucial requests.

Outside the Gulf Region

Outside the Gulf region, Operations Desert Shield and Desert Storm deployments required a massive transportation effort made possible only by extensive international cooperation. Of particular importance, many nations granted access for overflight and landing rights, overland transportation, and use of port facilities. In addition, as discussed in Appendix P, several nations provided cash and in-kind material and lift support to offset the costs of the US deployments.

Key to arranging for the movement of US forces to the theater was the role outside the Gulf region of those Unified and Specified commanders supporting the Central Command (CENTCOM). This support consisted of two principal elements, one the military assets and resources provided to CENTCOM, and the other the orchestration of the support. This orchestration was essential to deployments into the theater during Operation Desert Shield and to preparation for the conduct of combat during Operations Desert Shield and Desert Storm. In effect, there was within the larger Coalition a network of US activities overseas – the unified Commanders-in-Chief (CINCs), their subordinate commanders, embassies, attaches, and security assistance offices – which arranged overflight, access, transit, staging rights, and other support, such as hospital facilities and security services for the deploying forces. The European Command (EUCOM) and Pacific Command (PACOM) organizations were particularly instrumental in coordinating this support.

BUILDING THE MILITARY COALITION

Cultural Sensitivity

Deployment of large numbers of US forces to Saudi Arabia meant harmonizing western culture with the the birthplace of Islam. A rigorous indoctrination program was undertaken to orient US personnel on the region's unique history, customs, religion, law, and mores. Since Islam eschews alcohol, CINCCENT issued a general order prohibiting consumption of alcohol in the CENTCOM area of operations (with waivers granted on a country-by-country basis). In recognition of Islamic sensitivities regarding attire, CINCCENT established a civilian dress code designed to reduce the likelihood of inadvertent offense.

Saudi Arabian standards of propriety in public media are considerably more conservative than those of the United States, so programming transmitted by the Armed Forces Radio and Television Service was monitored to avoid material that would be offensive, and service members were asked to comply with standards concerning material sent in the mail. United Service Organization entertainers were given area orientation briefings and performers cooperated by ensuring their tours were in consonance with Saudi sensibilities.

Saudi practice of Islam includes specific rules governing most aspects of female conduct. US women were provided thorough briefings concerning these rules and effectively adapted to the situation. Saudi Arabia also made some accommodations of cultural difference – for example, the prohibition against women driving was lifted if that was part of their official duty.

To provide some access to recreation of a Western flavor, as well as some relief for service men and women from the harsh environment and arduous duty of Operation Desert Shield, the US government chartered the cruise ship *Cunard*

> ***"It was hot. The daytime temperatures in the summer were often over 115 degrees, and sometimes 120. And drier than Phoenix -- you could get dehydrated just from taking a nap. Then in the winter it would freeze at night, down into the twenties or even the teens. There were scorpions all over -- in your bed, in your shoes, in your pack -- but they weren't as bad as the flies. Those flies were huge, and swarmed so thick you had to learn to eat with one hand and swat with the other. And sand. Fine, powdery sand that got everywhere -- in your clothes and in your equipment, no matter what you did to try and screen it. When the wind blew, you didn't have to brush your teeth -- just smile and they'd get sand-blasted clean."***
>
> **Desert Storm Airman**

Princess which docked in Bahrain and began its first cycle of rest and recuperation (R&R) operations on 24 December. With a berthing capacity of 900 in 398 cabins, the *Cunard Princess* made available a four-day, three-night R&R package for more than 50,000 service men and women of all branches and ranks (the vast majority junior) in its first six months of operation. Lodging, dining, sports, recreation activities, and local tour packages were paid for by the government; discretionary costs, such as snack foods, beverages, retail and concessionaire purchases were borne by the service members. At the request of the US Ambassador to Bahrain, the ship had the additional mission of evacuating US citizens in an emergency. Armed Forces Reserve Center – Bahrain, as it was officially called, ceased operations on 23 September 1991, and the *Cunard Princess* was released from contract.

It is a tribute to American service men and women that, under conditions of considerable stress and hardship, they demonstrated impeccable respect for a culture much different from their own. They recognized the importance to their mission of the overall relationship between Saudi Arabia and the United States. Their superb conduct will have a long-lasting, positive effect; the reputation they established will make it easier to build future coalitions with Middle Eastern and other partners.

Defensive Phase - Operation Desert Shield

Planning

On 8 August, after King Fahd had requested assistance and granted access for deployment of US forces, senior CENTCOM and Saudi planners agreed to establish a

combined group to plan the defense of Saudi Arabia, with the additional responsibility of proposing command arrangements for their respective commanders. The combined planning group concentrated on the ground campaign since the bulk of Arab forces were ground forces. Later they produced the Combined Operations Plan (OPLAN) for offensive operations to eject Iraqi forces from Kuwait (Operation Desert Storm) and numerous other contingency plans.

By mid-August, the combined planning group was briefed on the US unilateral plan (OPLAN 1002-90) to defend Saudi Arabia. This initial combined planning group was composed of the CENTCOM J5, the Ministry of Defense and Aviation (MODA) J3, general officers from the various Saudi armed forces, and a working group of US and Saudi field grade officers. The Saudi officers were the operations deputies for their respective services, and the press of requirements to prepare for an imminent attack by Iraq made it impossible for them to devote sufficient time to the combined planning group. As a result, the CENTCOM J5 and MODA J3 agreed to share responsibility for developing a combined OPLAN for the defense of Saudi Arabia.

There is an aphorism that plans are worthless, but planning is indispensable. Although four major combined OPLANs eventually were developed, the most valuable aspect of the combined planning process was that it required that the Saudis plan for the reception, sustainment, and integration of Coalition forces and it provided the only forum to identify and resolve combined issues across all functional areas. Moreover, it provided a mechanism for rapid access to US and Saudi decision makers and institutionalized the plan development process for the Saudis.

Initial planning for the defense of Saudi Arabia (Operation Desert Shield) evolved from the concept developed earlier by the US for the defense of the Arabian Peninsula, modified to include a larger force. The concept of operations was to establish initial defenses with US forces in the vicinity of Al Jubayl and reduce enemy forces with tactical airpower as they attacked across the 100 miles from the Kuwait border to US defensive positions. Concurrently, US forces would continue to deploy into Saudi Arabia through Ad Dammam, Dhahran and Al-Jubayl.

On 20 August, CINCCENT published Operation Order (OPORD) 003 as an interim combined defense plan. The purpose of OPORD 003 was to ensure US commanders understood the capabilities, intentions, and tasks of Saudi forces and to authorize the liaison and coordination necessary to establish a fully integrated Coalition defense. Although OPORD 003 was disseminated to only US forces, it was developed by the US/Saudi combined planning group and represented the first combined planning product of the crisis.

On 13 September, the combined planning team briefed a combined concept of operations for defense of Saudi Arabia to CINCCENT and Lieutenant General Khalid Bin Sultan Bin 'Abd Al-'Aziz. The commanders approved continued development of a combined defense plan and provided specific planning guidance. In October, Lieutenant General Khalid was designated Commander, Joint Force/Theater of Operations (later, Joint Forces Command (JFC)) and the MODA J3

was also the JF/Theater of Operations J5. The net result of this reorganization was that minor planning decisions no longer required approval of the MODA Chief of Staff. Lieutenant General Khalid's new position increased his decision-making authority and improved US access to top Saudi officials. These changes substantially improved the combined planning process.

As additional countries continued to provide forces for the defense of Saudi Arabia and the Coalition's combat capability increased, the concept for defending Saudi Arabia with a US-only force, or a US/Saudi force as reflected in OPORD 003, became obsolete. The initial combined defense concept relied on an economy of force in the Northern Area Command (NAC) and in the sector between NAC and the Eastern Area Command (EAC). As other nations offered additional combat units, the opportunity arose to establish substantially stronger defenses and reduce the risk to Coalition forces. By 15 October, Syria agreed to provide one combat division and the Egyptians already were defending north of Hafr Al-Batin with one mechanized division and offering to provide another division if requested by Saudi Arabia.

War game analyses confirmed the inadequacy of available forces to defend the NAC, encompassing a large area surrounding Hafr Al-Batin and King Khalid Military City (KKMC). These analyses showed that with the addition of an Egyptian division and a Syrian division, a successful defense of the NAC was possible. Saudi Arabia accepted the Egyptian offer.

The final combined defense plan for Operation Desert Shield (Combined OPLAN for the Defense of Saudi Arabia) was signed on 29 November and published in Arabic and English versions, and Coalition forces generally were used accordingly. CINCCENT's intent was to wait until all forces arrived in theater and issue an execute order. As it transpired, there was no major Iraqi attack beyond Kuwait; and the need for supporting plans from subordinate commands and a CINCCENT execute order was obviated by the decision to deploy additional forces and begin repositioning Coalition units in preparation for offensive operations.

Forces

Forces from outside the Gulf region began deployment to Saudi Arabia soon after Iraq's invasion of Kuwait. Egyptian and Syrian special forces were among the first Arab forces to arrive, augmenting Saudi and GCC forces already present. US naval combatants were present in the Gulf of Oman and Persian Gulf when the Iraqi forces attacked. US forces began deploying on 7 August, and elements of the 82nd Airborne Division arrived the next day. US Air Force (USAF) air superiority fighters, airborne warning and control system (AWACS) aircraft, and air refueling tankers arrived in Saudi Arabia on 8 August; bomber aircraft began deploying on 11 August and, four days later, 20 were in place. On 8 August, Maritime Prepositioning Ships sailed from Diego Garcia and US Marines prepared to join them at Al-Jubayl. United Kingdom (UK) Jaguar air-to-ground fighters and Tornado strike fighters were in the

region by the end of August. The arrival of substantial numbers of ground attack aircraft from the United States during August combined with the carrier-based air already in the Gulf of Oman to produce a formidable force. In addition, many nations contributed light forces that could be deployed quickly. These early commitments signalled global resolve and served as a deterrent to further Iraqi aggression.

Heavier forces began arriving by September. The 3rd Egyptian Mechanized Division began deployment on 21 September and had completed deployment on 6 October. In CINCCENT's assessment, by early October there were enough ground forces available to defend against further invasion. The 7th UK Armoured Brigade began deploying 15 October and completed deployment by 20 November, augmenting the Marines deployed near Al-Jubayl (although they ultimately moved to and fought with VII Corps). Deployment of the 9th Syrian Armored Division began on 1 November and was completed on 18 December. The 4th Egyptian Armored Division deployed initially on 19 December and completed deploying by 7 January.

The deployment of air-delivered munitions built up steadily to support land-based air forces. CINCCENT reported that by mid-September, there was enough capability to conduct an offensive air campaign as well as defensive air operations against the full range of Iraqi targets, had there been an invasion.

Naval forces that participated in the maritime operations of Desert Shield and Desert Storm included those of Argentina, Australia, Bahrain, Belgium, Canada, Denmark, France, Germany, Greece, Italy, Netherlands, Norway, Oman, Poland, Portugal, Qatar, Saudi Arabia, Spain, Turkey, the United Arab Emirates (UAE), UK, and United States. Further discussion of maritime operations is in the ensuing section on sanctions in this appendix.

Command Arrangements

Command arrangements for Operation Desert Shield evolved as Saudi Arabia made agreements with friendly nations for deployment of their forces. Foreign Islamic forces were invited with the understanding they would operate under Saudi operational command. US forces would be commanded by the US National Command Authority (NCA) with CINCCENT exercising command in theater. The initial agreement allowing the entry of US forces into Saudi Arabia provided for "strategic direction" of US forces by the Saudi Military Command, consistent with the constraints of the US Constitution. "Strategic direction" was never defined. After researching precedents, CENTCOM assumed the phrase to mean general guidance at a strategic level with no actual command authority, since the Constitution contains no provision for foreign command of US troops. The net effect of the wording was to accommodate both Saudi and US sensitivities, by allowing the

Saudis to claim authority over the foreign forces on their soil, while at the same time respecting US requirements to adhere to the provisions of the Constitution.

The UK arranged with Saudi Arabia for British forces to be under tactical control (TACON) of CINCCENT while the UK NCA maintained command. France arranged for an independent chain of command for French forces reporting to the French NCA while agreeing to coordinate operations in theater with Saudi Arabia's military command. Later, the Coalition shifted to an offensive plan and the French ground forces were placed TACON to ARCENT around mid-December, ultimately to serve on the westernmost flank of XVIII Airborne Corps. Thus the NCAs retained command of their forces while selected Western and all Islamic nations authorized the US or Saudi Arabia to exercise operational control of their forces. Figures I-1 and I-2, below, show the command relationships of Operations Desert Shield and Desert Storm.

Arab forces in the Kuwaiti Theater of Operations (KTO) were under EAC or NAC operational control depending on their location. The EAC tactical sector for Operation Desert Shield lay from Kuwait south to the northernmost limit of the US sector and from the east coast west to a line extending roughly south from the westernmost part of the Kuwait panhandle. The main forces assigned to EAC were Saudi and GCC forces. The NAC encompassed the area south of Kuwait and Iraq excluding the EAC sector. The NAC included Hafr Al-Batin, KKMC and the terrain feature Wadi Al-Batin, a dry river bed that runs along the Kuwait-Iraq border south-southwest into Saudi Arabia. Most major Arab forces that eventually deployed to Saudi Arabia were in NAC, including two Egyptian divisions and a Syrian division. While EAC and NAC exercised operational control (OPCON) during Operation Desert Shield, OPCON during Operation Desert Storm was exercised by forward tactical headquarters with different commanders and staffs. These new commands were called Joint Forces Command East and North (JFC-E and JFC-N). EAC and NAC functioned as rear area commands during offensive operations. Figures I-3 and I-4, below, show the geographical positions of EAC and NAC, and JFC-E and JFC-N, respectively.

Arrangements for command and operational control of military forces reflected the sense of national, ethnic, and religious pride which were of great importance to every nation participating in the Coalition. Parallel chains of command satisfied these political considerations and placed a premium on cooperation among the leadership of major Coalition forces. It is a tribute to the commanders involved that they were able to establish an effective and cooperative relationship.

The combined group described earlier did the planning for the Coalition. Operational coordination was facilitated by establishing the Coalition, Coordination, Communications, and Integration Center (C3IC) in the MODA building that served as the headquarters for both CINCCENT and Commander Joint Forces/Theater of Operations, the Saudi commander of Islamic forces. C3IC was the center for intelligence and operational information exchange and assessment. A metaphor for the cooperative spirit of the Coalition, it ensured coordination of

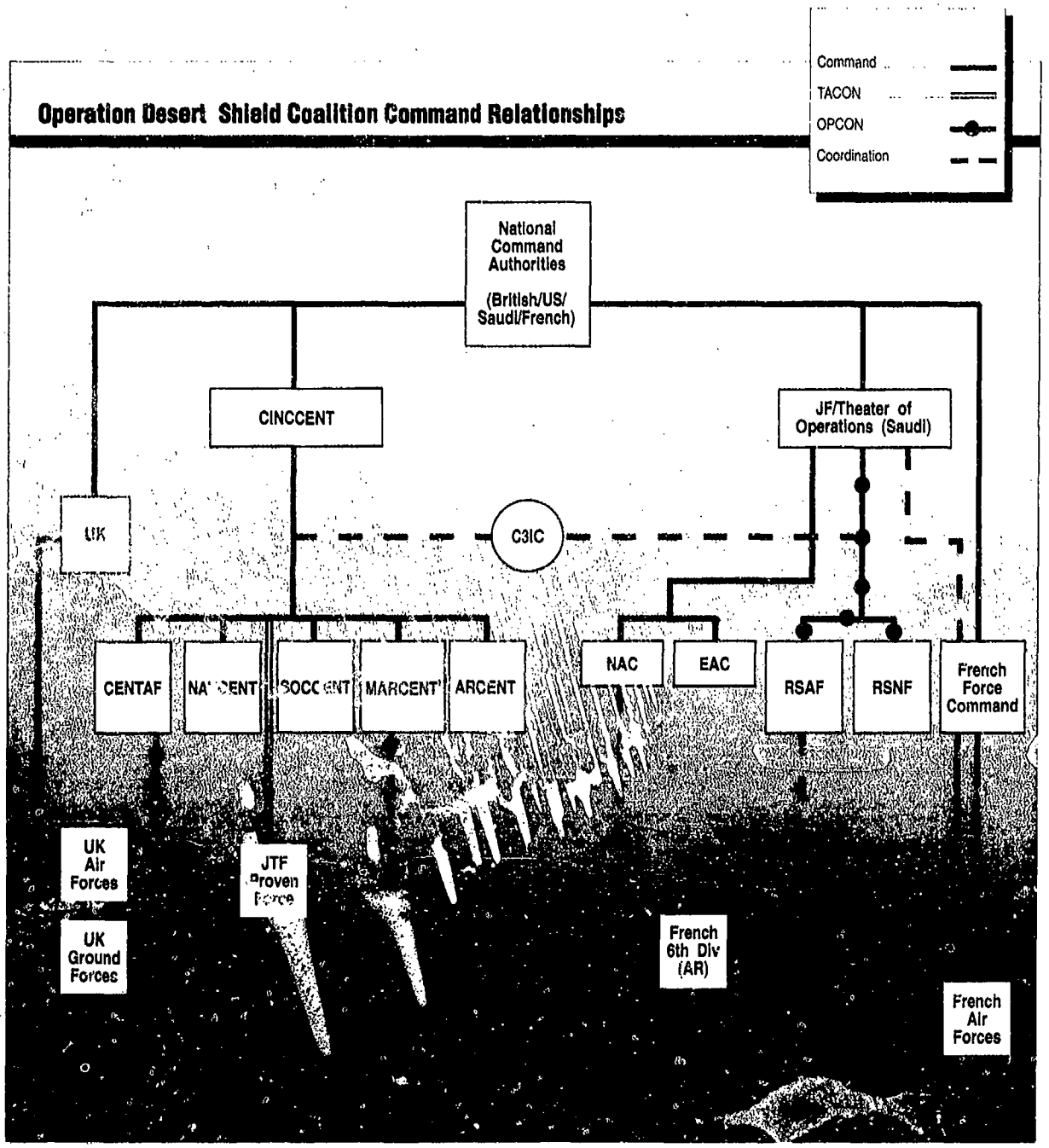


Figure I-1
Operation Desert Shield Coalition Command Relationships

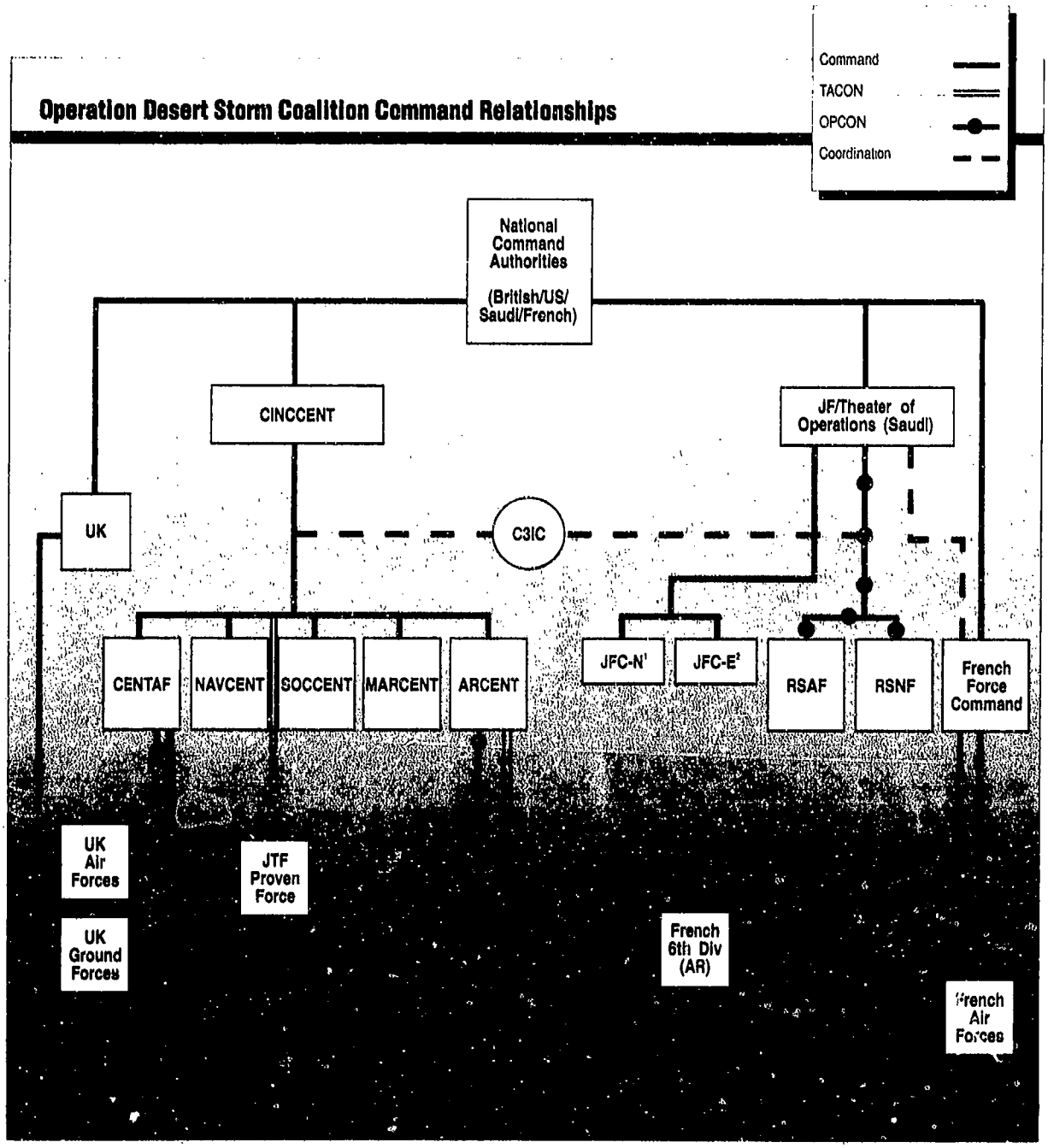


Figure I-2
Operation Desert Storm Coalition Command Relationships

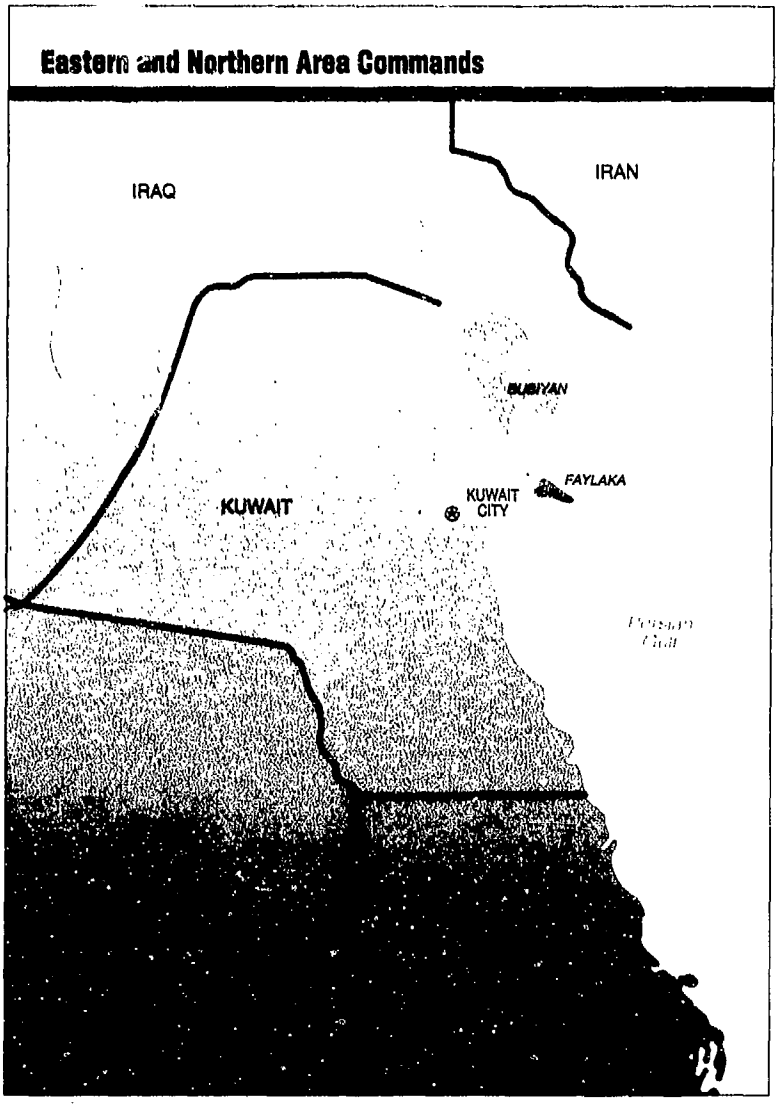


Figure I-3
EAC and NAC Boundaries

operations among the Coalition forces from the theater command level, as well as providing a forum where routine issues could be resolved informally and collegially among staff officers.

The C3IC grew out of the requirement, recognized in the first days of Operation Desert Shield, to establish some kind of combined command center which

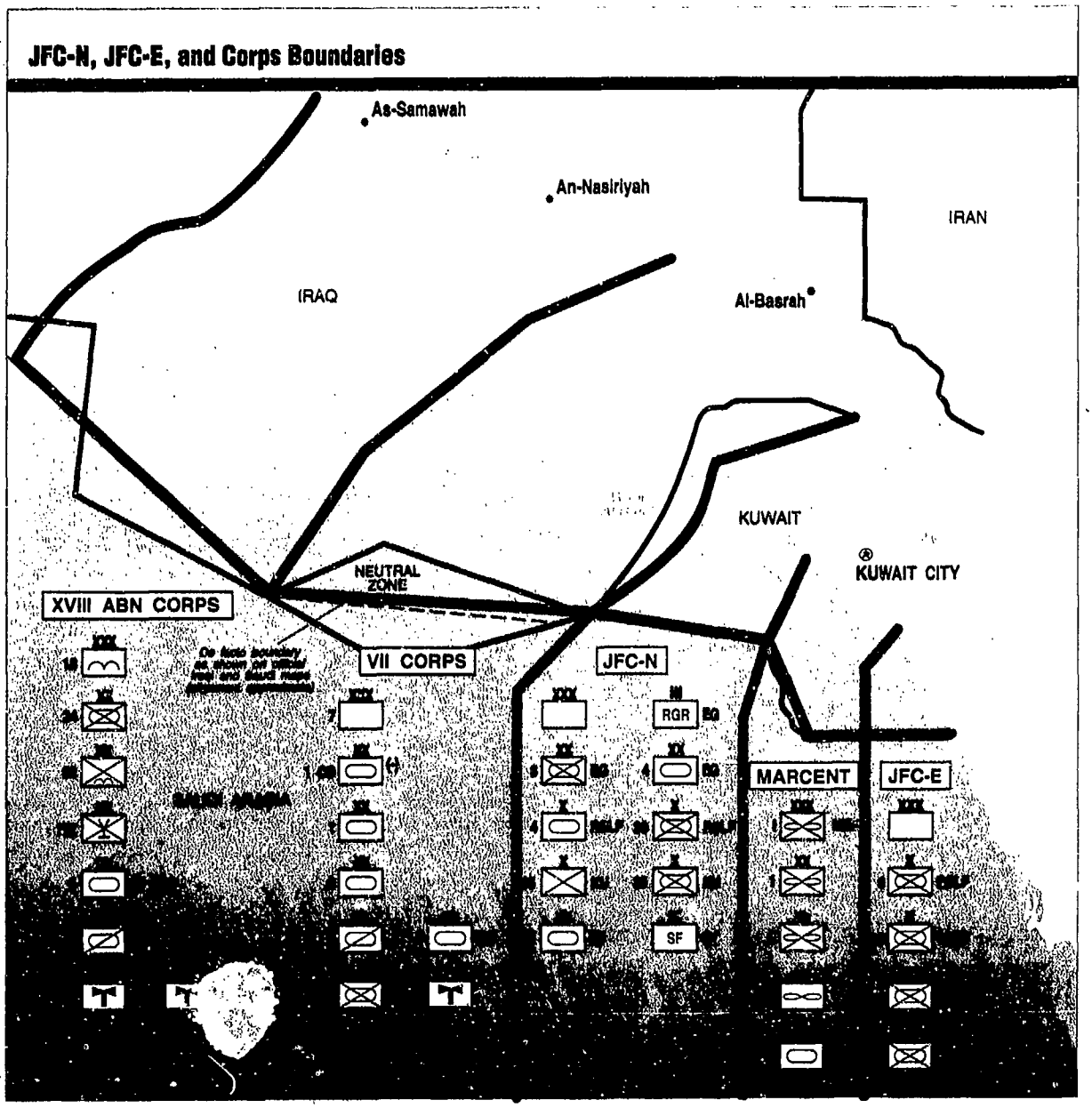


Figure I-4
JFC-N, JFC-E, and Corps Boundaries

was not a section of an existing US or Saudi headquarters. It began in mid-August with a small, lean, multi-service team built from the staffs of component commands by a US and a Saudi major general. After an initial period in which the members strove to establish their role, the C3IC emerged as a bridge between CENTCOM and the Saudi-created EAC and NAC. Mid-grade officers established personal relationships with the staffs of their respective national commands which permitted them to bring information into the C3IC. Saudi and US counterparts then worked closely together to produce briefings which could be delivered by both Saudi and US officers. The congenial atmosphere at the action level reflected the amity of the most senior leaders; but a key to the effectiveness of the arrangement was the formality of the meeting and briefing structure. The resulting predictability helped prevent surprises and embarrassment, and the presence of very senior officers on both sides underlined the importance of the work produced.

As early as August, with the prospect of more and more Coalition forces being committed to support Operation Desert Shield using different equipment and command and control (C2) procedures, CINCCENT had recognized two important requirements: to assess their capabilities and limitations, and to ensure they were integrated at the operational and tactical level. In the case of front-line, combat units, the Coalition Warfare Support mission was tasked to US Special Operations Forces (SOF) because of their unique capabilities – language and cultural orientation skills, wide range of tactical and technical expertise, and high levels of training. A fuller discussion of their activities is in Appendix J. Other US forces provided liaison teams to non-US Coalition partner (NCP) support units. The United States assigned these teams to NCP commanders down to battalion level. Using US communications systems, they coordinated with appropriate US and NCP commands in their area of responsibility (AOR). The liaison officers who helped train Arab units in combined tactics and procedures during Operation Desert Shield worked with the same units during hostilities to smooth battlefield coordination. Among the most important tasks of US liaison teams was indirect fire support coordination for the NCP units to which they were assigned. Most Coalition nations also exchanged liaison personnel with nearby ground and air units. Coordination of ground operations was improved by the assignment of AORs designed to minimize mutual interference between forces speaking different languages. The network of US liaison officers provided the best (and sometimes the only) comprehensive command, control, and communications (C3) system among the diverse Coalition forces, insuring that commanders of all units remained well informed of emerging developments.

As a complementary program, Kuwait also provided interpreters for liaison with US forces assisting in the liberation of their country. Soldiers, teachers, students – all manner of people fluent in English who had escaped the invasion – measurably improved Coalition cooperation by donating their linguistic skills.

The presence of large numbers of aircraft from many nations and services presented a significant challenge to C2 of air operations. Aircraft operations were concentrated in the Persian Gulf region and northeastern Saudi Arabia. During the defensive phase, air operations typically included strategic and theater airlift, air defense, surveillance and reconnaissance, intense training, and commercial airlift

flights. Planning and exercising for the defense of Saudi Arabia envisioned a massive air attack that included close air support (CAS), battlefield interdiction, air defense, and sustained bombing against strategic targets in Iraq.

While Saudi Arabia had a substantial civil and military aviation capability and infrastructure, the magnitude of Coalition air forces and the scope of their operations required extraordinary resources and adherence to procedures to coordinate operations safely and effectively. CENTAF prepared a daily air tasking order (ATO) in coordination with the Royal Saudi Air Force (RSAF) with inputs from Coalition air elements. This procedure maintained readiness of Coalition air forces and ensured flight safety. Despite the fact that during Operations Desert Shield and Desert Storm more than 2,700 aircraft from 10 countries flew some 112,000 missions, cooperation among Coalition air forces resulted in a perfect record of no friendly air-to-air engagements and no mid-air collisions. Considering the tempo of air operations and the diversity of the Coalition, this was a monumental achievement.

Coalition nations' NCAs maintained command of naval forces with a high level of multinational cooperation orchestrated by the United States. Individual national naval commanders in theater exercised OPCON of Coalition naval forces, with units of one nation occasionally operating under the tactical control of another. The benefits of an effective peacetime exercise program and cooperation among the commanders and units of Coalition navies made for well coordinated maritime intercept operations (MIO).

Summary

Operation Desert Shield was a political and military success because there was time to create a broadly based coalition which isolated Iraq, deterred it from further invasion, implemented sanctions, reassured Gulf states of the world's resolve to defend them against aggression, maintained access to Gulf oil, and empowered the United Nations to act effectively against aggression. Coalition military forces cooperated in the defense of Saudi Arabia and arranged for C2 of defensive operations.

Deployment would have been impossible without the contribution of strategic airlift and sealift from around the world, but the emplacement of a force adequate to defend Saudi Arabia took several weeks. Prepositioning more equipment and supplies in the region could accelerate the process in another emergency, when there may be less time to deploy.

Offensive Phase - Operation Desert Storm

Planning

Anticipating the possible requirement to eject Iraq from Kuwait, CINCCENT began unilateral contingency planning for offensive operations in August, while at the same time planning with the NCPs for the defense of Saudi Arabia. Although the UK took part in the preliminary planning for offensive operations from late October, other NCPs were not formally involved until the United Nations and Coalition partners agreed to the operations in December.

Preliminary planning for offensive operations involved two major mutually supporting efforts. First, CENTAF planned for an air campaign that involved strikes against strategic targets deep in Iraq as well as targets in the KTO. Second, the CENTCOM staff began planning for a ground campaign in conjunction with ARCENT.

During Exercise Internal Look in the weeks before the invasion, CINCCENT had formed the opinion that to eject Iraq from Kuwait with acceptable levels of risk and losses would require more forces than were on hand for Operation Desert Shield – that is, a single US Army corps and a Marine division (MARDIV) augmented by an Egyptian corps, a Syrian division, Saudi and other GCC forces, a UK brigade and French forces. Nevertheless, initial ground campaign planning assessed all courses of action using this mix of forces. The process confirmed CINCCENT's conviction: at those force levels, the attack would have to drive straight into the teeth of Iraq's strongest defenses. It might well succeed, but the risk of failure was too great and the potential cost in casualties too high. More forces, on the other hand, would permit the now famous maneuver around the enemy's right flank to surprise and destroy his elite Republican Guard in strategic reserve. This would allow not only the liberation of Kuwait but also the reduction of Iraqi potential for future aggression, and it would do so without risk of inordinate casualties. The President, the Secretary of Defense, and the Chairman of the Joint Chiefs of Staff (CJCS) agreed. In November, the President announced the deployment of an additional Army corps, another MARDIV and amphibious brigade, increased combat service support, and double the existing Operation Desert Shield air and naval forces to ensure a short conflict with minimum casualties. An expanded account of the evolution of this thinking is in Chapters III and V.

On 29 November, the UN Security Council (UNSC) approved Resolution 678 to use all means necessary to enforce previous resolutions. By mid-December virtually all members were committed, and the same combined team that had planned the defense of Saudi Arabia began Coalition planning for offensive operations.

US planners briefed their NCP counterparts on preliminary proposals, including attacks by the Joint Forces/Theater of Operations (Arab forces) into Kuwait with Egyptian forces attacking in the west to secure Al Abraq and thence eastward

to block approaches to Kuwait City. Saudi and GCC forces would attack along the coast east of the Marine attack as well as in the west on the right flank of the Egyptian attack. It was proposed that Arab forces would liberate Kuwait City.

The combined operations plan was designed to achieve national goals of the Coalition partners and specified the following campaign objectives:

- Destroy Iraq's military capability to wage war
- Gain and maintain air supremacy
- Cut Iraqi supply lines
- Destroy Iraq's chemical, biological, and nuclear (NBC) capability
- Destroy Republican Guard forces
- Liberate Kuwait City with Arab forces

The plan called for battlefield preparation through early deception operations, air operations, and counter-reconnaissance operations which would fix Republican Guard forces in the KTO and cause Iraq to focus efforts in the eastern areas of Iraq and Kuwait.

The concept of operations also directed forces to continue to defend Saudi Arabia while preparing for offensive operations. The air attack was to focus on Iraqi centers of gravity: C2, NBC capabilities, and the Republican Guard. The air campaign would move progressively into the KTO to isolate it and reduce the Iraqi defenses' effectiveness. A multi-axis ground, naval, and air attack would create the perception of a main attack in the east; however, the main effort would be in the west.

The combined operations plan directed JFC-E to conduct a supporting attack to penetrate Iraqi defenses and protect the Marine Component, Central Command (MARCENT) right flank. When directed, JFC-E forces were to secure Kuwait City.

JFC-N was directed to conduct a supporting attack to penetrate Iraqi defenses and protect the right flank of VII Corps as far north as Al Abraq. When these objectives were achieved, JFC-N forces would continue the attack to block Iraqi lines of communication (LOC) north of Kuwait City and then help secure and clear it.

All commands were directed to secure crucial rear area facilities and LOCs. A separate Combined Theater Rear Operations Plan was promulgated as an annex to the Desert Storm OPLAN.

While it took almost four months to complete the combined plan for the defense of Saudi Arabia, it required only four weeks to plan the combined ground offensive campaign. Lessons learned from defensive planning accelerated the

greater challenge of offensive planning. Translation of plan revisions from English to Arabic was the most time consuming task in plan preparation. It required Arab officers with considerable operational experience and English proficiency to translate important instructions to reflect the commander's intentions accurately. To streamline this process, the two theater commanders eliminated all but the most essential guidance from the offensive plan.

By keeping plan documents brief, the combined planning group was able to produce several contingency plans concurrently with the offensive plan: to respond to an Iraqi unilateral withdrawal from Kuwait; to clear and secure Kuwait City, assuming Iraq defended it; and to defend Saudi Arabia and Kuwait after offensive operations. The planning process was one of the Coalition's strengths.

Forces

NCPs contributed important forces to Operation Desert Storm. Egypt contributed the 4th Armored Division, 3rd Mechanized Division, and 20th Special Forces Regiment, all of which played a key role in the attack into Kuwait. The UK contributed the 1st Armoured Division that participated in the main attack with VII Corps. The 6th French Light Armored Division participated with XVIII Airborne Corps in the westernmost attack into Iraq, protecting the left flank of the entire Coalition. Saudi Arabia's forces included five independent brigades and smaller units. Syria's 9th Armored Division and special forces regiment participated as the reserve for JFC-N. Saudi Arabia, Bahrain, Kuwait, Oman, and Qatar also contributed forces to the JFC-E Force. Kuwait forces included three independent brigades and smaller units. Overall, the contribution of the 160,000 non-US Coalition forces was essential to the success of the ground operation. This includes the forces of several smaller nations, which made a significant contribution to the success of Operation Desert Storm and, in some cases, made sacrifices disproportionate to their size.

In addition to ground forces, the UK contributed five tactical fighter squadrons, France provided three tactical fighter squadrons, Italy and Canada one fighter squadron each, Saudi Arabia five fighter wings, and Kuwait two tactical fighter squadrons.

Command Arrangements

Command arrangements during Operation Desert Storm evolved from arrangements in effect for Operation Desert Shield. US, Saudi, UK and French forces remained under the command of their respective national authorities. French forces retained their coordinating relationship with the Commander, Joint Forces/Theater of Operations, while the 6th French Armored Division was placed under ARCENT's

TACON for Operation Desert Storm where it operated as a unit of XVIII Airborne Corps. British air and ground forces were under CENTAF and ARCENT TACON, respectively. With their forces split between two separate reporting chains, neither of which was British, UK commanders needed unusual flexibility and imagination. The smooth battlefield coordination is a tribute to their effectiveness. CINCCENT was the land component commander for ground forces assigned to ARCENT and MARCENT. Participating forces from Islamic nations were under the command of the Saudi Arabian Joint Forces/Theater of Operations Commander.

There were parallel command structures, depicted in Figure I-2 above, for the forces controlled respectively by US and Saudi commanders. They agreed any military action or operation would be subject to mutual discussion and approval.

The plan established liaison teams to coordinate both operations between ground units and CAS to ground forces. While all Coalition partners provided liaison personnel, US liaison teams were assigned to Coalition units at every command level down to the battalion. US teams assigned to the NCP corps level had significant operational planning expertise as well as robust communication capabilities. They exchanged timely operational, planning, intelligence and logistics information between US and NCP commands during preparation for and conduct of the offensive.

Tying the Coalition ground forces into the C3IC at the headquarters used by CINCCENT and Commander Joint Forces/Theater of Operations ensured that theater level commanders had a clear picture and issued coordinated guidance to forces participating in the ground campaign. The C3IC and US liaison teams with their capable communications were important to effective C2 during the ground war.

Summary

The achievement of broad-based support for offensive operations to eject Iraq from Kuwait required delicate diplomacy at the highest levels, which took place in consonance with the doubling of US forces in theater. Their resolve bolstered by UN Resolutions, the Coalition partners proved adept at planning, having learned the value of keeping combined planning documents brief. The multi-corps ground forces were organized and employed in a manner which accommodated the individual sensitivities and political requirements of each nation, while matching missions with capabilities. The liaison teams of several nationalities and the C3IC exerted a strong cohesive influence on the Coalition by streamlining communication and coordination.

COALITION OPERATIONS

Sanctions

Within the Gulf Region

Initial Coalition operations during Operation Desert Shield consisted mainly of the steady introduction of major ground forces by Coalition partners, and MIO to cut off resupply of Iraq's commerce and war materiel. On 16 August, CJCS directed CINCCENT to execute the MIO, effective 17 August, consistent with the scope of the UN Charter, article 51, and UNSC Resolution 661. At the same time, a notice to mariners was issued to alert merchant shipping of the operations and the potential for boardings. Coalition naval forces encountered merchant shipping bound for Iraqi ports with prohibited cargo during the earliest stages of Operation Desert Shield.

The Navy's extensive operating experience with foreign navies paid handsome dividends during the Maritime Intercept Force (MIF) operations. In fact, the Operation Desert Shield MIF was not the first multinational response to a crisis in the Persian Gulf. During the 1987-1988 Earnest Will operation, five nations, who were members of both the Western European Union (WEU) and NATO, participated with the United States in protecting reflagged shipping in the Persian Gulf. The broad-based cooperation during Operation Earnest Will improved working relationships among the participating nations, particularly between the US and France, and deepened trust and cooperation between the US and the GCC states. This experience helped pave the way for the successful Coalition effort during Operations Desert Shield and Desert Storm.

On 25 August, UNSC Resolution 665 approved the use of force in imposing trade sanctions against Iraq, and a growing number of nations began to assist in the MIO. To organize this increasingly complex operation, CINCCENT assigned overall MIF coordination to Naval Component, Central Command (NAVCENT). Accordingly, he sponsored the first monthly international Naval Planning Conference in Bahrain on 9 and 10 September, attended by 20 countries. Several approaches to MIO coordination were proposed, including use of WEU auspices; but the delegates decided on a loosely organized arrangement in which NAVCENT would take the lead. After the meeting, NAVCENT organized MIF operating sectors for the 17 Coalition navies who provided ships to the MIF – the six GCC states (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and UAE), plus Australia, Belgium, Canada, Denmark, France, Greece, Italy, the Netherlands, Spain, UK, and United States. Of the remaining conferees, Argentina and Norway soon also provided ships, and Egypt made ports available for diverted shipping (as did Oman, Saudi Arabia, and UAE), as well as helping with surveillance. Each sector generally included ships from more than one country, in addition to the forces of the local GCC states, with the understanding that the senior naval officer in each sector was to act as the local

sector coordinator. In the Red Sea and Northern Persian Gulf, the local coordinators usually were the US aircraft carrier battle group (CVBG) and destroyer squadron commanders. The GCC states played a vital role in the MIO by preventing merchant vessels from using their littoral waters to avoid the MIF. Table I-1, below, lists participants and their areas of operation.

Table I-1: Non-US Coalition Partners in Maritime Intercept Operations

27 September 1990: 10 Countries, 42 Ships

Country	Location
Australia	Gulf of Oman
Belgium	Gulf of Oman
Canada	Gulf of Oman
Denmark	Gulf of Oman
France	Djibouti Persian Gulf Red Sea
Greece	Red Sea
Italy	Arabian Sea Persian Gulf
Netherlands	Gulf of Oman Persian Gulf
Spain	Gulf of Oman Red Sea Strait of Hormuz

United Kingdom	Gulf of Oman Persian Gulf

15 December 1990: 12 Countries, 50 Ships

Country	Location
Argentina	Gulf of Oman Persian Gulf
Australia	Gulf of Oman
Belgium	Gulf of Aden Gulf of Oman
Canada	Gulf of Oman
Denmark	Gulf of Oman
France	Djibouti Gulf of Oman Red Sea
Greece	Red Sea
Italy	Persian Gulf
Netherlands	Gulf of Oman Persian Gulf
Norway	Persian Gulf
Spain	Gulf of Oman Red Sea Strait of Hormuz

United Kingdom	Persian Gulf

15 February 1990: 12 Countries, 66 Ships

Country	Location
Argentina	Gulf of Oman Persian Gulf
Australia	Gulf of Oman
Belgium	Gulf of Oman Port Said
Canada	Gulf of Oman Persian Gulf
Denmark	Persian Gulf
France	Djibouti Gulf of Oman Persian Gulf Port Said Red Sea Yanbu, Saudi Arabia
Greece	Red Sea
Italy	Persian Gulf
Netherlands	Gulf of Oman Persian Gulf
Norway	Persian Gulf

Spain	Gulf of Oman Red Sea Strait of Hormuz
United Kingdom	Persian Gulf

Each participating naval force received its tasking, reporting requirements, interception, boarding, search and seizure guidance, and rules of engagement from its own NCA. Coalition navies coordinated their operations by ultra high frequency (UHF) and teletypewriter radio circuits. Ships equipped to do so used tactical data link. NAVCENT's monthly coordination meeting settled operating areas, ship availability, and procedures.

Disabling fire was authorized with NAVCENT approval, but was never used, although warning shots were fired on several occasions, hundreds of ships were boarded, and many were diverted for carrying prohibited cargo. Two MIF combatants normally conducted boarding operations. Efforts were made continually to maximize the participation of NCP navies in MIO to enhance multinational coordination and demonstrate international resolve. Boarding teams from one ship boarded the suspect vessel while the second ship remained nearby to render assistance.

Although the US Navy was involved in most of the MIO, ranging from intelligence gathering and surveillance to boardings and take downs, NCP navies performed almost half of all boardings. French, Greek, and Spanish ships participated in more than 85 percent of all boarding operations that did not involve the United States. US ships conducted several joint MIF boardings with Australian, Canadian, Greek, Spanish, and UK warships. The MIF's multinational character proved essential to the integration of the Coalition's political will and military power.

For example, among the first intercepts conducted by an NCP, the Saudi patrol boat *Hitteen* stopped, boarded, and searched a vessel carrying prohibited cargo on 1 September. *Hitteen* escorted the vessel to a UAE port for further inspection.

Another example of a multinational intercept occurred on 8 October, when *HMS Battleaxe* (F 89), *HMAS Adelaide* (F 01), and *USS Reasoner* (FF 1063) intercepted the Iraqi MV *Al Wasitti*. *Al Wasitti* refused to stop despite warning shots fired across the bow. *Al Wasitti* was then boarded by UK Marines inserted by helicopters, who forced the ship to stop. A law enforcement detachment from *Reasoner* boarded the ship, found it empty of cargo, and allowed it to proceed in accordance with procedures.

Also on 8 October, the Iraqi merchant ship *Tadmur* was boarded by *HMS Brazen* (F 91), *HMAS Darwin* (F 04), and *USS Goldsborough* (DDG 20) in the North

Arabian Sea while the *Tadmur* was enroute from Aqaba to Iraq. *Tadmur* was carrying foodstuffs and was diverted to Muscat, Oman, where it was searched by British and Omani officials.

These examples of multinational participation in intercept operations emphasize the smooth tactical coordination of wartime operations, the necessity of having divert ports nearby, and the cooperation of the GCC nations in searching and administering ships diverted to their ports.

The Coalition naval embargo authorized by UNSC Resolution 665 and air embargo authorized by UNSC Resolution 670 were very effective in applying economic sanctions. The air embargo was never challenged; and as a result of Coalition efforts during the seven months of the Persian Gulf crisis, more than 165 ships from Coalition nations challenged more than 7,500 merchant vessels, boarded nearly a thousand ships to inspect manifests and cargo holds, and diverted 51 ships carrying more than one million tons of cargo in violation of UN sanctions. Commerce through Iraqi and Kuwaiti ports essentially was eliminated; ships were deterred from loading Iraqi oil while Turkey and Saudi Arabia prohibited use of Iraqi oil pipelines which crossed their territory. Virtually all Iraqi oil revenues were cut off, and the source of much of Iraq's international credit was severed, along with 95 per cent of the country's total pre-invasion revenue.

Outside the Gulf Region

While the principal military actions to enforce the UN sanctions occurred within the Gulf Region, there were supporting activities outside that area. In Europe and elsewhere, NCPs prepared naval ships for deployment and sailed them to SWA to support the MIO. Some nations, unable for various reasons to support Gulf operations directly, assisted by assuming patrol and presence duties which freed other Coalition naval forces for Gulf deployment. EUCOM developed defensive operations for the key LOCs running through the Mediterranean Sea. Control of these operations later were transferred to NATO and monitored by Allied Forces Southern Europe command structure.

Another action occurred in Italy which was of significance to the Persian Gulf naval operations. Iraq had ordered four frigates and six corvettes, all modern types and well armed, as new construction from Italian shipyards. Essentially ready and, in several cases, with Iraqi crews in place, the ships had not been delivered because contractual agreements were incomplete. When Operation Desert Shield began and the UN sanctions were implemented, Italy determined the ships would not be delivered to Iraq and began marketing them elsewhere.

Defensive Phase

Within the Gulf Region

While MIO were being conducted, initial Coalition ground operations during Operation Desert Shield involved deployment, debarkation, marshalling equipment and troops, movement to tactical assembly areas, training, and defensive employment. The largest NCP deployments were made by Egypt, Syria, France, and UK. Early arrival of Egyptian and Syrian heavy forces was delayed, in part, because Saudi Arabia was unable to receive them and provide support such as food, water, shelter, fuel, and transportation from ports of debarkation to tactical assembly areas (TAAs). The reason for the difficulty was that Saudi Arabia was already fully extended in providing these resources for the large US deployment. A key contribution in this process was 100 heavy equipment transporters (HETs) made available by Egypt. HET shortages plagued the Coalition on many occasions, and Egypt's timely assistance made a significant difference in the Coalition's ability to disperse heavy equipment from ports of entry and, later, to get it to the battle.

After most of the Phase I US deployments were completed, the most vulnerable area was the NAC where the force to space ratio was too thin. Deployment of Egyptian and Syrian heavy divisions in the NAC considerably improved the defenses and increased confidence in a successful Coalition defense against an Iraqi attack.

Egypt, Syria, and France transported their forces and equipment in ships to Red Sea ports where they were moved across Saudi Arabia to assembly areas in the NAC. In part, this path for deployments was made necessary by congestion in the east ports and LOCs as US forces deployed. Early deploying units remained near developed areas for water and other vital support during the hot season. Arrival in ports of debarkation involved consolidating troops with their equipment. This was facilitated by staging areas adjacent to piers where large numbers of personnel and quantities of equipment could be assembled and prepared for further movement. While expedient, this dense concentration of large numbers of troops inevitably presented a lucrative target.

After arrival in TAAs, units began a process of familiarization, organization, maintenance of equipment, and initial training. Familiarization and organization involved arranging for logistical support from the Saudis and exchanging orientation visits with previously deployed units or local troops in the area. Preparations included fortifying positions, providing screens, and establishing communications.

From the start, CENTCOM and ARCENT had placed a high priority on training Coalition forces although, at first, not all Coalition members were equally convinced of the value and necessity of combined training. The achievement of a consensus on this matter was important, because of the value of combined training in building

trust and coordinating doctrine and tactics of Coalition forces. Although the Army had worked with Egyptians and Jordanians in past exercises, it never had trained with the Saudis or most of the other Arabs in the Coalition. The US Army Training and Doctrine Command deployed about 130 Mobile Training Teams and New Equipment Training Teams consisting of some 800 personnel to train soldiers in Europe and the Middle East. In addition to basic training for UAE females, they provided an abbreviated basic training course for more than 500 Kuwaiti linguists assigned to US Army units. Elements of the 5th Special Forces Group had deployed with the first American troops to arrive in Saudi Arabia, and by 1 December, they already had instructed 13,000 NCP troops in 43 different subjects. Since the Coalition troops would have to rely on a largely American air force, communications and CAS received especially heavy emphasis, but the Green Berets also stressed weapons training and instruction in basic small unit tactics, chemical countermeasures, and land navigation.

Late in the defensive phase, training was increasingly oriented towards preparation for the offensive. US forces trained Coalition forces for breaching operations and constructed a full-scale replica of an Iraqi defensive position including mine fields, fortifications, trenches, and strong points. XVIII Airborne Corps also trained its counterparts, instituting a partnership program which paired each of its units with a corresponding Saudi formation from the EAC. The 3rd Armored Cavalry Regiment, for example, conducted live fire exercises with the 8th Saudi Armored Brigade, and American engineers instructed their Saudi counterparts in breaching techniques. Marines in the EAC also trained with Saudis and GCC forces, usually at the small unit level. Since many Arabs spoke English and some Americans Arabic, language did not prove a major barrier, but cultural sensitivities still made combined training a challenge for both sides from time to time.

Air operations during the defensive phase were designed for air defense of friendly air space, to prepare to conduct an offensive air campaign, to train, to rehearse operational procedures for the first three days of the air attack, and to condition Iraqi air defenses to regard as routine the same maneuvers eventually used to launch the air attack. Air operations were intensive and the large number of Coalition aircraft deployed required the closest control for effective training and safety of flight. In addition to US, Kuwaiti, and Saudi Arabian air forces, Coalition combat air forces were contributed by the GCC, UK, France, Italy, and Canada. NCP air forces participated with US air forces in air defense operations and training. Training included strike, strike support, counter-air, air defense, CAS, antishipping, and reconnaissance missions.

Coalition partners contributed ships that participated in the MIO and provided mine countermeasures (MCM) capabilities. Participation in MIO and MCM attracted several nations unable to contribute ground or air forces in theater.

Kuwaiti Resistance to Iraqi Occupation

The crushing weight of Iraqi military superiority did not deter thousands of brave men and women who chose to resist the invaders and fight on from inside Kuwait. Despite acts of vicious retribution by the occupying forces – often including the abuse or murder of Kuwaitis in the presence of their family members -- the Resistance tied down an estimated two divisions of Iraqi occupation troops in Kuwait City to maintain order and suppress acts of sabotage and harassment. Besides engaging targets of opportunity such as Iraqi personnel and command C2 facilities, the Resistance hid, sheltered, and smuggled out of Kuwait many Western and third-country nationals. Understandably, these resistance forces were eager to cooperate with the Coalition.

The experience with the Kuwaiti Resistance underscores the usefulness of SOF to help train, equip, and organize such forces to considerable military advantage. Apart from the occupying forces Iraq had to dedicate to the maintenance of order, the Resistance operatives were a valuable touchstone for the state of Iraqi troop morale and organizational characteristics. They also exerted a sizeable negative influence themselves on Iraqi morale, while encouraging their compatriots. Indeed, observers of Kuwaiti society have pointed out the galvanizing influence of the occupation on the structure and values of Kuwaiti neighborhoods. Clearly, coalition building must take account of the potential of Resistance movements as an important force multiplier.

Outside the Gulf Region

Immediately after the decision to send US forces to SWA, and before the maturation of the coalition concept, US Allies and friendly nations became involved in support of actions to counter Iraq's aggression. Particularly in Europe but also in the Pacific and Indian Ocean areas, the granting of transit and overflight rights, and access to bases, dramatically assisted the strategic deployment of US forces by air and sea, which continued throughout the defensive phase of Operation Desert Shield. Additional allied support was provided as forward positioned US stocks and selected tactical units were deployed to SWA, although the bulk of this support occurred after the decision to build an offensive capability. Security became a concern for the air and sea LOCs for strategic movement, particularly as they passed through the restrictive and potentially vulnerable Mediterranean region, and NATO acted in September to provide security forces there. Finally, within the various Allied national capitals, deliberations regarding the extent of commitment to be provided the Coalition were conducted in a compressed schedule at the urging of the United States and the United Nations. It is worth noting that August is traditionally a holiday period in Europe, normally characterized by greatly reduced government staffing and an inability to react rapidly; against this background the speed with which the Coalition took shape was impressive.

Host Nation Support by NCPs

One event that required significant international cooperation was the deployment of the 12th Combat Aviation Brigade from Wiesbaden, Germany, through France to Pisa and Livorno, Italy, to SWA. As a hint of things to come after transition to the offensive buildup, the hiring of trains and provision of border crossing clearances involved the commercial transportation facilities of Germany, France, and Italy. The governmental customs and interior ministries provided rail clearances as well as overflight rights for the unit's organic helicopters. The Italian government additionally became involved in loading and clearing the unit from Livorno and Pisa; strikes by Italian workers about pay issues were potential interruptions but, not entirely coincidentally, occurred only when there was no need for their support.

As mentioned earlier, the extensive deployment of forces from the continental United States (CONUS) to SWA was facilitated by prompt granting of overflight rights by all the European countries, and landing rights at 90 European airfields, with Torrejon, Spain and Rhein Main, Germany as the principal support locations. The host nations provided excellent coordination of airlift movement, an impressive feat in light of the potential for interference between the heavy strategic flow to support the Coalition and the normal commercial operations, particularly at Frankfurt am Main and Madrid International.

PACOM coordinated similar staging support, including overflight and landing rights, in the Pacific and Indian Ocean area.

NATO Activities

NATO established significant security arrangements for forces moving through the Mediterranean Sea to SWA. The threat of international terrorism was real and great throughout Operation Desert Shield and Desert Storm, whether initiated by Saddam Hussein, by Libya, by others supporting Iraq, or by those anxious to harm the Coalition forces (particularly the West and the United States) at any opportunity. Accordingly, NATO arranged for the following actions during August and September:

- Established NATO Airborne Early Warning (NAEW) orbits with E-3As in Mediterranean region

- Activated the On Call Naval Force Mediterranean (NAVOCFORMED)

- Activated a Mediterranean MCM Force

- Deployed the Standing Naval Force Channel (STANAVFORCHAN) to the Mediterranean.

These operations committed a total of 45 ships and 29 surveillance aircraft from eleven nations (Belgium, France, Germany, Greece, Italy, the Netherlands, Norway, Spain, Turkey, the UK, and the United States), plus 10 NATO AWACS aircraft.

Another NATO action during this same period was the initial declaration of measures from the NATO alert system. These measures were for preparatory steps to review procedures, staff headquarters, and increase security and reporting. It is noteworthy that the NATO allies did not mobilize or enact the emergency national crisis legislation required before the provision of formal Wartime host nation support (HNS) under existing bilateral agreements. Nevertheless, allied support provided to the US was, in many cases, nearly identical to that agreed to during a NATO war, although often using commercial contracts rather than processes planned for wartime. For example, military personnel and resources often were substituted for civilian assets, which were not mobilized.

Eastern European Countries

During the defensive phase, Poland, Czechoslovakia, Hungary, Romania, and Bulgaria also provided support, reflecting the historic changes that were taking place in Eastern Europe at that time. They offered many items of potential use to the Coalition in SWA. With a view to future requirements, EUCOM initiated a diplomatic effort to develop overflight rights for US aircraft supporting Operation Desert Shield. This initiative was crucial to the development of mutual understanding and was the forerunner for many substantive contributions during the buildup of the offensive capability, including Hungary's deployment of medical teams and Czechoslovakia's deployment of a chemical detection and analysis team.

Pacific and Indian Ocean Area

Friends and allies in the Pacific region were a great help, too. Japan and Korea contributed significant funds to the Coalition, as well as sealift and airlift to assist US deployments. Japan also donated computers, vehicles, construction equipment, and other valuable in-kind material. The Philippines, Australia, New Zealand, and South Korea pledged various assistance from warships to medical personnel.

Supporting US CINCs

Coalitions must be mutually supportive. During the defensive phase, there were several requests for US support from NATO allies and from other NCPs. The US provided a wide range of assistance such as intelligence support, air refueling, ammunition, specialized equipment, communications equipment, and even aircraft (25 F-15s to Saudi Arabia as part of FMS). A real challenge was to establish appropriate procedures and channels of communication to process the requests rapidly, and to maintain the paperwork necessary for an audit trail to allow final accounting.

The efforts of the unified and specified commands supporting CENTCOM were crucial from the outset of Operation Desert Shield. Earlier it was noted that the orchestration of HNS and of access rights was a substantial contribution of the overseas CINCs. There were additional contributions. During the defensive phase in Europe, the Coalition provided whatever support was required for the defensive buildup. The deployments to SWA of the assigned CVBG, tactical USAF units, and a CAB were among the key forces that arrived in minimum time. In addition, the Commander-in-Chief, Europe approved the reduction of theater precision-guided munitions below minimum supply to support CINCCENT. Deployments of special equipment such as communications gear, intelligence, and medical material were primarily supported by US forces in theater. Army modernization equipment such as the latest version of the main battle tank was shipped from theater reserve stocks. Sustainment stocks including ammunition and spare parts also were sent forward.

An interesting innovation was EUCOM's establishment of a rear area support base for CENTCOM called EUCOMM-Z. This support base provided maintenance for Army tank engines, Navy and USAF aircraft engines, and all service avionics in Europe. EUCOMM-Z was expanded to include other functions such as intelligence, communications, and medical support to be conducted within the European area to support CENTCOM. A network of airlift channel flights was established to move equipment requiring repair from Saudi Arabia to Europe and return. The EUCOMM-Z concept relieved CENTCOM of having to establish similar support capabilities in SWA.

During this phase other commanders participated in a similar fashion: Forces Command (FORSCOM) and Tactical Air Command (TAC) provided the CONUS-based Army and USAF reinforcing units; Atlantic Command (LANTCOM) and PACOM deployed naval forces such as CVBGs, Marine Corps (USMC) units, and the key prepositioning ships which delivered essential equipment to SWA early in the crisis. Transportation Command (TRANSCOM) was a particularly significant supporting command, scheduling the air and sea lift, deploying elements of its sealift, airlift, and sea terminal component commands to overseas locations both in and outside SWA to speed transportation and movements, and dispatching small planning cells to other CINCs' headquarters, particularly CENTCOM and EUCOM, to assist deployment planning. Strategic Air Command (SAC) made an indispensable contribution with massive tanker support across the Atlantic and Mediterranean.

Summary

Coalition operations during the defensive phase of Operation Desert Shield were wide-ranging, and crucial to the establishment of a defensive, deterrent posture to counter Saddam Hussein in SWA. The infusion of ground and air forces steadily improved the security posture of the Coalition, but it required a system of command arrangements tailored to accommodate the various sensitivities of the partners. Coalition naval operations began early to enforce the UN sanctions against Iraqi trade, incorporating a loosely defined but effective system of cooperation under on-scene commanders. Outside the theater, the most noteworthy activities were the granting of basing, transit and overflight rights for the heavy strategic lift, and tightening security in the Mediterranean region. Additional support, both to the United States, and by the United States to NCPs, in many cases served to activate a process that would be more heavily stressed in Phase II.

Offensive Phase

The full narrative of the offensive operations can be found in Chapters 5 (Transition to the Offensive), 6 (Air Campaign), 7 (Maritime Campaign), and 8 (Ground Campaign). Since the British fought as an integral part of VII Corps and the French of XVIII Airborne Corps, the story of their ground forces is in those chapters also. Discussed below are the principal operations of the other NCPs.

Within the Gulf Region

Coalition Air Operations

Besides the air forces of the GCC (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and UAE), the chief participants in the air operations were the British, Canadians, French, and Italians. Notably, there were a number of exchange pilots scattered among the partners – in fact, two Royal Air Force officers on exchange duty in separate Groups of the 3rd Marine Air Wing received US Air Medals for their actions in the Iraq and Kuwait theater. Some participants provided a few aircraft, and some provided hundreds – in all, there were more than 3,000. The magnitude of these forces prompted all partners to participate in the ATO. Not only was this the policy of the Coalition leadership; it offered the only means of ensuring flight safety in theater. In this way communication and cooperation were built into the system, and

"The bandits are destroyed...."

A Royal Saudi Air Force (RSAF) captain (referred to hereafter as "Captain S") was flying combat air patrol on 24 January in command of a formation of four RSAF F-15 aircraft, when he was given a bearing and range to a possible target by Airborne Warning and Control System (AWACS). Turning his formation toward the threat, Captain S detected a radar contact and headed towards it. Rules of Engagement required the RSAF to visually identify all targets as hostile, and receive authenticated clearance from AWACS, before engaging. This made the RSAF's job more difficult but helped to ensure against fratricide. Captain S continued to approach the target and locked his fire control radar onto it at a distance of approximately 85 miles. The target was 5,000 feet above ground level, flying southeast at 660 knots, almost directly toward Capt S's oncoming fighters.

The four Saudis held course until, at approximately 35 miles, they separated into two flights of two planes each so as to be able to follow the target if it suddenly turned left or right. During the Saudis' approach, the target was descending to an altitude of 250 to 500 feet, so the Saudis began to descend too. Captain S and his wingman had good radar contacts throughout the intercept, and at a range of about 30 miles were able to distinguish two separate target aircraft flying in formation about half a mile apart. A sudden turn by the targets at 15 miles placed the other two Saudis too far away to be able to participate in the engagement, but left Captain S's flight on the targets' tail. Having taken his final radar lock at about 15 miles, he continued to close on the targets using full afterburner and his remaining advantage in altitude.

He chased the targets for two to three minutes at altitudes of 250 to 1,000 feet and airspeeds of 720 to 780 miles per hour. Due to haze, Capt S had to close to within 3,500 feet to be certain of the targets' identity: they were Iraqi F-1 Mirage fighters. At first, because of the range from AWACS, he had trouble receiving permission to fire, but as soon as he was given clearance, he fired two AIM-9L air-to-air missiles without effect. Captain S's third missile struck one Iraqi, and he maneuvered to reposition for a shot at the other. The second F-1 began a hard turn, but Capt S downed it with an AIM-9L from approximately 6,000 feet. Both Iraqis jettisoned external fuel tanks as the first missile was fired, and Capt S does not believe they knew he was intercepting them until then. After the encounter, he transmitted the message, "The bandits are destroyed," and the Saudi formation returned to base unscathed.

all the capabilities of the Coalition could be orchestrated efficiently. For example, most members took part in the preliminary deception procedures which conditioned the enemy to disregard patterns of behavior which, on D-Day, were the prelude to attack.

In addition to the tactical aircraft, NCPs made a crucial contribution to the logistic effort by making civilian aircraft available as a kind of non-US supplement to the Civil Reserve Air Fleet (CRAF) under TRANSCOM. The national airlines of Italy, Kuwait, Luxembourg, the Netherlands, and South Korea significantly reduced the airlift problem, especially by the movement of people. Some nations, for divers reasons unable to offer combat units, furnished transport aircraft for use in theater, a precious commodity considering the short haul airlift requirements of the XVIII Airborne and VII Corps' long LOCs.

The start of Operation Desert Storm brought all the Coalition air forces into action. It is a tribute to the effectiveness of the ATO that there were no friendly aircraft shoot-downs. This is not to say there were no difficulties. As in the case of units in the ground campaign, a substantial issue was that of discriminating between friendly and enemy aircraft, or Identification Friend or Foe (IFF). Some Coalition members had been among the main suppliers of Iraqi military hardware for some years before the conflict, so the Iraqis had a wide range of equipment closely resembling, and in some cases identical to, the Coalition's. This, combined with the unprecedented density of sorties, made for a constant challenge.

On the other hand, Coalition coordination and cooperation achieved numerous successes. The orchestration of all theater air operations ensured that each partner made the maximum use of its arsenal. The most sophisticated weapon systems were used against the best defended targets, while those aircraft whose performance was more limited also were used fully against targets within their capabilities. AWACS aircraft manned by Coalition crews of different nationalities helped coordinate the air battle for all partners. One outstanding example of multinational cooperation came when an RSAF pilot, directed by a USAF AWACS aircraft, shot down a pair of Iraqi fighters.

The Battle of Khafji

The JFC-E, with three reinforced brigades consisting of Saudis and GCC forces, was preparing for offensive operations on the right flank of the Coalition when, on the night of 29 January, Iraq attacked Ras Al Khafji, achieving some tactical surprise.

In all, there were five separate Iraqi attacks during the night and the following day. First, an Iraqi armored brigade attacked across the Saudi border 17 miles west of Al Wafrah, where they were engaged by a Marine Light Armored Infantry (LAI) battalion supported by USMC AV-8s, F/A-18s, A-6s, and AH-1Ws, and USAF A-10s and AC-130s. The Iraqis returned across the border, having lost 10 tanks

and four enemy prisoners of war (EPWs). The Marines lost eleven killed and two wounded when two Light Armored Vehicles were destroyed by fire from friendly forces. At about the same time, an Iraqi tank column attempted to cross the Saudi border south of Wafrah, but withdrew with the loss of one tank when its lead tanks came under long-range fire from the USMC 2nd LAI Battalion. Iraqi forces staged through the Wafrah area, occasionally patrolling south of the Saudi border and directing artillery fire at Marine and Saudi positions. The Wafrah cultivated area became an assembly point for enemy forces fighting in Khafji.

Two hours later, an Iraqi mechanized infantry battalion crossed the border north of Khafji , where it met a screening force of the 2nd Saudi Arabian National Guard (SANG) and tactical air support. The outnumbered screening force broke contact and withdrew to the south, whereupon elements of the Iraqi battalion occupied Ras Al Khafji. The Coalition destroyed 13 Iraqi vehicles in this engagement with no friendly losses. The 1st and 2nd MARDIV then moved regiment-sized forces to block any further Iraqi advances and to reinforce JFC-E. The Iraqis were unaware that, by coincidence, a small reconnaissance team of Marines had entered Khafji unobserved before the attack began, were trapped when the town was captured, and had concealed themselves.

Not long after midnight on 30 January, shortly after they had occupied Khafji, the Iraqis sent mechanized infantry and tanks across the Saudi border 20 miles northwest of the town. A Marine LAI battalion supported by USMC, Navy, and USAF tactical air drove them back north of the border. After sunrise, another force of 40 Iraqi tanks crossed the border west of Al Wafrah: it also was engaged and thrown back by a Marine LAI battalion supported by additional tactical air. The Marines destroyed 15 enemy tanks and captured nine EPWs without friendly losses.

In the early afternoon, another Iraqi mechanized infantry battalion was reported at the Saudi border north of Khafji. The Iraqis withdrew north of the border after being attacked by Coalition ground forces and USMC AV-8s, F/A-18s, A-6s, and AH-1Ws, and USAF A-10s.

By the afternoon of 30 January, both sides could claim a measure of success. Whereas the Iraqis had had much the worse of their five engagements with the Coalition on the ground, only one incident had pitted Iraqi forces against Coalition Arabs, and the result was the tactical withdrawal of the Coalition forces and the Iraqi occupation of Khafji. The question was, would the Coalition now attempt to retake the town, risking heavy losses or perhaps failure; or would they concede the geographically insignificant Iraqi gains but thereby leave unresolved the fate of the hidden Marines and offer Iraq a much-needed psychological victory?

The Iraqis learned the Coalition Arabs' decision at 0230 on 31 January, when the counterattack began. With Qatari forces blocking to the north and the 8th Royal Saudi Land Forces (RSLF) Brigade blocking to the south, the 2nd SANG Task Force (TF) engaged the Iraqis, supported by USMC artillery and CAS and naval gunfire. Initially thwarted by the ferocity of the defense, the Coalition Arabs nevertheless redoubled the attack and, after several hours of intense fighting, cleared the town. An hour

after Khafji was declared liberated, the 2nd SANG TF engaged the remaining enemy tank forces seven miles to the north, taking 160 EPWs. They proceeded to eliminate the remaining pockets of resistance around Khafji, and, as the afternoon of 31 January ended, the last Iraqi forces withdrew across the Kuwaiti border. The JFC-E repulsed an Iraqi company-size armor attack on 2 February in the vicinity of Khafji, ending the episode.

Saddam Hussein's purpose in attacking Khafji is not known for certain. He may have sought to probe Coalition forces or provoke the ground battle he had repeatedly said he wanted. Although Iraqi forces were able to mount the probing attack, their effort had three major consequences, all beneficial to the Coalition. First, it exposed the limitations of the Iraqi ground forces and confirmed their vulnerability to Coalition tactics. Second, it catapulted the morale and self-confidence of the Arab forces, who had heard much about the invincibility of the war-hardened Iraqis. Finally, the incident erased any misperception there may have been on the part of the other Coalition members as to the quality of the Arab troops. In the words of a young USMC officer eyewitness, "Because we train differently and because our methods are not the same, many Marines initially questioned the effectiveness of the Saudi and Qatari soldiers. At Khafji, without any but the most rudimentary plan, Arab soldiers conducted a night counter-attack against enemy armor with just this guidance: 'Attack Khafji.' And they did – without question or hesitation. Some 19 were killed and 36 wounded, some terribly. Khafji put to rest any doubt about the courage, decisiveness, aggressiveness or willingness to obey their orders and earned them the respect reserved for the best amongst us."

The Ground Offensive

Besides the defense and recapture of Khafji, the highlights of the Coalition ground operations were the Arab assault on Iraqi concentrations in Kuwait culminating in the liberation of Kuwait City, the 1st UK Armoured Division's participation in the main attack, and the 6th French Light Armor Division's seizure of objectives in Iraq. These Coalition ground forces, in conjunction with the US, produced the necessary combat power for an attack across a wide front that achieved all objectives swiftly with minimum casualties. The UK and French forces operated as part of VII Corps and XVIII Airborne Corps respectively, and the account of their operations is covered in Volume II, Chapter VIII.

Final preparation for offensive operations began on D-Day when the Coalition was confident that Iraq would be unable to observe forces moving to attack positions or to determine the location of the main attack. To clear their area for movement of the VII Corps, JFC-N forces moved to their attack positions, and were in place by 21 January.

Coalition forces for the ground offensive were arrayed from left to right (west to east) in five major formations. On the left flank was the XVIII Airborne Corps including the 6th French Armored Division. To the right of XVIII Airborne Corps was the VII Corps which included the 1st UK Armoured Division. In the center was JFC-N which consisted of the 3rd Egyptian Mechanized Division, 4th Egyptian Armoured Division, an Egyptian Ranger Regiment, 9th Syrian Armored Division, a composite Syrian Commando Regiment, and a consolidated unit under Saudi command called Task Force Khalid made up of the 20th Mechanized Brigade (RSLF), the Kuwaiti Shaheed and Al-Tahrir Brigades, and 4th Saudi Armored Brigade. Also under JFC-N was Forward Forces Command 'Ar'Ar, a blocking force west of Rahfa comprising three Saudi battalions and the 7th Pakistani Armored Brigade. On the right of JFC-N was the I Marine Expeditionary Force (MEF). On the extreme right flank was JFC-E made up of three task forces. TF Omar was composed of the 10th Infantry Brigade (RSLF), UAE Motorized Infantry Battalion, and an Omani Motorized Infantry Battalion. The second task force, TF Othman, consisted of the 8th Mechanized Infantry Brigade (RSLF), Bahrain Infantry Company, and Kuwaiti Al-Fatah Brigade. The final task force, Abu Bakr, comprised the 2nd SANG Motorized Infantry Brigade and a Mechanized Battalion from Qatar. Figure I-5, below, shows the disposition of Coalition ground forces on G-Day.

At 0400, 24 February (G-Day), the ground offensive to eject Iraq from Kuwait began. In the east, JFC-E cut six lanes through the first obstacle and began moving at 0800. It secured its initial objectives and continued north, capturing large numbers of Iraqis as it went. The high rate of advance of JFC-E and US units enabled the theater commanders to accelerate the time table for initiating the attack by the remainder of the force. When this had been done, the Egyptians in JFC-N also attacked on 24 February, about 1500. The Egyptian preparatory attack caused the Iraqis to light their fire trenches and give away their artillery positions, and destroyed the Iraqi security force. On the morning of 25 February, the 3rd Egyptian Mechanized Division launched a successful main attack through fire trenches, minefields, and harassing fire. The Egyptians, concerned about an Iraqi armored counterattack, established blocking positions in sector.

On G + 1 (25 February), Coalition forces continued to press the attack (see Figure I-6, below). The JFC-E secured its objectives against light resistance and with very few casualties; however, by this point, progress was slowed by the large number of Iraqis who had surrendered. In the center, JFC-N continued to attack together with VII Corps. The 3rd Egyptian Mechanized Division continued its attack to the north and captured 1,500 EPWs and two tanks. Other units, including the 9th Syrian Armored Division, prepared to follow.

During this period, the massive exodus of Iraqi forces from the eastern part of the theater began. Elements of the Iraqi III Corps, commanded by one of the best Iraqi field commanders, were pushed back in Kuwait City by JFC-E and I MEF. Iraqi units became intermingled and disorder ensued. These forces were joined by Iraqi occupation troops based in Kuwait City. During the early morning hours of 26 February, military and civilian vehicles of every description, loaded with Iraqi soldiers and goods looted from Kuwait, clogged the main four-lane highway north from

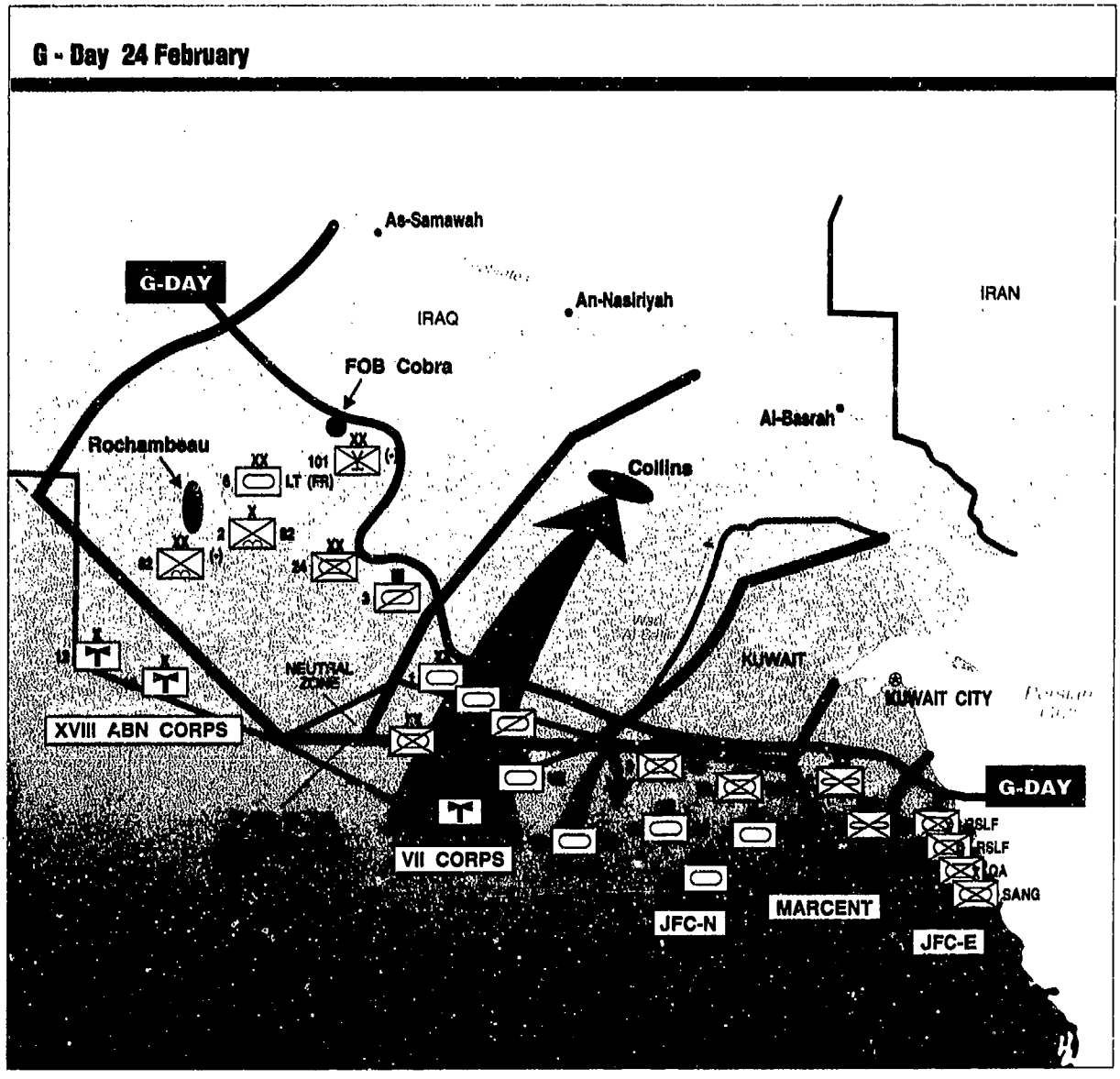


Figure I-5
Coalition Disposition, G-Day

Kuwait City. To deny Iraqi commanders the opportunity to reorganize their forces and establish a cohesive defensive line, the Coalition struck these forces repeatedly from the air.

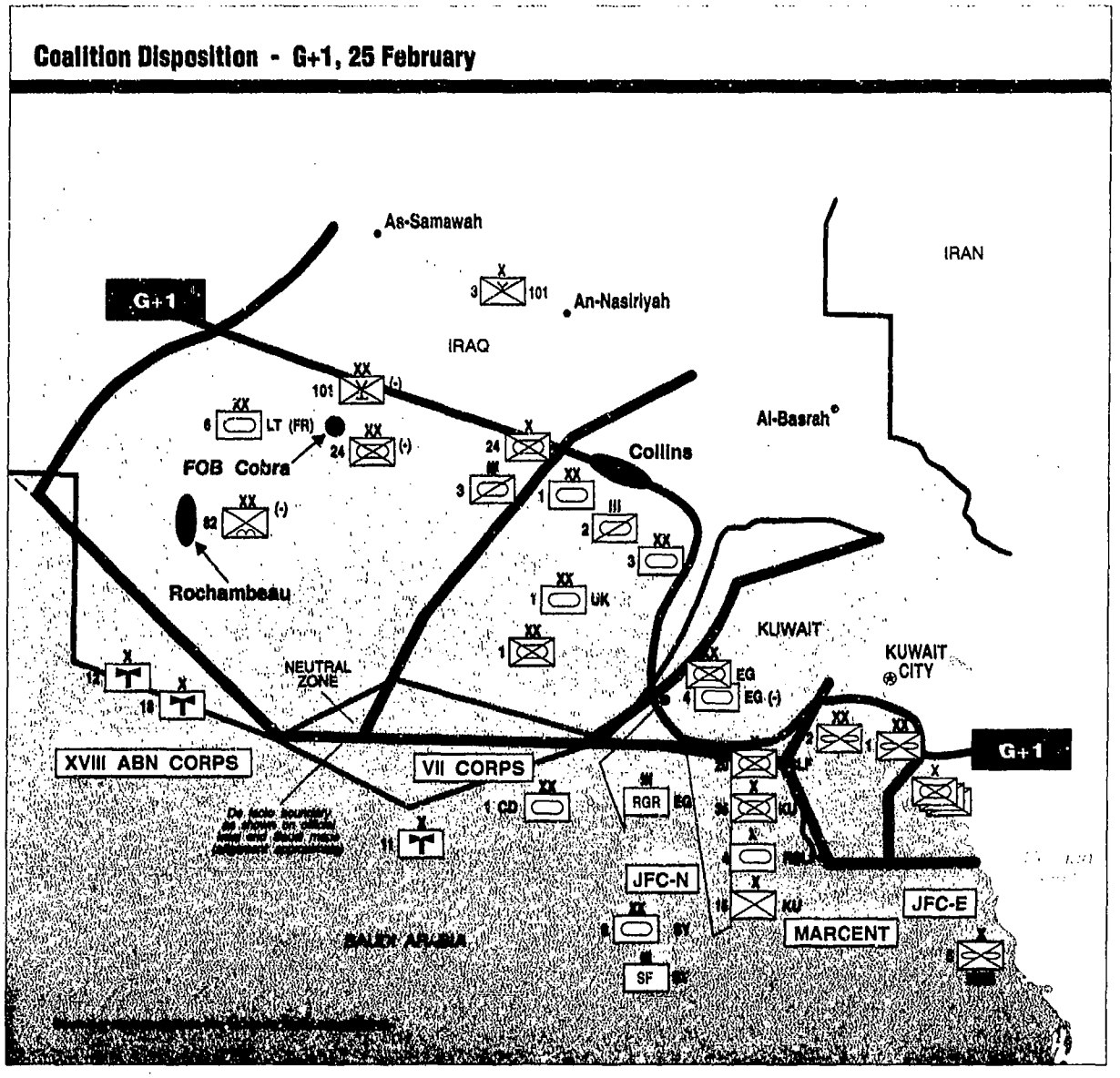


Figure I-6
Coalition Disposition, G + 1

Coalition forces continued operations well ahead of schedule on G + 2 (26 February), meeting generally light resistance, although there were several sharp engagements. The JFC-E was so successful that its boundary was changed twice, and it was given four additional objectives. By day's end, units of the JFC-E, which was

composed of forces from each GCC nation, were positioned to lead a drive into Kuwait City. Figure I-7, below, shows the disposition of forces on G + 2.

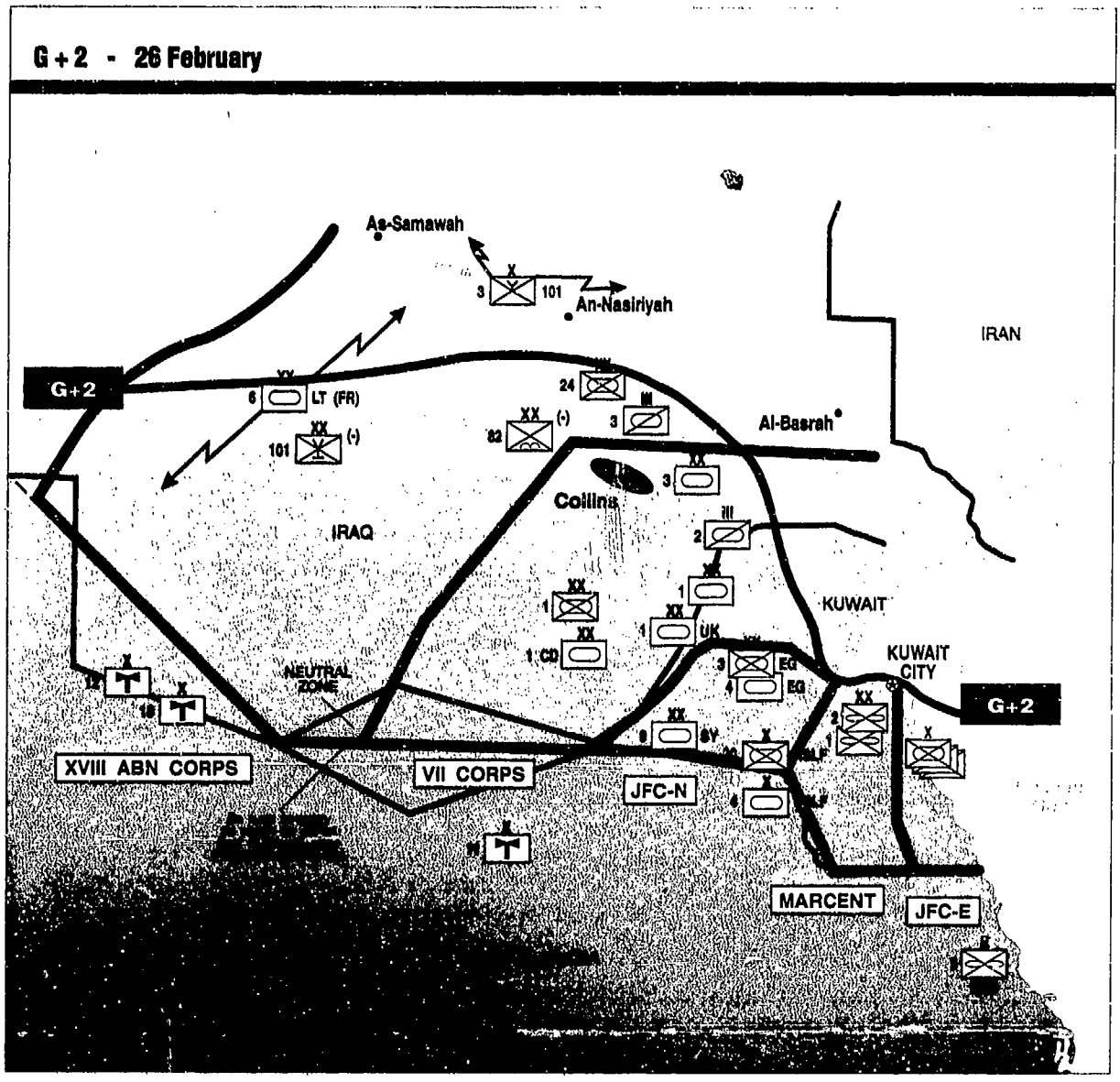


Figure I-7
Coalition Disposition, G + 2

Meanwhile in the center of the front, the JFC-N continued to attack, seizing intermediate and final objectives before evening. The Egyptian Corps secured its objective in the vicinity of Al Abraq, and then turned east and maneuvered 60 kilometers to seize 'Ali Al-Salim airfield.

Exploitation and pursuit continued through G + 3 (27 February) against rapidly disintegrating resistance. The JFC-E consolidated its position in southern Kuwait City and coordinated a link-up with JFC-N forces which were preparing to enter Kuwait City from the west.

The Liberation of Kuwait City

The Coalition leadership desired that Kuwait forces alone should clear and secure Kuwait City. To accommodate this preference and to provide for the worst case, planning for this operation provided for two contingencies. The first was that Iraq would defend Kuwait City as a means of prolonging the war and inflicting heavy casualties. In this case, Coalition forces would conduct a siege of the city for an unspecified time followed by an operation conducted by Arab forces to secure and clear the Iraqis from the built-up areas. Planners envisioned the length of the siege would be influenced by the condition of the population, the level of Iraqi resistance, and the length of time required to deploy Arab forces to their siege positions around the city after they had secured and cleared their zones outside the populated areas. It was assumed that clearing and securing of the zones outside the city would be required to neutralize Iraqi forces bypassed during the initial armor attack and advance.

The Kuwait Army Commander felt the Iraqis would not stand and fight in the populated areas. Accordingly, a second variation of the plan provided for relief of the city by Kuwaiti forces with provision for reinforcement by other Arab forces if the Kuwaitis ran into heavier resistance than they had expected.

A brigade-size force from JFC-N approached from the west and prepared to occupy the western part of Kuwait City. Forward elements of JFC-E, approaching from the south, linked up with JFC-N and prepared to occupy the eastern part of the city.

As events unfolded on the battlefield, the Kuwaiti Commander's prediction proved correct, the Iraqis fled the populated areas, and the Kuwaitis were able to secure and clear Kuwait City with minimal assistance from other Arab forces. They completed this operation with a degree of pride and emotion to be expected from an army of liberation freeing its people from the grip of a long and brutal occupation.

As a footnote to this story, 45 Marines served with JFC-E forces, providing liaison with I MEF; and 1st and 2nd Air/Naval Gunfire Liaison Companies coordinated air,

artillery, and naval gunfire. Also, at the request of Kuwait's Army commander, Special Forces had been operating with the Kuwaitis extensively, as they had with other NCP forces, since August. SOF assisted with C2 and performed foreign internal defense with Kuwait's forces. Foreign internal defense involves training friendly security forces in basic skills and small unit tactics. Appendix J gives more details of SOF operations.

On G + 4 (28 February), Coalition offensive operations were suspended, Iraq having been ejected from Kuwait.

> ***"A last important lesson is that what we have seen this week is not an Arab defeat. On the contrary -- it is a resounding Arab victory. The Arab League roundly condemned the invasion of Kuwait. Troops from nine Arab countries, representing more than half the world's Arab population, participated in coalition operations. Arab armies and air forces performed superbly in this conflict and played a leading role in the liberation of Kuwait."***
>
> **Paul Wolfowitz**
> **Under Secretary of Defense for Policy**

Outside the Gulf Region

Host nations met extensive specific US support requests, just as the US met host nation and NATO requests. This interactive support of the NCPs in Europe resulted in large part from the cooperative planning done for many years within NATO. Long time relationships with host nation personnel and organizations were invaluable in obtaining support. Officials in various military branches knew their counterparts personally, as well as their administrative organizations, and their regulations. Although its charter prevented NATO from participating directly in Operations Desert Shield and Desert Storm, the familiarity of US forces with the European NCPs and vice versa measurably increased support for Coalition operations in SWA.

Host Nation Support By NCPs

During the offensive phase of Operation Desert Shield and Desert Storm, the Germans supported 73 road convoys of 25 to 30 vehicles each on the autobahns with road march authorizations and rest and overnight facilities. Although there had been similar road and rail support during exercises in the past, never had such an extensive demand been levied at such short notice, with such unusual conditions (e.g., vehicles loaded with ammunition on trains), and in such a concentrated period of time. The German rail system (Deutsches Bundesbahn) already was severely taxed by seasonal requirements but, despite the considerable hardships incurred by many Germans during the Christmas holidays, VII Corps was given adequate priority and all of its equipment was at the sea port of embarkation (SPOE) 42 days after the Phase II deployment order was issued.

Another example of a movement requirement met in an unprecedented manner by several NCPs (Germany, the Netherlands, the UK, and Italy) was the loading of nearly 300,000 short tons of ammunition through seven SPOEs; several of the ports used had been excluded from supporting any ammunition movements in the past and net explosive weight limits frequently were raised or waived to expedite the movements. Nearly as much ammunition to sustain SWA operations came through European ports as from CONUS.

A unique capability of the German forces which the US required on a priority basis was the Fuchs NBC reconnaissance vehicle. This is a six-wheeled, amphibious, armored vehicle equipped with sensors that detect and identify all known chemical warfare agents and measure radioactive contamination. Germany responded by providing 60 Fuchs vehicles: 50 supported the Army and 10 the USMC. In the important area of HETs, the Coalition acquired 181 from the Germans which had formerly been used by East Germany.

Additionally, the NCPs in Europe supported the Coalition with significant amounts of money; especially noteworthy was Germany. NATO also augmented theater tactical airlift. Nine countries provided more than 800 aircraft sorties within Europe to help the US move high priority cargo and personnel, which would have remained backlogged while waiting for US aircraft. The six C-160 transports Germany made available flew nearly 3,400 hours carrying US requirements within EUCOM.

Most importantly, the host nations provided security. The terrorist threat, which was extremely high throughout Europe and even higher in Turkey, lasted longer than ever before. The host nations provided security at facilities and installations, to deploying units both at ports and while enroute within their country, and to the otherwise unguarded family housing areas where dependents of deploying soldiers remained. A new HNS agreement strictly for security was executed with German authorities. There were no terrorist incidents and the large number of demonstrations were mostly peaceful. The extent to which the host

nations' security efforts were responsible for that welcome situation cannot be determined, but the cooperation and support were unstinting.

Especially within Germany, where the dependents of deployed US soldiers remained in place rather than relocate to CONUS, host nation communities, organizations, and individuals supported US families generously. Some assistance was specifically requested by the United States; however, much was volunteered at the hosts' initiative, including free transportation, tours, food, facility access, and in many cases gifts of money.

Overflight and landing rights and other access continued to be an invaluable contribution to US deployments, originating in both CONUS and Europe. Sixteen countries in Europe provided enroute staging support at 90 airfields as the buildup accelerated. (As a matter of interest, Greece made bases available for the US to operate aircraft bound for Turkey.) More than 95 percent of the flights to SWA staged through Europe, and consisted of about 2,200 tactical, and 15,402 strategic airlift (including 3,142 CRAF) sorties. Additionally, tanker aircraft operated from 10 airbases in seven countries (France, Greece, Italy, Portugal, Spain, Turkey, and the UK).

B-52s conducted combat operations from Britain and Saudi Arabia to strike targets in Iraq; and similar B-52 operations were conducted from Moron, Spain, which was without precedent. Turkey provided bases for the US Joint Task Force Proven Force to conduct tactical air combat into Iraq, as well as the deployment of the Allied Command Europe Mobile Force (Air). Although not all European NCPs deployed forces into SWA, in other ways each supported the overall Coalition mission.

NATO Activities

NATO expanded its support during Phase II. The Defense Planning Committee and the Military Committee maintained NATO at an increased alert status, with a total of 43 measures ultimately activated to respond to threats from Saddam Hussein – by far the most extensive use of the NATO alert system since its inception.

Within the Mediterranean area, a NATO Communications Information System Network linked the surface ships, NAEW, and controlling commands using satellite communications to exchange radar and other C2 and threat information. The Allied Command Europe Mobile Force (Air) of 60 aircraft (Alpha Jets, Mirage, RF-104, F-15, E-3A) and air defense units (Patriot, I-Hawk, and Roland) from Belgium, Germany, Italy, the Netherlands, Turkey, and the United States, and NATO AWACS operated at five Turkish bases as a deterrent, flying more than 1,600 air sorties in all. Finally, Supreme Headquarters Allied Powers Europe (SHAPE) headquarters became actively involved in the theater airlift process by activating an airlift cell which matched

requirements of the various nations in Europe with assets made available by Belgium, Germany, and others.

Eastern European Countries

The support initiated during the defensive phase increased in the offensive phase. The Eastern European countries approved overflight rights and made available specific equipment urgently needed in SWA. In addition, Czechoslovakia sold 40 HETs to the US, which reflected the significant changes then taking place in Eastern Europe's relations with the West. These HETs proved invaluable not only in moving heavy equipment from ports of entry to staging areas, but in the long offensive drive into Iraq as well. Czechoslovakia also provided chemical detection and analysis equipment along with trained operators. Hungary, Romania, and Poland sent medical teams to Saudi Arabia.

Pacific and Indian Ocean Area

Throughout this period PACOM continued to coordinate support across a wide spectrum, ranging from military units such as Canadian and Australian Navy ships, to funding like that pledged by Korea and Japan, to the overflight rights granted by numerous Coalition friends. South Korea deployed C-130 airlift assets and a medical team to SWA, while Australia, New Zealand, the Philippines, and Singapore provided additional medical support.

Supporting US CINCs

The unified and specified commands expanded their support to CENTCOM during both the second phase of Operations Desert Shield and Desert Storm. For example, major force units were deployed forward from EUCOM. As a measure of that effort, some 40 percent of Army personnel stationed in Europe, 16 percent of USAF personnel (but 54 percent of the aircraft), and 38 percent of naval personnel deployed from Europe to SWA, along with approximately 292,000 short tons of ammunition of all Services. Training facilities in Europe were used to receive nearly 5,000 Army Individual Ready Reserves, train them on combat vehicles, and deploy them to SWA as replacement crews. Other EUCOM support in this period included the establishment of Operation Proven Force in Turkey, consisting of 6,000 US personnel and more than 120 aircraft of 13 types deployed to Incirlik Air Base. Approximately 4,400 sorties were flown, striking 120 targets in Iraq and downing five Iraqi aircraft.

In a similar fashion, the other CINCs, and the individual Services and Defense Agencies as well, continued their support with the result that the US force in theater was essentially doubled from Phase I. In addition to the earlier and continuing deployment and sustainment activities of EUCOM, PACOM, LANTCOM, TRANSCOM, and FORSCOM was the support by SAC. The SAC tanker services for the deploying strategic and tactical aircraft were essential to maintain the flow to SWA, and, once the war started, SAC provided CINCCENT with B-52 bombers to expand his conventional bombing capability. Finally, Commander-in-Chief, US Space Command supported CENTCOM. US Space Command (SPACECOM) crews called Scud warnings directly into CENTCOM Headquarters, and SPACECOM personnel operated the Global Positioning System and weather satellites to enhance coverage over the KTO in direct support of air, ground, and naval operations.

Direct US support to the European NCPs increased significantly in Phase II and fell into three principal areas: airlift (C-5 sorties, for example, to lift Dutch Patriots into Turkey); C3 capabilities to help establish key networks linked with UHF satellites and to provide secure communication facilities at the most senior national levels as well as at operational locations; and intelligence support for the national leadership. US support to deploying UK forces included 3,000 Multiple Launch Tocket System (MLRS) pods, 20,000 M82 primers, and 150 M548A1 tracked ammunition carriers as well as miscellaneous C3 equipment and transportation support. France received C3 equipment and intelligence support. Turkey received 200 AIM-9M missiles and significant C3 equipment. Italy received air refueling services. NATO (SHAPE, Allied Forces Southern Europe, and 6th Allied Tactical Air Force, for example) received extensive C3 equipment (primarily for secure communications), other equipment such as night vision goggles, and extensive intelligence support.

In addition to its support for members of the Coalition, the TF Patriot Defender deployment into Israel was conducted at very short notice (less than 29 hours from alert in Germany to initial operational capability in Israel) and resulted in 13 known Scuds destroyed.

Summary

The stunning success of the Coalition forces on the ground and in the air during the offensive phase of Operation Desert Shield and Desert Storm owed a great deal to the combined planning process, the willingness of the partners to incorporate one another's political requirements into military arrangements, the deconflicting influence of the ATO in the air and the liaison teams on the ground, the opportunity to prepare for the assault, and of course the courage and determination of the individual service members of all nationalities who adapted to each other so harmoniously and fought together so bravely.

As the Coalition changed its mission from defense to offense, the mutual support provided outside the Gulf Region increased significantly. Demands were heavy, and support was provided willingly and often before it was requested.

Arrangements for Enemy Prisoners of War

Coalition commanders anticipated the capture, confinement, and support of up to 100,000 Iraqi EPWs, and began discussions early with Saudi Arabia to arrange for HNS, detention, and repatriation assistance.

US policy requires that a formal international agreement be concluded as a prerequisite to transferring EPWs to a coalition partner for custody. Intensive US and Saudi effort through December bore fruit when an agreement was signed in early January. Arrangements made with Saudi Arabia provided that custody of EPWs would be transferred by the United States to the Saudis after registration of EPWs by US forces.

The effort to construct, staff, and organize the EPW system was another logistical feat achieved through the combined efforts of the United States and Saudi Arabia. Both partners worked to ensure their respective camps, which were inspected by the International Committee of the Red Cross, met international standards. The Saudis intended to establish model EPW camps where, as hosts, they desired that Iraqis would be treated as guests in the Arab custom. It was a Coalition objective that Iraqis would have much better conditions as EPWs than as soldiers in the Iraqi army, a theme conveyed to the Iraqi soldiers as psychological warfare prior to the ground war. Efforts to prepare for a large number of EPWs were rewarded when more than 85,000 arrived.

Expeditious repatriation of EPWs became a high Coalition priority when offensive operations were suspended. Coalition officials initiated talks on EPW exchanges with Iraq's representatives. Iraq said it was anxious to turn over Coalition prisoners of war but was unwilling to accept large numbers of Iraqi EPWs in return. While most Iraqis accepted repatriation, some exercised their right not to return to Iraq and they still are being cared for by the Saudis.

OBSERVATIONS

Accomplishments

- Coalition was perhaps the most successful in history.
- Coalition reduced length of conflict and friendly casualties.
- United States emerged as the logical leader of future coalitions in Gulf and probably elsewhere.
- NATO experience was invaluable for coordinating warfighting, C3I, and logistics.
- Out of area operations with NATO members are enhanced by NATO experience.
- Forty years of Gulf presence and, in particular, US performance in Operation Earnest Will paid off in willingness of GCC to trust the United States.
- US military personnel demonstrated outstanding professionalism in adapting to the Islamic culture.
- The US FMS system provided Saudi military infrastructure, US origin equipment and training for most of our regional partners, and contributed importantly to the foundation of peacetime cooperation and interoperability on which the Coalition was built.

Shortcomings

- Present strategic airlift and sealift assets are inadequate to move enough coalition people and materiel far and fast enough to cover some possible contingencies.
- Combined forces C3 is still rudimentary, IFF is inadequate.

Issues

- US needs to cultivate global network of regional partnerships as basis for forming coalitions during crises.
- Next time, there might not be such a long period to develop a coalition.

- Need for right mix of forces and equipment early implies rapid mobility and prepositioning.
- Organization of coalitions must reflect political as well as military requirements.
- Security assistance programs have excellent potential for inexpensive coalition building in advance (e.g. international military education and training, service school exchanges, English language training, mobile training teams, etc.).
- Acquisition of US equipment by coalition states promotes interoperability.
- Combined exercises are invaluable to effective coalition operations.

APPENDIX J

SPECIAL OPERATIONS FORCES

"The Special Forces made an invaluable contribution. I have my own special operations command, SOCCENT, Special Operations Command, CENTCOM. They were the very first...to be deployed. As you know, the overall SOCOM responsibility is to raise, train, and equip the Special Operations Forces, and then the employment of the Special Operations Forces falls to the theater commander through his component commander."

General H. Norman Schwarzkopf
Commander-in-Chief
Central Command

INTRODUCTION

Four days after President Bush's announcement that US forces would deploy to the Persian Gulf, Special Operations Forces (SOF) were on the ground in Saudi Arabia. Constituting only a small percentage of the total forces deployed into Southwest Asia (SWA), SOF played a unique and important role in Operations Desert Shield and Desert Storm. This was the largest SOF deployment and the largest integrated use in history of Special Operations units in one geographical region.

Virtually every aspect of the wide range of specialized SOF capabilities and skills was tested. Many missions were directed at high value and often perishable targets at great distances from established support bases. These required sophisticated communications and rapid long range transports. Other invaluable accomplishments included training and assistance for Coalition forces, special reconnaissance (SR), and personnel recovery operations. Throughout, SOF did not operate independently, but were fully integrated in every stage of planning and executing the theater campaign. They operated with conventional forces as part of the combined arms team.

This appendix focuses on the SOF organization and capabilities deployed to the Gulf and details many of the operations they carried out during Operations Desert Shield and Desert Storm.

COMMAND AND CONTROL RELATIONSHIPS

During Operation Desert Shield, SOF operated under a command relationship begun with the passage of the Cohen-Nunn Amendment to the Goldwater-Nichols Defense Reorganization Act of 1986 (GNA). This amendment created the Special Operations Command (SOCOM). Before SOCOM's creation, SOF was the responsibility of the US Readiness Command (REDCOM), the Services, and the Joint Staff (JS). The establishment of SOCOM as a unified command was designed to improve operational capability and give joint focus to Special Operations.

As prescribed in Title 10, USC Section 167, all SOF based in the Continental United States (CONUS), to include Army and Air Force Psychological Operations (PSYOP) and Army Civil Affairs (CA), are assigned to CINCSOC, who exercises Combatant Command (COCOM) of these forces. Before deployment of SOF assets, CINCSOC exercises operational control (OPCON) through subordinate joint functional commands or Service components. CINCSOC usually provides SOF to other regional commanders-in-chief who, in turn, assume COCOM of these committed forces. During Operations Desert Shield and Desert Storm, SOF were reassigned to Central Command (CENTCOM), which assumed COCOM. CENTCOM and a sub-unified command, US Special Operations Command, Central (SOCCENT), then assumed OPCON of SOF forces (less PSYOP and CA and Naval Special Warfare (NSW) forces afloat.)

SOCCENT was a joint command with subordinate Army Special Operations Forces Task Force (ARSOTF), the Naval Special Warfare Task Group (NSWTG), and Air Force Special Operations Command Central (AFSOCCENT) and a separate Special Forces Group (SFG). The Service components retained responsibility for administrative and logistical support of their SOF elements. Although SOCCENT was a sub-unified command, it worked with other CENTCOM elements to plan missions and to select areas of operations and targets for SOF missions in Kuwait and Iraq.

SOCCENT deployed to SWA in early August. The command was based temporarily in Riyadh before establishing permanent headquarters at King Fahd International Airport in mid-August. In order to improve operations with forward deployed Coalition forces, SOCCENT later established a forward command center, located with the forward headquarters of 5th SFG, in King Khalid Military City (KKMC). During Operation Desert Storm, SOCCENT also established a forward tactical operations and communications center for combat search and rescue (CSAR) in Al Jouf near the Iraqi-Saudi border. This location improved coordination and communications with SOF aviation assets flying missions into Kuwait and Iraq.

Service SOF elements were integrated into the SOCCENT structure primarily through the command relationship of Operational Control or OPCON. This is the authority delegated to a commander to direct assigned forces to accomplish specific missions or tasks. The relationship relieves the commander of the requirement to provide logistic and administrative support to those elements. This simplifies both

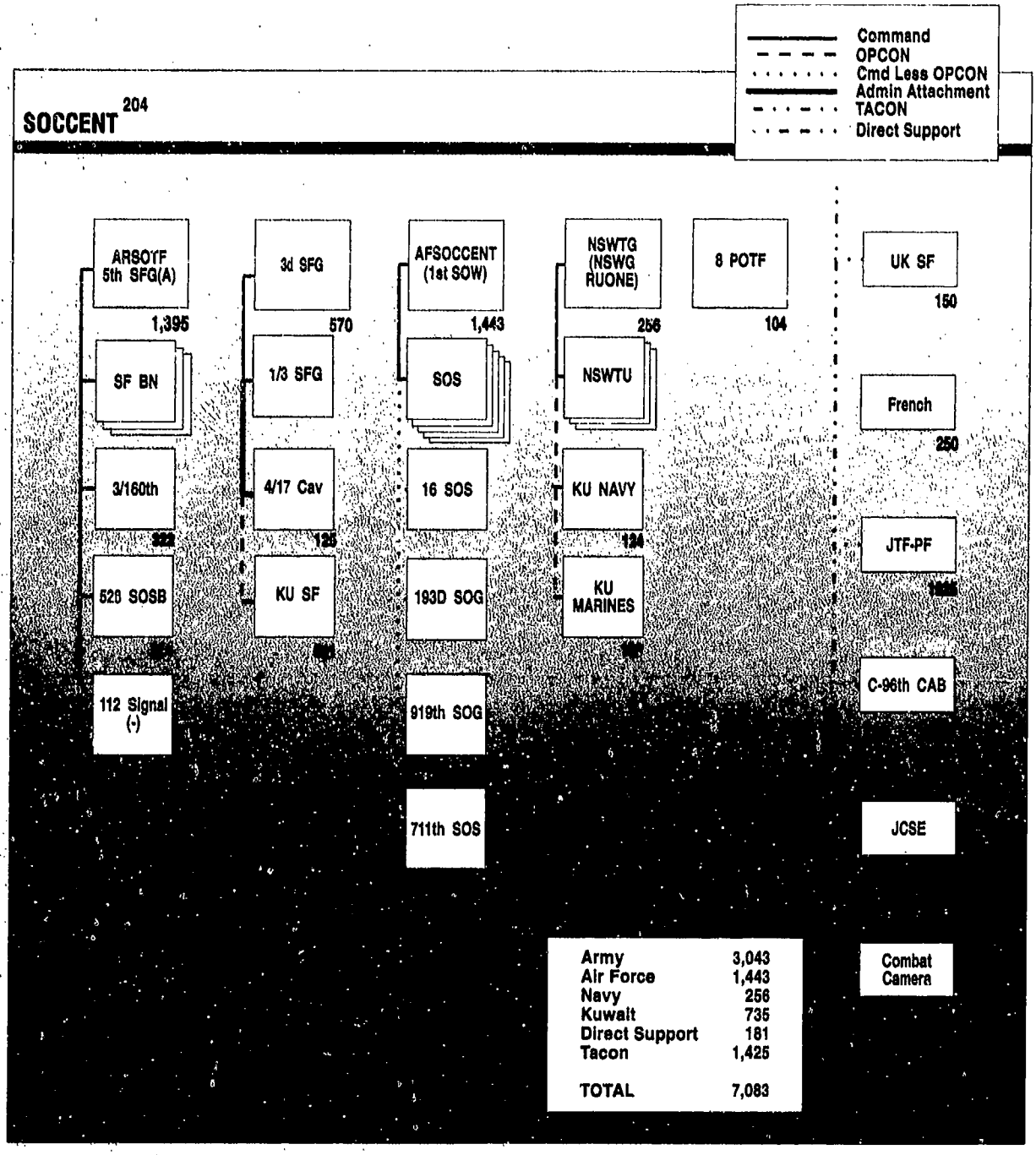


Figure J-1
SOF Command Relationships

the gaining commander's responsibilities and helps to ensure adequate support for operating forces in the most efficient manner possible.

Army forces which were OPCON to SOCCENT included the 3rd Special Forces Group and the Army Special Forces Task Force (ARSOTF) which was comprised primarily of the 5th Special Forces Group and other Army SOF elements.

US FORCES OPCON TO SOCCENT

ARMY

5th Special Forces Group (Abn)
3rd Special Forces Group (Abn)(-)
A Company,10th Special Forces Group (Abn)
TF 3-160 Special Ops Aviation Regiment
4th Squadron, 17th Air Cavalry
528th Special Ops Support Bn
112th Special Ops Signal Bn (-)

NAVY

Naval Special Warfare Group One
SEAL Team One (2 Platoons)
SEAL Team Five (2 Platoons)
Swimmer Delivery Vehicle Team One (1 Platoon)
Special Boat Unit 12 (High Speed Boat Det and Rigid Inflatable Boat Det)
Mobile Communication Team
Naval Special Warfare Development Group (High Speed Boat Det)

AIR FORCE

8th Special Operations Squad (MC-130E)
9th Special Operations Squad (HC-130)
20th Special Operations Squad (MH-53J)
55th Special Operations Squad (MH-60G)
71st Special Operations Squad (HH-3)

Although Civil Affairs (CA) and Psychological Operations (PSYOPs) units are part of the CINCSOC force structure, they were not placed OPCON to SOCCENT. Instead, the 352nd Civil Affairs Command and other civil affairs assets were attached to Army Component Central Command (ARCENT). Psychological Operations units including those in or centered on the 4th Psychological Operations Group, were also attached to ARCENT. The intent was to place these units under the operational control of the units they would support during actual hostilities. Nevertheless, much of the planning for the use of Psyops units was done at CENTCOM.

SOCCENT exercised OPCON of all Naval Special Warfare (NSW) assets except for SEALs assigned to Fleet units. Fleet SEALs were under OPCON of Naval Component, Central Command (NAVCENT) and conducted operations in support of

Maritime Interception Operations (MIO) (A discussion of this support is contained in Chapter IV.). SEALs assigned to SOCCENT were made available to NAVCENT for combat search and rescue (CSAR). NSW, under the operational control of SOCCENT, provided support to NAVCENT, Marine Corps Component, Central Command (MARCENT), as well as SOCCENT.

As an exception to the lines of control described previously, the Air Force Component, Central Command (CENTAF), exercised OPCON of AC-130 gunships from the 16th Special Operations Squadron (SOS), 919th SOS, and EC-130 *Volant Solos* from the 193rd Special Operation Group (SOG) Pennsylvania Air National Guard. These two squadrons directly supported MARCENT and ARCENT forces during the ground operations.

Considerable numbers of SOF forces deployed directly from CONUS, although some NSW elements were afloat with carrier battle groups and Amphibious Ready Groups (ARG) in the Red Sea, Mediterranean Sea, and Persian Gulf. Other SOF deployed to SWA from Europe.

Each Special Operations component assigned to SOCCENT had an intermediate level headquarters in theater to coordinate logistics support for assigned forces with ARCENT. As the theater logistics provider, ARCENT initially was responsible for providing assigned SOF with logistics support for supply, petroleum, oil, and lubricants (POL), ammunition, rations, maintenance, and required base operations functions to the Army. Later this support responsibility was extended to all on-shore SOF.

SOF MISSIONS

CENTCOM's Operation Order (OPORD) 003-90, developed between August and November, stated the following general SOF mission: "USCENTCOM Special Operations Forces will conduct special operations in Kuwait, Iraq, and Northern Saudi Arabia in support of all phases of the USCINCCENT campaign plan." The order was published in December and allowed SOCCENT latitude and flexibility in executing its missions. This general mission statement was applicable throughout Operations Desert Shield and Desert Storm.

From the CENTCOM general mission statement, SOCCENT derived the following tasks:

- Position Special Operations teams and liaison officers (LNO) with forward deployed coalition units in the Eastern Area Command (EAC) and Northern Area Command (NAC) and conduct Foreign Internal Defense (FID) training as required;

- Conduct special reconnaissance (SR) of Iraqi forces from Combined Special Operations Areas (CSOA);

- Coordinate CSOA forces passage through friendly lines with appropriate ground force commanders; and,

- Be prepared to conduct CSAR in Iraq and Kuwait.

Figure J-2
Special Operations Forces are Capable of Conducting a Variety of Missions

When the Operation Desert Shield OPORD was published, the SOCCENT J-3 planning staff began to prepare the next order to support offensive operations. SOCCENT's taskings from CINCCENT for Operation Desert Storm were changed to:

- Conduct CSAR operations in Iraq and Kuwait; and,

- Continue to provide Special Operations LNOs to ensure coordination of coalition warfare activities.

These operational taskings taxed the SOF resources of all Services assigned to SOCCENT. As a result, SOCCENT requested and received one additional battalion from the 3rd SFG and an additional company from the 10th SFG.

Although not specifically included in the tasking, there also was a requirement for direct reconnaissance support to the tactical corps. This mission was implied, however, by the requirement to provide SR missions in Kuwait and Iraq.

"The variety of missions that the Special Operations Forces provided over there was across the entire spectrum of what they are expected to do. First of all, foreign internal defense; they were absolutely magnificent, number one, in training the Coalition forces -- the Arab forces. But number two, probably more importantly, they were right with them during the entire conduct of the war, to act as advisors to control air support, to coordinate gunfire, and that sort of thing. They also did strategic reconnaissance missions. They were very, very effective in their strategic reconnaissance missions."

General H. Norman Schwarzkopf
Commander-in-Chief
Central Command

SOF OPERATIONS DURING OPERATIONS DESERT SHIELD AND DESERT STORM

The tasks listed above represent all facets of SOF doctrinal missions, for which SOF units are trained, equipped, and manned to perform. The following discussion describes how these tasks, categorized by mission areas, were accomplished.

Reconstitution of Kuwaiti Military

A key SF mission was to reconstitute Kuwaiti military capabilities. The intent was to train, advise, and help the Kuwaiti forces and to increase their interoperability for future operations. The reconstitution mission was developed in meetings between COMSOCCENT and the Kuwaiti Armed Forces Chief of Staff. The plan was to train a SF battalion and a commando brigade, organized from former Kuwaiti military personnel at KKMC. The mission was given to the 5th SFG on 11 September; in mid-September, 60 Kuwaitis began a training program conducted by six Special Forces Operational Detachments (SFOD). The program was in four-phases: individual, squad, platoon, and company level. Each phase lasted two weeks. The mission's initial phase was completed by the end of September, with 57 of the initial 60 Kuwaitis successfully meeting training requirements. (The instruction later was modified and 20 students added.)

The mission to reconstitute Kuwaiti military capabilities was expanded to encompass four new Kuwaiti infantry brigades organized at KKMC. Training for these units extended from 26 December 90 to 22 February 91, when the units joined Coalition formations for the ground offensive phase of Operation Desert Storm. A total of 6,357 personnel from the Kuwaiti SF battalion, commando brigade (later

redesignated as the Al-Tahrir Brigade), and the Al-Khulud, Al-Haq, Fatah, and Badr Infantry Brigades were trained. Subjects included weapons training, tactics, staff procedures, law of land warfare, close air support (CAS), forward observer procedures, antiarmor operations, and nuclear, chemical and biological (NBC) defense.

The primary constraint on the training program was the lack of training ammunition and equipment for remnants of the Kuwaiti regular army. Training was suspended from 7 November to 10 December, pending receipt of necessary equipment and supplies. Training continued once additional ammunition and equipment were received.

The reconstitution of the Kuwait Navy began in mid-September. Continuing until commencement of hostilities on 17 January, Naval Special Warfare Task Group Central (NSWTG-CENT) played a key role in preparing the ships *Sawahil*, *Istiqlal*, and *Sambovk* for combat operations. From October through December, NSWTG-CENT SEALs and Special Boat Unit (SBU) personnel trained and equipped the crews of the three ships. Additionally, they helped with maintenance and repair actions, as well as helping establish standard operating procedures on the ships. These ships were later used to support CSAR and other NSW operations.

Coalition Warfare Support

SOF's capabilities, particularly in language skills, cultural orientation, broad tactical and technical expertise, and level of training, allowed them to perform a wide range of missions supporting Coalition forces. Coalition warfare support missions were assigned to SOCCENT who, in turn, tasked Army Special Forces (SF) and SEALs.

Shortly after arriving in country, NSWTG-CENT was directed to train Royal Saudi forces in the EAC. For three weeks, a 20-man SEAL element worked with the Saudis and taught not only CAS, but also small-unit tactics and weapons. The SEALs were relieved by the 5th SFG on 7 September. These combined teams provided surveillance and early warning along borders out to the neutral zone, providing security as VII Corps and XVIII Airborne Corps forces deployed west. A SEAL platoon with units from the Royal Saudi Naval Forces (RSNF) conducted border surveillance in the coastal area near the Al-Khalij border station north of Ras Al-Khafji from 14 October 90 to 29 January 91. They withdrew only after Iraqi armored forces attacked through their positions enroute to Ras Al-Khafji.

SOCCENT also provided specifically tailored SF Coordination and Training Teams to work with Coalition partners. Initially, the mission was limited to support of the Royal Saudi Land Forces (RSLF) and the Saudi Arabian National Guard (SANG). However, as forces from Egypt, Syria, Oman, Morocco, Bahrain, the United Arab Emirates (UAE), and Qatar arrived in Saudi Arabia, they also sought US training and

support assistance. Eventually, 109 SF Coordination and Training Teams (CTT) were created. SF CTT also were later sent to French forces.

Included in the Coalition training was an exercise that had a significant impact not only on current readiness, but on future training programs as well. A Combined Arms Live Fire Exercise (CALFEX) was conducted by elements of the RSLF and ARCENT. SOF teams trained with elements of the RSLF and acted as facilitators for the exercise.

The integration of the non-US Coalition members with US forces was improved by the use of Army SF teams, which linked the CENTCOM maneuver planning staff and the Arab-Islamic units. Regularly scheduled situation reports were passed by SOF liaison teams through the US chain of command to CENTCOM. Islamic forces provided activity reports to the Saudis, occasionally a time-consuming process; Army SF liaison teams provided the theater commander a more expeditious means of acquiring information about forces locations, status, and capabilities. These teams also provided coordination between adjacent Coalition forces, which helped in command and control, and did much to prevent casualties from the fire of friendly forces. Additionally, they passed support requests when needed.

Figure J-3
SOF Teams Trained Coalition Forces

Another Army Special Forces team task was to help conduct realistic training. The teams built replicas of objectives and worked with commanders to rehearse attack plans. Rehearsals developed confidence among soldiers. Some examples of

training include instructing the Royal Saudi Land Forces (RSLF) general purpose forces in CAS, naval gunfire support (NGFS) and fire support coordination. The 1st Battalion, 5th SFG and a SEAL platoon also trained Royal Saudi Naval Forces (RSNF) and Marines in small unit tactics, diving operations, air operations, demolitions, weapons, mission planning, and high-speed boat operations.

Overall Coalition warfare support was a success and attests to SOF's ability to integrate those Coalition units into the overall theater plan. Arab forces were effectively integrated into the command and control, communications and intelligence structure of the joint forces. However, two shortcomings warrant mention and subsequent review. First, overall language proficiency skills and the number of language-trained SOF personnel was insufficient to meet Coalition warfare support requirements. Secondly, because SOF operations normally emphasize smaller unit skills and unconventional warfare, some liaison teams had limited experience and training in larger unit (battalion level and higher) operations. Consequently, advice and assistance in mobile armored warfare and employment was limited. Battalion and brigade level combined arms operations and doctrine should be a part of SOF training programs and professional development.

Special Reconnaissance (SR)

SOF conducted SR missions throughout Operations Desert Shield and Desert Storm. SR operations are reconnaissance and surveillance actions to obtain or verify, by visual observation or other collection methods, information about enemy capabilities, intentions, and activities, or to gather data about the meteorological, hydrographic, or geographic characteristics of a particular area. SR missions complemented national and theater intelligence collection assets through border reconnaissance and deep penetration missions to obtain specific, time-sensitive information of strategic and tactical significance.

NSW units conducted security missions along the Kuwaiti coast from 23 August to 12 September. Navy SEALs and Navy SBU detachments conducted nightly patrols off Al-Jubayl Harbor while Marine Corps (USMC) maritime pre-positioned ships (MPS) unloaded. Beginning in October, SEAL platoons maintained a continual presence north of Ras Al-Khafji. These platoons provided real-time intelligence and coordinated close air support. For example, in late January, SEALs photographed the Iraqi minelayer, T-43, while it was actively laying mines in Kuwaiti territorial waters. Additionally, four hours after Coalition air strikes began on 17 January, SEALs called in CAS and destroyed the Iraqi border station, 400 yards north of the Saudi-Kuwait border.

When the offensive began, NSW units conducted 11 SR missions onto the Kuwaiti beaches and north of Al- Khafji. A SEAL platoon, north of Ras Al-Khafji, was directly involved in the battle for Al-Khafji. As Iraqi forces prepared to move

south, the SEALs called in CAS. The unit remained in position on the border, providing real-time intelligence on Iraqi troop and vehicular movement until they were forced out by enemy fire.

SR operations were not limited to the Kuwait-Saudi-Iraq border and along the coast of Kuwait; missions also were conducted farther north and deep into Kuwait and Iraq during the offensive. Extensive planning for these missions began in early January. SOCCENT forces conducted 12 SR missions during Operation Desert Storm; in these deep reconnaissance missions, some Army SF operated for lengthy periods behind enemy lines -- one team had spent 60 hours behind enemy lines by the time the cease fire was declared.

NSW units continued to patrol the coastal areas as the offensive began, providing valuable intelligence on enemy coastal defenses while increasing Iraqi concerns about amphibious landings.

During the same period, Army SF performed SR missions to support XVIII Airborne Corps and VII Corps. Army SF teams provided essential information to ground tactical commanders during the final ground offensive preparations. This information included analyzing soil conditions to determine whether it would permit passage of heavy armored vehicles.

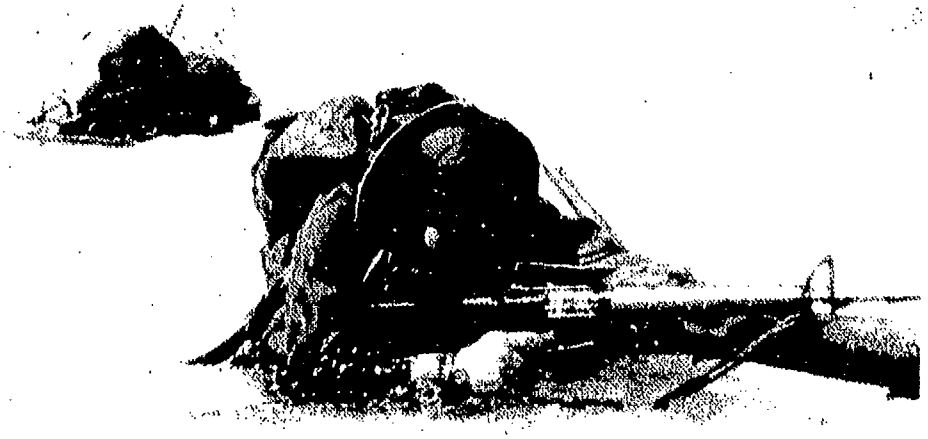


Figure J-4
SOF Elements Conducted Special Reconnaissance Operations Along the Kuwaiti Coast

Figure J-5
SOF Helicopters Conducted Aerial Reconnaissance of Key Areas

Additionally, SOF aircraft also conducted aerial reconnaissance and photographic missions of the Mina Al-Ahmadi oil terminal after Iraq released oil into the Persian Gulf. Using both USAF and Army MH-60 aircraft, NSWTG SEALs and photographers from the combat camera detachment conducted aerial reconnaissance. These missions documented the extent of contamination from the oil spill and verified the success of Coalition airstrikes in stopping the oil flow.

Direct Action (DA) Missions

DA missions include raids, ambushes, or other assault tactics. These missions may involve placement of munitions and other devices and conduct of standoff attacks by coordinating fire from air, ground, or maritime fire support platforms. SOF forces planned for, but did not conduct any DA missions during Operation Desert Shield; however, several DA missions were conducted during Operation Desert Storm.

In the planning for Operation Desert Storm, SOCCENT was given the mission of destroying two key Iraqi early warning radar sites near the Saudi-Iraqi border. Destruction of these sites facilitated Coalition air strikes at the start of the air

campaign deep into Iraqi territory. SOCCENT developed a plan which coupled the firepower of the AH-64 Apache with the long range navigational capability of the MH-53 Pave Low helicopter. The MH-53s led the AH-64s to a point approximately 10 kilometers from the radar sites 22 minutes prior to H-Hour. The AH-64s then destroyed the radar sites with Hellfire missiles and 30 mm cannon fire.

In addition to the opening attack on the Iraqi radar sites, SOF aircraft were also involved in other DA missions. The MC-130E *Combat Talon*, was selected to support operations to breach Iraqi minefields and reduce obstacles facing the Coalition forces. BLU-82s, powerful 15,000-pound bombs supported counter-obstacle operations, PSYOP operations, and targeted enemy command and control (C2) headquarters during the early phase of Operation Desert Storm. Five of these missions dropped 11 BLU-82s on nine different Iraqi positions, including Faylaka Island. Although there were mixed reports of the effectiveness of the bombs against minefields, a collateral result was psychological intimidation and degradation of morale in the targeted units. Numerous Iraqi EPWs cited these bombs as significant factors in their decision to surrender.

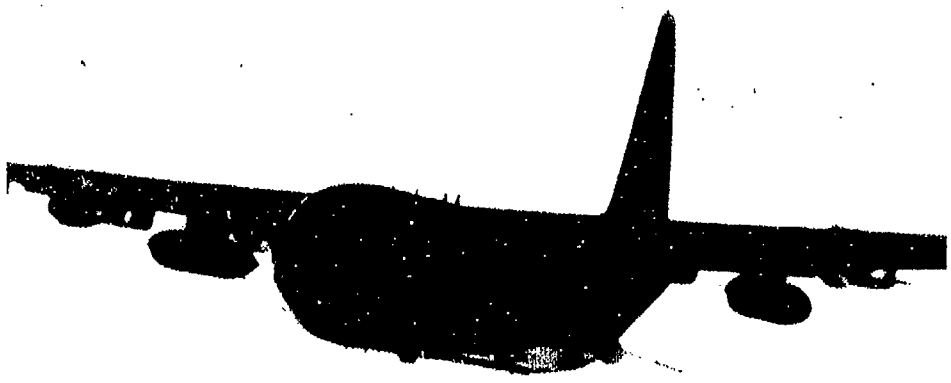


Figure J-6
Air Force Special Operations AC 130 In Support of Operations Over Kuwait

On 24 January, SOCCENT NSW forces conducted a daylight raid on enemy forces on Qaruh Island and recaptured the area -- the first Kuwaiti territory Coalition forces recaptured. These forces successfully captured Iraqi soldiers, along with substantial amounts of weapons and ammunition without sustaining any casualties.

Once secured, the island was used as a staging area for other NSW reconnaissance and DA missions, including those conducted against offshore oil platforms.

NSW operations were extensive during the ground phase of Operation Desert Storm, particularly counter-mine operations. Mine-hunting missions were conducted off the coast of Kuwait.

SEALs participated in aerial mine hunting with USN helicopters. The patrols searched for floating mines, and when found, SEALs dropped from hovering helicopters, swam to the mine, and attached a pre-timed demolition charge; 25 floating mines were destroyed in this manner. Additionally more than 145 floating mines were destroyed by USN Explosive Ordnance Disposal divers and Coalition mine clearance divers.

As Operation Desert Storm began, direct action missions were conducted to seize enemy-held off-shore oil platforms. Reconnaissance patrols determined the platforms had antiaircraft weapons on them and served as observation posts, monitoring Coalition ship and air movements in the approaches to Kuwait City. The offshore platforms also could provide launch platforms for missiles directed against the Coalition. The elimination of these platforms became an essential part of the preparations for an amphibious landing near Kuwait City. On 19 January, Navy SEALs aboard Rigid Inflatable Boats, and supported by the *USS Nicholas* and the Kuwaiti patrol craft *Istiqlal,* boarded and recaptured the Ad-Dawrah oil field platforms.

In late January, Special Operations AC-130 *Spectre* gunships began DA and fire support missions in southern Iraq, northwest Kuwait, and near Kuwait City. The aircraft armed with 20mm, 40mm, and 105-mm cannons, provided support for Coalition forces. AC-130 *Spectre* gunships were able to operate over friendly positions providing effective fire on enemy positions for several hours at a time. They were particularly effective in attacking Iraqi ground forces in the KTO and in support of Joint Forces Command-East (JFC-E) units during the battle of Al-Khafji.

The Iraqi forces apparently believed an amphibious assault would be a key component of the Coalition maneuver scheme and retained several divisions in the Kuwait City area to repulse the invasion. A significant mission in support of the CENTCOM deception plan involved simulating beach preparations for an amphibious landing to convince the Iraqis that such a landing was imminent. As the ground operations were about to begin, SEALs entered the water and swam ashore to plant delayed charges and set up lane markers to deceive the Iraqi forces as to the Coalition forces' intent.

On 26 and 27 February, SOCCENT planned and coordinated use of assets in the liberation of portions of Kuwait City. The 3rd SFG with attached SEALs secured and cleared the US Embassy simultaneously with actions taken by UK and French units to occupy their embassies. Using a heliborne assault, SOF teams touched down inside the abandoned US Embassy compound and sealed the area and recaptured the buildings. The next day, SOF turned the compound over to the State Department.

SOCCENT elements working with Kuwaiti resistance groups, helped seize and clear the Kuwaiti Police Headquarters and other key government buildings.

Figure J-7
Soldiers Witness the Symbolic Raising of the Colors at the Embassy in Kuwait

Electronic Warfare

Using both ground and air assets, SOCCENT conducted signal monitoring and radio direction finding operations against Iraq shortly after arriving in SWA. Special Forces Electronic Warfare Teams established joint and combined electronic listening posts to detect and monitor Iraqi signals. These operations added to the surveillance reports along the border and fixed the locations of Iraqi headquarters and artillery observers. Once additional forces had arrived and the SOF command infrastructure

was established, SOCCENT moved ground listening and monitoring stations into CSOAs Shannon and Cochise. The data was sent back to SOCCENT, where analysts processed the information and coordinated with targeting teams.

Combat Search and Rescue (CSAR)

CINCCENT designated CENTAF as the theater CSAR coordinator. CENTAF established and operated the Joint Rescue Coordination Center (JRCC) to coordinate these missions. Because SOF aircraft were best suited to conduct long-range personnel recovery missions, the SOCCENT commander was designated as commander of combat rescue forces. SOF provided 24-hour, on-call CSAR for Coalition aircrews. Army SOF helicopters (MH-60), upgraded with mini-guns, and Naval Reserve HH-60H helicopters, and MH-47 helicopters were available for these missions in addition to Air Force Special Operations Command, Central (AFSOCCENT) assets.

SOF aircraft supporting the CSAR mission were located in Saudi Arabia. SOCEUR aircraft covered the northern area of Iraq. In addition to Iraq and Kuwait, SOCCENT's CSAR area extended 12 miles in the Arabian Gulf. The Navy was responsible for CSAR beyond 12 miles in the Gulf and in the Red Sea.

CSAR procedures required a reasonable confirmation of a survivor's situation and location before a mission could be launched. This required the downed crews to call-in using hand-held survival radios.

Radios like the PRC-112, have optional preset frequencies and codes, in addition to the international channels. Unfortunately, there was only a limited number of PRC-112s available to units in SWA, with more than half of the radios in SOF units. Sufficient numbers of these radios did not exist for all Coalition aircrews. An immediate attempt was made to procure additional PRC-112 radios and associated power sources from US, Asian, and European sources.

There were 38 downed Coalition aircraft and many downed crew members. Several downed crew members ejected over or near heavily fortified Iraqi positions, deep inside Iraq, making rescue attempts impossible due to distances involved and the enemy situation. Seven CSAR missions were launched. There were three successful recoveries; all rescued crew members were Americans. Kuwaiti partisan forces also recovered a downed Kuwaiti pilot. Three of the successful CSAR missions are described below.

The first rescue of a downed air crewmember was a daylight recovery of a Navy pilot deep inside Iraq on 21 January. AWACS controlled the flights of air cover from two A-10s and a pair of AFSOC Pave Low helicopters which flew more than 160 miles into Iraq for the recovery. As the Pave Lows were on final approach for the pick-up, an Iraqi radio intercept truck headed straight for the pilot. The A-10s on

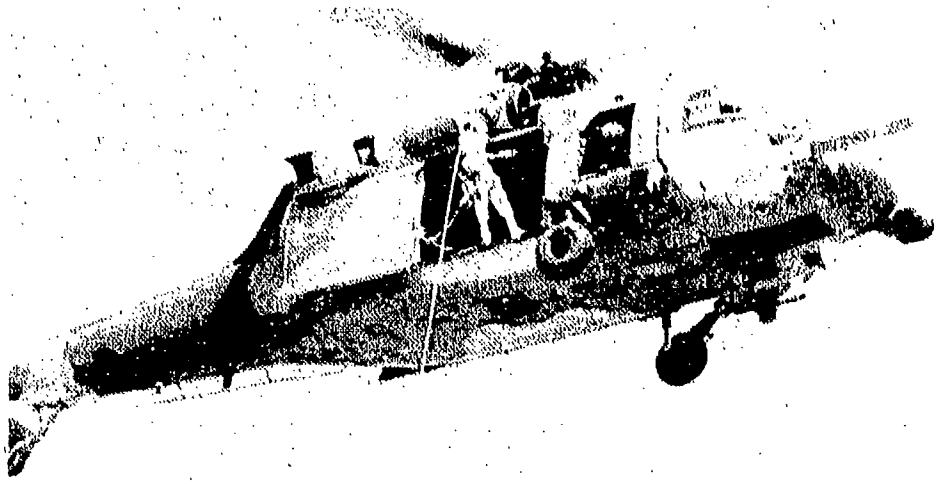


Figure J-8
CSAR Missions Were Conducted During the War

station immediately responded by attacking and destroying the van. The aircraft continued to fly overhead, covering the helicopters as they landed. After a successful pickup, the helicopters returned to base, nearly eight hours after the Navy aircraft was shot down.

Another recovery occurred on 23 January. The frigate *USS Nicholas,* (FFG 47) was on station off the Kuwaiti coast. Using the ship's SH-60 helicopter, SEALs aboard the ship recovered a pilot from within two miles of the Kuwaiti coast who had ejected from his stricken aircraft. The CSAR mission took only 35 minutes to complete. The third rescue occurred on 17 February and involved the night rescue of a USAF pilot 60 miles behind enemy lines. Army SOF responded with two MH-60s, and while in the process of recovering the crewman, the pilots, who were wearing night vision goggles, evaded an Iraqi surface-to-air missile.

There was a strong demand for SOF aircraft during Operation Desert Storm. Special Operations aircraft provide capabilities not normally found in similar types of aircraft. As a result of these sophisticated capabilities, the aircraft were requested to perform innovative missions outside the traditional Special Operations role. As a consequence, SOF aircraft had one of the higher utilization rates in theater. In the case of CSAR missions, SOF aircraft were preferred because of their radar evasion, communications, and weapons system countermeasures capabilities that were considered important for aircraft survivability. However, the combination of CSAR

requirements and the other demands for these assets left little room for contingency missions.

LOGISTICS

Special Operations logistics support, in the past, has depended upon the Service's logistics support structures to meet the bulk of SOF sustainment requirements. During Operations Desert Shield and Desert Storm, SOF requirements exceeded theater support capabilities. These problems were caused, in many cases, by the early deployment of SOF tactical units, the limited initial logistics infrastructure in the AOR, and the slow buildup of the theater logistics system. Support to the SOF logistics base was neither adequately prioritized nor organized.

The 5th Special Operations Support Command (Theater Army) (TASOSC), was designed to plan and coordinate the support and sustainment for Army SOF. However, 5th TASOSC was not organized until after most SOF were in theater. During peacetime conditions, 5th TASOSC, is a planning cell and not manned at the required operational level. Deployment required personnel augmentation. In addition, the 5th TASOSC was not sufficiently integrated into the theater logistics network. USAF and Navy SOF did not have similar organizations at theater level, and were dependent on logistics support from their own component organizations.

Most SOF-specific items had to be procured from non-military sources, transported to Saudi Arabia, and transshipped to the requesting unit in theater. SOCCENT received support from SOCOM, who coordinated acquisition of most SOF-specific items and forwarded them to the theater.

For Army SOF, direct support was provided by the 528th Special Operations Support Battalion (SOSB). The 528th SOSB was under the operational control of the ARSTOF, and not a subordinate element of 5th TASOSC. The support battalion provided rations, fuels, repair parts, transportation and maintenance. This small battalion also operated an arrival and departure airfield control group (A/DACG) at KKMC. The tasks for the 528th SOSB expanded when SOCCENT directed it to provide maintenance and repair support to NSW units. The 528th was not structured properly to accomplish all these missions.

The 528th SOSB deployed to Saudi Arabia without enough repair parts because they did not yet have a fully established Authorized Stockage List (ASL). Pending receipt of repair parts, the 528th received support from the 1st Corps Support Command (COSCOM), and eventually from the 101st Airborne Division (Air Assault) Support Command (DISCOM). Most major assemblies replaced by the 528th SOSB during the first two months were obtained from these sources. The 528th SOSB had only light maintenance capability and sent night vision devices and laser range finders to the 101st Airborne Division (Air Assault) for repair. Due to the

additional taskings, the 528th performed as a general support maintenance and supply unit, although neither structured nor resourced to do so.

USAF SOF were supported by maintenance squadrons that deployed with them to the theater. The accelerated air movement of materiel caused a backlog in reception and onward movement of supplies because forward logistics support bases were inadequately manned and equipped. Specifically, the lack of ground transportation specialists and materiel handling equipment slowed the receipt of repair parts shipments and delayed the retrograde of repairable aviation components. This resulted in longer supply procurement times and delayed the receipt of repair parts at the unit level. The slow movement of retrograde parts severely hampered repairs of aircraft, affecting the mission-ready rate. Specific examples include rotor blades, T-700 MH-60G engines, C-130 propellers, and HC-130 in-flight tanker refueling system components.

NSW forces deployed with a 30-day support package. Resupply for afloat NSW forces was handled through established Service support channels. For those NSW forces based ashore, *ad hoc* arrangements were made through Army supply channels to provide support including vehicles, climate-controlled tentage, messing facilities, and consumables. Examination of the NSW support requirements and structure is recommended for future operations.

Due to operational tempo requirements, environmental conditions, and the slow buildup of the maintenance support base, high failure rates were experienced with certain types of communications equipment. A mobile communication team provided repair for this equipment. Replacements radios were available in CENTCOM for issue, and this helped to maintain a high level of readiness of communications equipment.

Aerial refueling support was provided by the 9th SOS in two geographic operating areas. The bulk of the 9th SOS' missions were flown in the eastern area of operations throughout Operation Desert Storm. As the war evolved, the 9th SOS also provided tanker support to the western area of operations. In total, the 9th SOS flew 103 sorties and 316 hours, including 89 combat sorties and six combat support sorties, that involved 47 refueling missions with the transfer of 412,000 pounds of fuel.

COMBATTING TERRORISM (CT)

From the beginning of Operation Desert Shield, the United States was concerned about possible terrorist attack. Consultations and exchanges of information among Coalition partners and other members of the UN led to the expulsion of over 200 Iraqi diplomatic personnel, embassy staff, and intelligence personnel from their posts throughout the world. This undoubtedly had a disruptive effort on Iraqi terrorist operations.

Within the US Government, the National Security Council took the lead in producing a well-founded, coordinated policy. Throughout the conflict OSD met frequently in the interagency arena to consult and formulate policy options, including employment of SOF. These policy determinations involved both components of CT: antiterrorism, which involves defensive measures to reduce vulnerability or individuals and property to terrorist acts; and counterterrorism, which involves offensive measures taken to prevent, deter, and respond to terrorism.

The OSD Combatting Terrorism Program served as a pivotal basis for antiterrorism actions on a global basis. The principal mechanism to facilitate inter-Service coordination and support of US Government antiterrorism activities was the DOD Antiterrorism Coordinating Committee (ATCC). Its membership includes representatives from the intelligence, law enforcement, and security communities. Ongoing antiterrorism actions reported by the membership at that time included a wide variety of activities. Concerns that the draw-down and deployment of CONUS-based military security and law enforcement personnel could have made DOD installations more vulnerable to terrorist attacks were passed to the Federal Bureau of Investigation (FBI). In turn, the FBI instructed its field offices to establish liaison with military installations to explain its role in terrorist situations and to alert local and state law enforcement agencies to report any indications of terrorist activity.

A cross section of other DOD antiterrorism activities included the Commander-in-Chief, Forces Command's accelerated identification and security planning for key DOD assets. These are industrial and infrastructure facilities (owned by private sector or by government agencies) that are essential to mobilize, deploy, or sustain the armed forces. EUCOM commanders, working with military security police and with local officials, established protective measure to be taken by their troops or in their communities. CENTCOM provided antiterrorism awareness training to its military personnel. This training raised individual and collective awareness of the general terrorist threat and the measures that could be taken to reduce personnel vulnerability. Vulnerability surveys were also made of command and billeting facilities, both in CONUS and in the Persian Gulf AOR.

As part of the Combatting Terrorism Program, SOCOM developed and prepared counterterrorism contingency plans and was prepared to respond to terrorist acts and possible hostage situations. OSD was prepared to address policy aspects of multiple CT contingency operations, however, terrorism never materialized.

PSYCHOLOGICAL OPERATIONS (PSYOP)

PSYOP focused on destroying Iraqi morale and encouraging mass surrender and desertion. After the cease fire, an Iraqi division commander stated that next to the Coalition bombing operations, PSYOP was the greatest threat to his troops' morale. PSYOP leaflets and radio broadcasts undermined unit morale, provided

instructions on how to surrender, instilled confidence that prisoners would be treated humanely, and provided advanced warning of impending air attacks, thus encouraging desertion. PSYOP objectives were:

- Gain acceptance and support for US operations;
- Encourage Iraqi disaffection, alienation, defection and loss of confidence;
- Create doubt in Iraqi leadership;
- Encourage non-cooperation and resistance;
- Strengthen confidence and determination of friendly states to resist aggression; and,
- Improve deterrent value of US forces.

Command Relationships for the Psychological Operation Group

Planning for psychological operations began immediately after the invasion of Kuwait. A PSYOP planning group consisting of military and civilian personnel from CENTCOM, SOCOM, and the 4th Psychological Operations Group (POG) was formed at CENTCOM Headquarters, MacDill Air Force Base, FL. in early August. This group became the nucleus of the PSYOP command and control element that deployed to Saudi Arabia in late August.

Leaflet, radio and loudspeaker operations were combined and this combination was key to the success of PSYOP. Leaflets were the most commonly used method of conveying PSYOP messages. Twenty-nine million leaflets consisting of 33 different messages were disseminated in the Kuwait theater of operations. Delivery means consisted of MC-130, HC -130, A-6, F-16, B-52, and artillery. A building block approach for leaflet operations was used with the first leaflet themes being ones of peace and brotherhood. Increasing the intensity of the PSYOP message as events evolved, leaflet themes transitioned to emphasizing the United Nations imposed 15 January deadline. After the UN deadline passed and Operation Desert Storm began, themes emphasizing abandonment of equipment and desertion were used. Exploiting the effects of specific munitions, leaflets were also used to inform Iraqi units that they were going to be bombed. Feedback from interviews with enemy prisoners of war validated the success of leaflet operations.

"Voice of the Gulf" was the Coalition's radio network that began broadcasting on 19 January from ground based and airborne transmitters,18 hours per day for 40 days. The radio script was prepared daily and provided news, countered Iraqi propaganda and disinformation, and encouraged Iraqi defection and surrender.

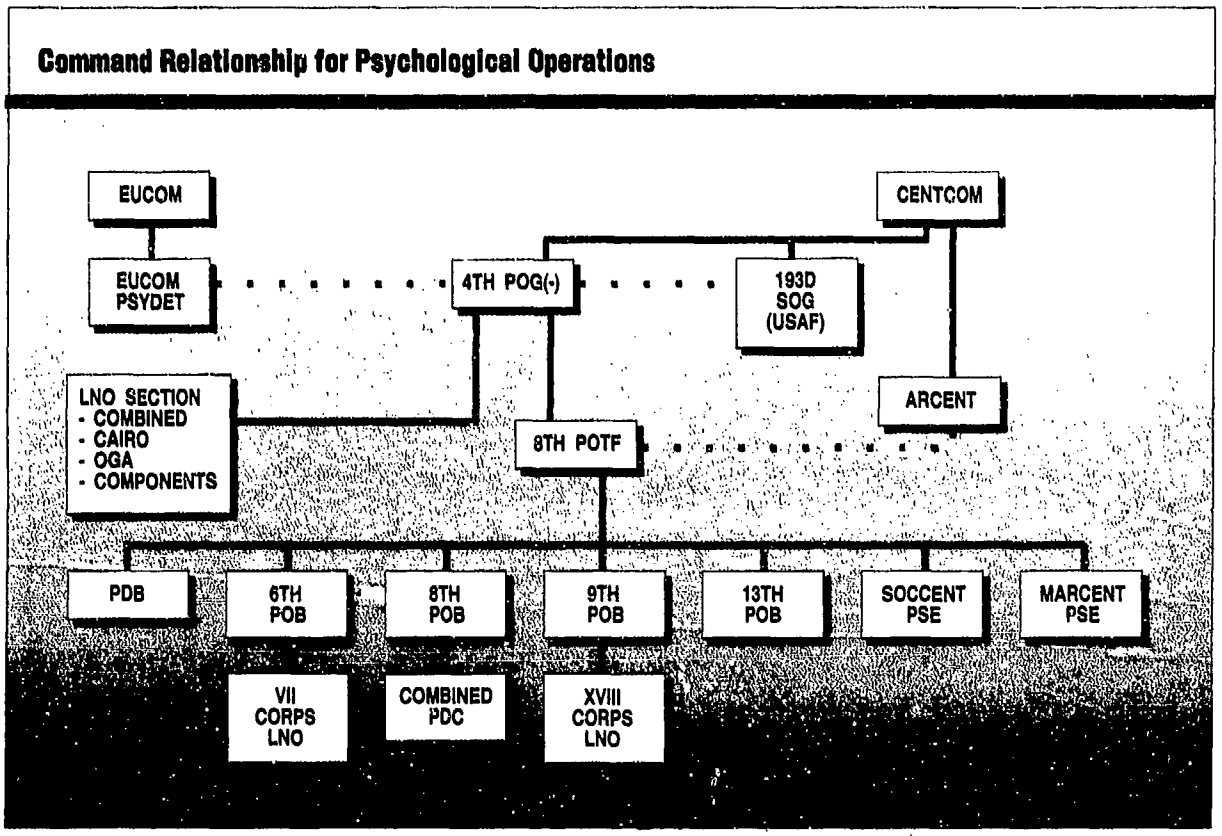


Figure J-9
PSYOP Command Relationships

Loudspeaker teams were used effectively throughout the theater. Each tactical maneuver brigade had loudspeaker PSYOP teams attached. Many of the 66 teams came from the Army Reserve Components (RC). Loudspeaker teams accompanied units into Iraq and Kuwait, broadcasting tapes of prepared surrender messages. Messages were transmitted in Arabic and were developed by cross cultural teams. These messages were similar to those on the leaflets being dropped. Iraqi soldiers were encouraged to surrender, were warned of impending bombing attacks, and told they would be treated humanely and fairly. Many Enemy Prisoners of War (EPW) mentioned hearing the loudspeaker broadcasts in their area and surrendered to the Coalition forces because they feared more bombing.

PSYOP proved very successful during the war; however, there are some areas that require further review. As noted earlier, there was a significant delay in the approval processes. PSYOP capabilities are best used when they are employed early

PSYOP Leaflet

Figure J-10
Example of PSYOP Leaflet

in an operation to promote deterrence and/or decrease an opponent's will to resist. Thus, the machinery to do so must be in place as soon as possible. Also, a concerted effort to recruit, train, and maintain linguists is needed.

Additionally, PSYOP unit structuring, both in the active and Reserve Components, must be reviewed, as well as the wartime command relationships among these units. Active and RC force mix should be evaluated to ensure sufficient PSYOP assets are available to provide support should more than one contingency occur.

CIVIL AFFAIRS

Planning

One of the functions of civil affairs is to assist in integrating US forces smoothly with the population and forces of the host nation. Deployment of large

numbers of US forces to Saudi Arabia meant harmonizing our western culture with the culture of our host. The challenge facing US personnel was to adapt to the customs of Saudi Arabia so conduct created an impression of respect for the Saudis and their culture. A rigorous indoctrination program was undertaken to orient US personnel on the region's uniqueness and its history, customs, religion, law, and mores.

Civil Affairs planners were active in identifying, planning, coordinating, and integrating host nation support (HNS) which was crucial to effective military operations. They identified sources of contract labor, services, materials, and supplies. Civil affairs planners assisted the Saudi in civil defense emergency planning. They kept the status of the Saudis civil defense preparedness including dispersal locations, warning systems, shelters, and NBC defense resources for civilians. Prior to offensive operations and at the request of the US embassy, civil affairs officers met with US civilian nationals living and working in Saudi Arabia to assure them of Coalition military capabilities so as to relieve some of their anxiety about being in a war zone.

Operations

Units from the US Army, US Army Reserve, and the USMC Reserve provided the Civil Affairs support for pre-combat, combat, and emergency reconstruction missions during Operations Desert Shield and Desert Storm in the Kuwait Theater of Operations (KTO). Units involved included the Army's 96th CA Battalion, the only active Army unit, 16 USAR units, and two USMC(Reserve) CA groups. Missions included coordinating and facilitating host nation support (HNS); emergency services and support to the civil sector; support to combat operations by minimizing civilian interference and casualties; providing for movement and control of civilians; emergency water, food, shelter, and medical care for displaced civilians and enemy prisoners of war (EPWs); and providing emergency services and reconstruction assistance to the Government of Kuwait in rebuilding its infrastructure following the cessation of hostilities.

In October, the Government of Kuwait requested US government help to plan the Kuwait Emergency and Recovery Program and the State Department turned to DOD for assistance. In early December, the Kuwait CA Task Force was formed, largely around personnel of the 352nd CA Command, a USAR unit from Riverdale, MD. The task force helped marshal resources, from both the private and public sector, which Kuwait needed to restore emergency services once the country was liberated. The task force objectives included mobilizing the Kuwaiti government-in-exile to plan for the necessary services, supplies and equipment. Initially, the task force worked with ministerial representatives of the Kuwaiti government in exile to plan and contract for the necessary services, supplies and equipment needed in the post-combat phase of the operation. The organization deployed to Saudi Arabia in January to complete final civil affairs planning and preparation to execute the plan.

Figure J-11
Civil Affairs Operations in Kuwait

CA forces contributed to the procurement of host nation support (HNS) by locating and arranging for supplies and services from US allies in the region. Initially, the 96th CA Battalion, and later USAR CA units, particularly the 304th CA Group, worked in direct support of ARCENT's 22nd Support Command on HNS matters. Their efforts helped sustain the force buildup in the KTO.

CA forces assigned to combat units performed the essential function of controlling and providing humanitarian assistance to displaced civilians, refugees, and EPWs encountered on the battlefield. In doing so, they minimized the effect these persons had on military operations and safeguarded them from combat operations. In the rear areas, CA forces organized and managed the displaced civilians and refugee collection points and camps and assisted the transition of responsibility for these groups from military to international relief organizations.

Deployment of CA forces competed in the early stages of Operation Desert Shield with the urgent requirements for combat capability, including combat forces, and the necessary logistical support units, equipment and supplies needed to sustain combat operations. As the force structure to meet tactical requirements were met, CENTCOM began to increase priority to post-hostility considerations, including deployment and employment of CA units. Most of the CA units were deployed between mid-January and mid-February.

Despite notable CA successes discussed in this report, the civil implications of military operations did not receive as much early planning attention as would have been preferred. In some instances, combat forces had already moved forward to their pre-assault positions by the time their supporting CA units arrived in-country. The planning assistance to the Kuwait government, although requested in October, did not commence until December and it was done in isolation from the war plans prepared by CENTCOM.

CONCLUSION

SOF played a valuable role in Operations Desert Shield and Desert Storm, conducting a wide range of missions. Through these successful missions, SOCCENT forces achieved total integration with the conventional forces and proved the applicability of SOF in a medium-high intensity conflict.

Use of Special Operations capabilities requires tradeoffs between the political risk that often accompanies the conduct of special operations and the military advantage provided. Cross-border operations provided both real-time tactical and operational level advantages to the force commanders; however, inadvertent compromise of these operations can signal strategic objectives, incurring both military and political repercussions.

> ***"When used properly and when synchronized with other battlefield assets, SOF is a combat multiplier that offers commanders a capability that will extend their vision of the battlefield, increase their flexibility, and enhance their initiative."***
>
> **General Carl W. Stiner, USA**
> **Commander-In-Chief**
> **Special Operations Command**

OBSERVATIONS

Accomplishments

- Operations Desert Shield and Desert Storm were the largest deployment of SOF units and personnel in modern history. They operated in all environments, on land, water, and in the air. SOF teams remained hidden behind enemy lines, conducting SR for CINCCENT and tactical commanders alike, and conducted DA missions to include the first offensive attack to begin the air campaign. SOF contributions also were particularly valuable in support of Coalition Warfare, reconstructing the Kuwaiti military, supporting CINCCENT's deception plan, and CSAR.

- SOF actions with the Coalition forces were important to the success of the operation.

- PSYOP contributed significantly to the collapse and defeat of the Iraqi army.

- CA forces were instrumental in acquiring HNS, handling dislocated persons, and the reconstruction of Kuwait.

- SOF RC augmented the Active component forces and performed well.

Shortcomings

- There was a strong demand for SOF aircraft during Operation Desert Storm. The combination of CSAR requirements and other demands left little room for contingency missions.

- There were insufficient numbers of the newer PRC-112 hand-held survival radios available for all Coalition aircrews. The newer PRC-112 radio has additional optional preset frequencies and codes to provide confirmation of a downed aircrew's situation and location.

- The PSYOPs process requires review and should be streamlined for timely implementation and execution.

- SOF theater language requirements and the number of available linguists were short of the required level. There is a continuing need to identify requirements in all Service Components and to ensure resources are available to train and maintain linguists.

- SOF were assigned to train and go into battle with Coalition partners. The preponderance of Coalition units were general purpose forces. SOF teams with Coalition units were required to have a working knowledge of combined arms maneuver doctrine. Some SOF members did not have detailed knowledge of the combined arms tactical considerations for large mechanized forces.

- NSWTG required conventional services and support when operating from the fleet. Future combat scenarios may require that they be able to operate and sustain themselves as a member of a joint force. NSW forces deployed in SWA relied on many *ad hoc* support agreements to accomplish the mission, instead of from a structured, in-place organization. The types of agreements, while successful in this case, are short lived and may not be available for other contingency deployments.

- Civil Affairs implications in military operations did not receive appropriate attention early in the theater planning process and was done in isolation from the theater plans. Future planning should include CA considerations earlier in the process.

Issues

- In Operations Desert Shield and Desert Storm, SOF operated where contingency planning was not fully developed. Service SOF operated out of their traditional environments and relied heavily on theater level conventional support services. In doing so, several areas where joint procedures need to be established were identified. To validate current requirements, test draft joint procedures, and help plan for future deployments, regularly scheduled joint SOF and general purpose support forces mobilization and deployment exercises should be conducted.

- SOCOM role in TPFDD determination should be established and cyclical planning for force call up and deployments reviewed and defined.

- PSYOP and CA assets were able to support CINCCENT requirements, however, support for a second contingency would have been difficult. Active and RC force mix should be evaluated to ensure sufficient PSYOP and CA assets are available should more than one contingency occur.

APPENDIX K

COMMAND, CONTROL, COMMUNICATIONS (C3), and SPACE

"Our superiority in precision munitions, stealth, mobility, and command, control, communications and computers proved to be decisive force multipliers"

General H. Norman Schwarzkopf
Commander-in-Chief, Central Command

Figure K-1
The Lines of Authority and Lines of Responsibility Were Clear from the President and Secretary of Defense, Through the Chairman, Joint Chiefs of Staff, to the Commander-in-Chief, Central Command, Which Meant a Much More Effective Fighting Force in the Gulf

INTRODUCTION

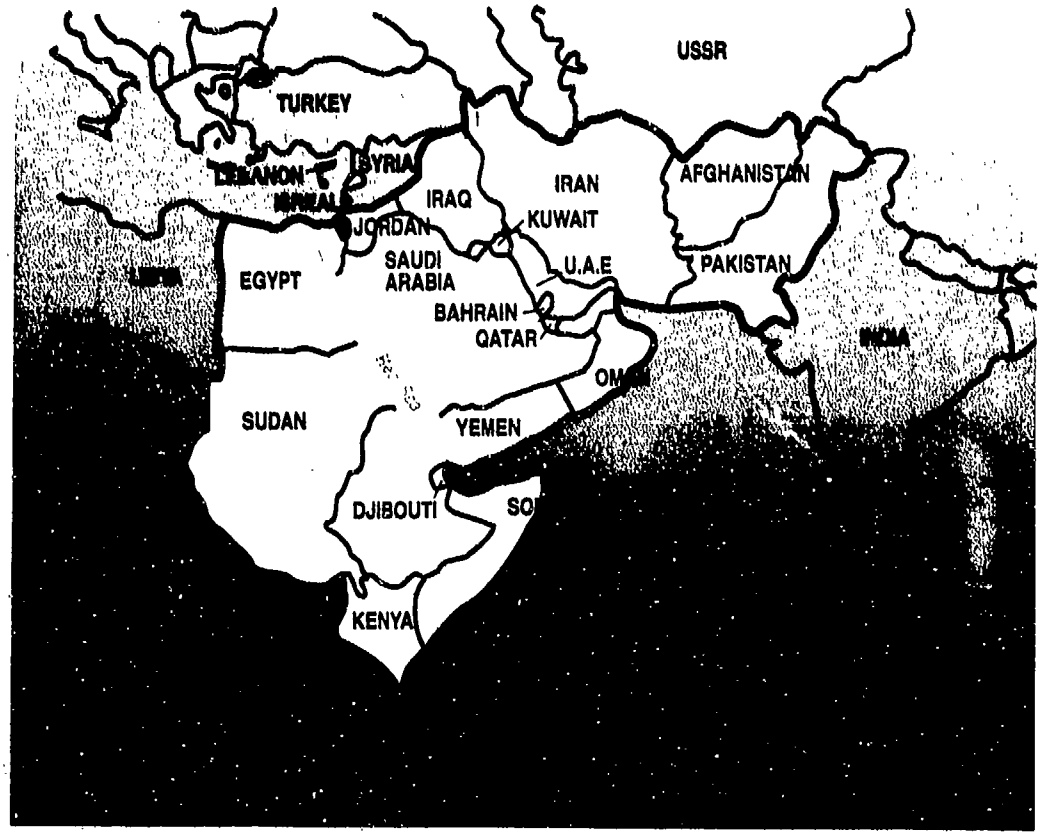
Historical Perspective of CENTCOM Involvement in SWA

Beginning in the early 1960s, a succession of commands was given the responsibility for planning Middle East operations. The first was the US Strike Command (STRICOM). Established at MacDill Air Force Base, FL, in 1962, STRICOM had responsibility for joint planning of operations in the Middle East, South Asia and sub-Saharan Africa. Although a unified command, it controlled no Navy or Marine Corps (USMC) units. During STRICOM's existence, the Fast Deployment Logistics concept was formulated. Although never implemented, it became the forerunner of today's prepositioning ships.

In late 1971, the Joint Chiefs of Staff (JCS) implemented a new Unified Command Plan. This plan replaced STRICOM with the US Readiness Command (REDCOM), and split STRICOM's responsibilities among existing unified commands. Three organizations gained operational responsibility for various parts of the Middle East/Southwest Asia (SWA): European Command (EUCOM), Pacific Command, and Atlantic Command. Although REDCOM was a unified command, it had no geographic area of responsibility (AOR). In essence, it became a training command, charged only with providing forces to other unified commands, and with the land defense of the continental United States (CONUS).

Another step in the development of a rapid deployment force came in 1980 with establishment of the Rapid Deployment Joint Task Force (RDJTF), under REDCOM's administrative control. Its initial worldwide mission soon was narrowed to SWA. In October 1981, the RDJTF was made a separate joint task force (JTF), reporting to the National Command Authorities (NCA) through the JCS. A final metamorphosis took place on 1 January 1983, when Central Command (CENTCOM), a unified command, replaced the RDJTF. Its AOR consisted of portions of SWA.

CENTCOM was organized with Service component commands, each responsible for all aspects of its respective Service's functions. In peacetime, except for the Navy Component, Central Command (NAVCENT), component commands have no forces assigned. Other CENTCOM forces are designated for planning purposes only for wartime requirements and assigned elsewhere in peacetime. For example, units designated for Army Component, Central Command (ARCENT) are subordinate to Forces Command (FORSCOM) in peacetime; Marine Component, Central Command (MARCENT) is an additional command responsibility assigned to I Marine Expeditionary Force (I MEF). Additional forces, if needed, would be made available from other commands within each Service. In peacetime, Commander-in-Chief, Central Command (CINCCENT) headquarters is at Tampa, FL. Except for Special Operations Component, Central Command (SOCCENT), each CENTCOM component commander is stationed elsewhere.



Map K-1
CENTCOM AOR

CENTCOM produced a draft operations plan (OPLAN), including annexes, for the wargame exercise Internal Look 90 in July 1990. CENTCOM and its Service components validated the OPLAN during Internal Look 90 and, as a result, this draft became the genesis for Operation Desert Shield.

US CENTRAL COMMAND

Headquarters	**MacDill AFB, FL**
Army Component (ARCENT) Headquarters	**Fort McPherson, GA**
Air Force Component (CENTAF) Headquarters	**Shaw AFB, SC**
Navy Component (NAVCENT) headquarters	**Pearl Harbor, HI**
Marine Corps Component (MARCENT) Headquarters	**Camp Pendleton, CA**
Special Operations Component (SOCCENT) Headquarters	**MacDill AFB, FL**

COMMAND AND CONTROL STRUCTURE

The Secretary of Defense, the Under Secretary of Defense for Policy, CINCCENT, ARCENT, and Air Force Component, Central Command (CENTAF) commanders and key staff officers arrived on 6 August in Saudi Arabia with an offer to deploy US forces to defend Saudi Arabia. After acceptance from the Saudi King in Jiddah, the Secretary, Under Secretary, and CINCCENT returned to the United States, leaving the officers who had accompanied them in Riyadh to begin Operation Desert Shield. The CENTAF commander was designated Commander, CENTCOM Forward, and remained in Saudi Arabia with the other general officers to coordinate with the Saudis and monitor the reception of US forces. The component commanders also served as CINCCENT's agents until he and his staff arrived and assumed the duties involved in building a combined coalition force.

The Goldwater-Nichols Department of Defense Reorganization Act of 1986 (GNA) sought to strengthen civilian control and oversight of military operations; improve the military advice provided to civilian authority; establish the Chairman, Joint Chiefs of Staff (CJCS) as the principal military advisor to the National Command Authorities; and place clear responsibility on combatant commanders while ensuring the Commanders-in-Chief's (CINC) authority was commensurate with their responsibilities. GNA gives the Under Secretary of Defense for Policy authority to review contingency plans. Operations Desert Shield and Desert Storm provided the first major occasion to assess the effect of the GNA in a joint environment. There were several areas in which GNA affected the Commander-in-Chief, Central Command's (CINCCENT) combatant command authority. GNA clarified the chain of command and the lines of communication from the President and Secretary of Defense, through the CJCS, to CINCCENT. The CJCS role was strengthened, increasing his ability to provide timely military advice; roles of Services, Defense agencies, and supporting CINCs were clarified, which improved providing timely assistance to CINCCENT. GNA's creation of the position of the Vice Chairman, Joint Chiefs of Staff (VCJCS) allowed the CJCS to devote full attention to Operations Desert Shield and Desert Storm while the VCJCS conducted day-to-day business, with no loss of continuity.

CINCCENT returned to Tampa where he could best influence the prioritization and deployment of forces and organize the command and control (C2) structure. CENTCOM had begun only recently to identify detailed needs in support of the operations plan for the defense of the Arabian Peninsula. The lack of an approved plan was especially crucial in the fluid situation in August. (In peacetime, once a unified campaign plan is approved, it provides the Services with the force requirements to execute the plan.) In support of Operation Desert Shield, it took time to identify all requirements and then match requirements with specific units.

The problem was not serious in dealing with large units such as corps and divisions, but became acute in identifying the many smaller separate units needed to support the larger force.

After the deployment of forces was under way, CINCCENT deployed his headquarters from MacDill Air Force Base (AFB) to Riyadh. In addition to deploying, supporting, and training the combat forces necessary to halt and reverse Iraqi aggression, it also was crucial that CENTCOM establish the theater command, control, and communications (C3) structure. This process included organizing, testing, and modifying lines of communications and developing an efficient scheme to control forces.

CINCCENT's command structure and relationships had been evolving for several years. For example, in 1980, military relationships were established during joint US/Saudi use of the Airborne Warning and Control System (AWACS). These were refined while conducting escort missions of reflagged oil tankers in the Persian Gulf during the 1987-1990 Operation Earnest Will.

> ***"Goldwater-Nichols established very, very clear lines of command authority and responsibilities over subordinate commanders, and that meant a much more effective fighting force in the Gulf. The lines of authority were clear, the lines of responsibility were clear, and we just did not have any problem in that area – none whatsoever."***
>
> **General H. Norman Schwarzkopf**

In establishing the Operation Desert Shield command structure, joint procedures and doctrine provided a basis for integration of US forces. While each service provided forces to CENTCOM, CINCCENT commanded and decided how to organize them. He organized US forces using both Service components (similar to the peacetime organizational structure) and a Joint Force Air Component Commander (JFACC) to integrate and coordinate combat power. This structure maintained continuity, ensured component commanders were responsible for Service missions in theater, and smoothed the transition to a wartime organization. SOCCENT remained a sub-unified command, allowing centralized operational control of special operations forces (SOF) from the military Services under a single commander. While there were no changes in the US command organization during the transition to Operation Desert Storm, non-US Coalition forces moved either under CINCCENT's operational control (OPCON) or tactical control (TACON).

The Chairman, Joint Chiefs of Staff (CJCS) established these command relationships:

CINC Combatant Command Options

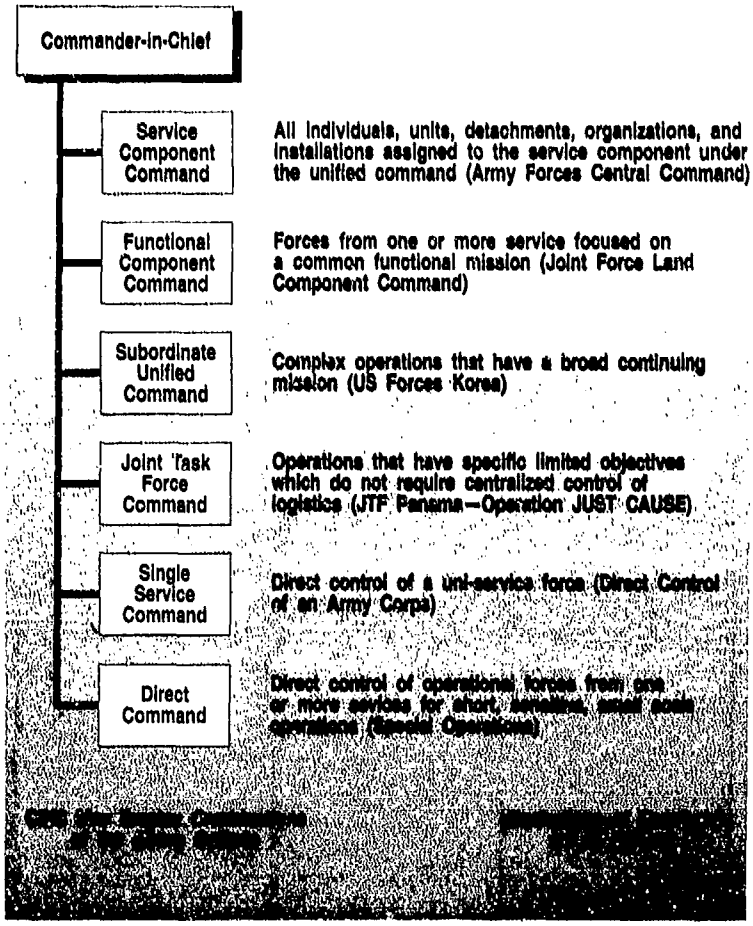


Table K-1
Commander Combatant Command Options

- CINCCENT was the supported combatant commander and responsible for all military operations within his AOR.

- Commanders-in-Chief, Europe, Atlantic, Pacific, Special Operations, Space, Transportation, South, Forces, and Strategic Air Commands (CINCEUR, CINCLANT, CINCPAC, CINCSOC, CINCSPACE, CINCTRANS, CINCSO, CINCFOR, CINCSAC) were supporting commanders and Commander, Tactical Air Command (TAC), a supporting resource manager.

The types or levels of command authority are well defined by Joint Pub 0-2, *Unified Action Armed Forces (UNAAF)* and Joint Pub 1, *DOD Dictionary of Military and Associated Terms*. The only recent addition occurred with the 1986 revision to the UNAAF, which expanded operational command (OPCOM) and operational control (OPCON) into combatant command, OPCON, tactical control and support, to better define GNA authorities. Support and coordination remained essentially unchanged. OPCOM still applies to allied command relationships in the North Atlantic Treaty Organization.

- Army, Marine Corps (USMC), SOF forces ashore in the AOR, Air Force (USAF) TAC forces in the AOR, and Naval forces assigned to Commander, Middle East Force (CMEF) were assigned Combatant Command (COCOM) to CINCCENT.

- Transportation Command (TRANSCOM) air/sea lift control units in the AOR, and Strategic Air Command (SAC) B-52s were OPCON to CINCCENT.

- SAC tanker forces and the other Commanders-in-Chief (CINCs) forces (e.g. TRANSCOM lift assets and EUCOM's aircraft operating from EUCOM's AOR), while operating in CENTCOM's AOR, were assigned TACON to CINCCENT.

- Other supporting CINCs' forces supporting CINCCENT were assigned to CINCCENT's TACON while operating in the AOR.

- CINCSAC, as both a supporting and supported commander, retained OPCON of all strategic reconnaissance forces in the AOR.

In addition, CINCCENT chose to retain the Joint Force Land Component Commander function rather than delegate the Land Component Command responsibility. CENTCOM's broad, complex mission required unity of effort and the integration of vastly different US and allied forces. CINCCENT directed the ground service components – ARCENT and MARCENT– and maintained coordination with the Saudi ground force command at his level. However, ARCENT and MARCENT had primary responsibility for developing and analyzing courses of action for their respective ground offensives.

On 9 August, all Gulf Cooperation Council states except Qatar, agreed to permit access to US forces, and the first increment of the CENTCOM Forward Headquarters Element (FHE) arrived in Saudi Arabia. (Qatar agreed to permit access a week later.) By mid-August, the FHE was established in the National Defense Operations Center bunker, under the Saudi Arabia Ministry of Defense and Aviation (MODA) building in Riyadh. Initial requirements were to provide communications between components and CENTCOM Rear; monitor and coordinate maritime intercept operations; track deployment of US and friendly forces; and help coordinate aircraft beddowns. Other immediate tasks included defining command

Explanation of Command Relationship Terminology

- Combatant command (COCOM): COCOM equates to owning forces. All Army forces in the AOR are under COCOM of CINCCENT – allows broadest command relationship.
- Operational control (OPCON): OPCON equates to leasing forces. B-52s remain COCOM under CINCSAC but are OPCON to CINCCENT – allows maximum control without burden of support.
- Tactical control (TACON): TACON equates to renting (short term) forces. CINCEUR F-111s operating from CINCEUR were TACON to CINCCENT while operating in CENTCOM's AOR – allows use and control of another CINC's assets.
- Component: NAVCENT, for example, is the Navy component for CINCCENT and is responsible for coordinating all Navy functions.
- Support is providing a service: CINCTRANS C-141s and C-5s provide airlift and transportation support to CINCCENT.

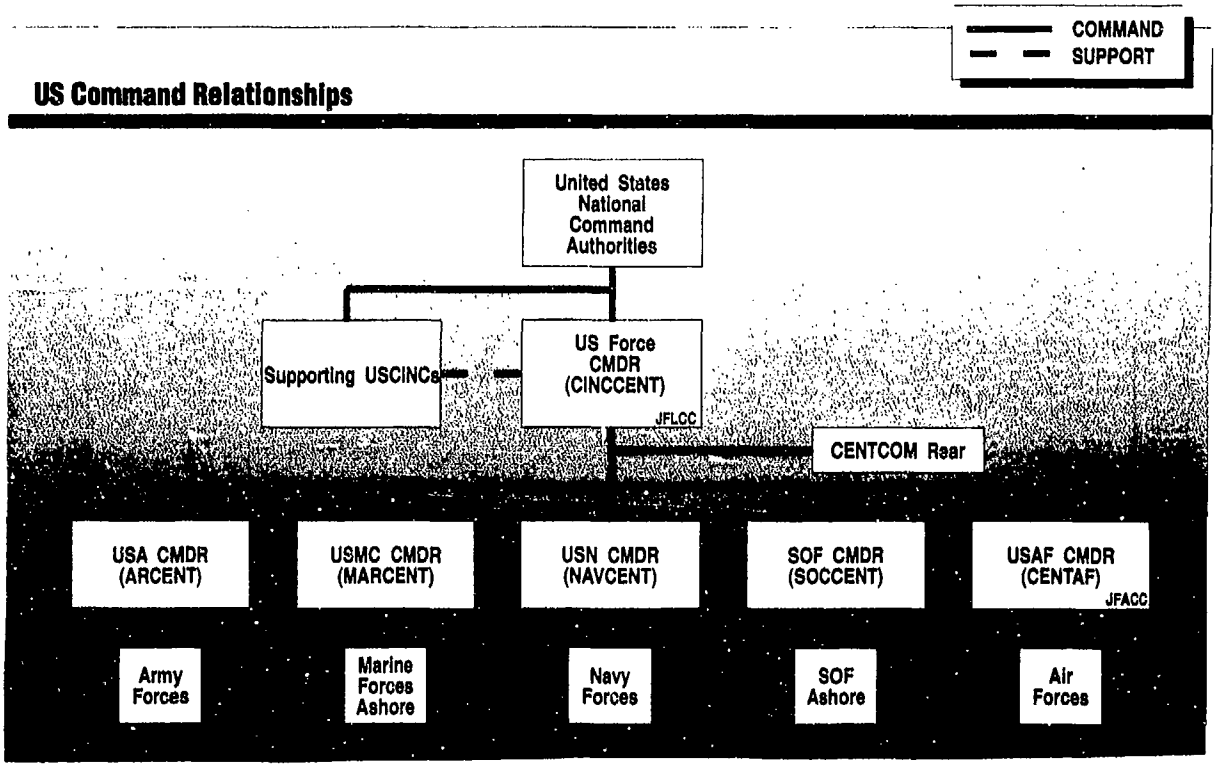


Table K-2
Central Command Command and Control Relationships

relationships, initiating combined planning, and integrating third-country participation into Operation Desert Shield.

COMMAND AND CONTROL STRUCTURE OF COMPONENT COMMANDS

Army Command Relationships

The 3rd US Army commander also served as the ARCENT commander. He developed a wartime command structure in Saudi Arabia to control deploying Army units. This structure practically doubled in size on 8 August with the arrival of the ARCENT Advance Command and Control Element. (The ARCENT headquarters main body arrived next, in two echelons, bringing the headquarters to an effective strength of 266 on 23 August.) ARCENT (Main) was established in Riyadh on 16 August to oversee the arrival, sustainment, and combat planning for deploying Army units. Until CINCCENT arrived in theater, the ARCENT commander was responsible for preparing for the joint force's arrival. CINCFOR assumed the additional duty of ARCENT (Rear) headquarters. (FORSCOM is a specified major Army command whose responsibilities include providing forces to meet worldwide contingencies and defending CONUS.)

Third Army had three different structures to meet its responsibilities for joint and combined coordination, theater support operations, and operational direction. As the Army component, ARCENT was responsible for all aspects of Army operations, rear operations and certain types of multi-service logistics support throughout the CENTCOM AOR. As a Theater Army, it established the extensive logistics systems and infrastructure needed to receive and sustain deploying forces and directed the emplacement of the Patriot antitactical ballistic missile system. Later in the crisis, as a numbered Field Army, it exercised C2 of the movement of army forces into attack positions, combat operations in Iraq, and reconstruction efforts in Kuwait.

Army deployments continued from August through March and ultimately exceeded 330,000 active and Reserve Component soldiers. The XVIII Airborne Corps deployed from US bases from August through November; the Europe-based VII Corps deployed from November through January; and echelons above corps units deployed from August 1990 through March 1991. (The latter units make up the support structure that performs specific functions to increase or support corps capabilities. These units include artillery, engineer, signal, Military Intelligence (MI), Military Police, transportation, medical, and Civil Affairs (CA) organizations, among others.)

Given the size of the theater and the scope of responsibilities, a C2 system was needed to provide timely assessments and to permit rapid reallocation of resources. ARCENT increased its C2 capability by creating seven liaison teams, a mobile alternate command post (CP) positioned forward, and a more robust, integrated

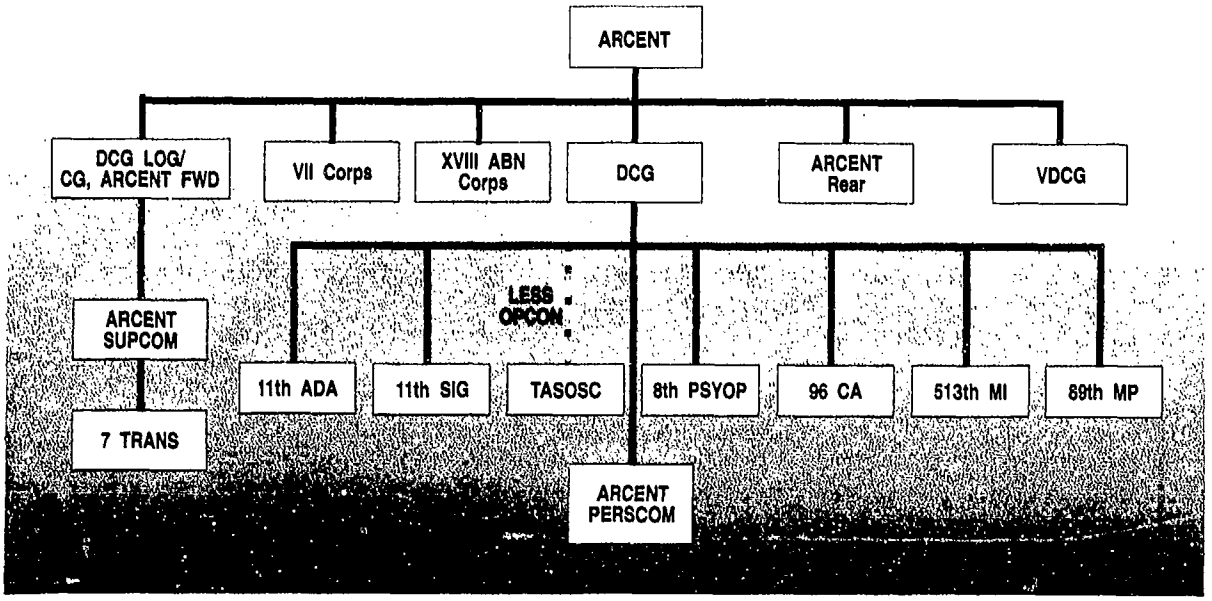


Table K-3
ARCENT Command Relationships

operations and intelligence center in Riyadh, using the 513th MI Brigade's capabilities.

Liaison teams were assigned to major ground forces (XVIII Airborne Corps, VII Corps, Joint Forces Command-North (JFC-N), Joint Forces Command-East (JFC-E), the Egyptian Corps, I MEF, and 1st Cavalry Division). Liaison personnel were detailed from units deployed around the world, while equipment (e.g., communications) was taken directly from production lines, stocks and units in CONUS and Europe. The teams were a vital link for CINCCENT and the ARCENT commander, playing a crucial role in coordinating operations between Coalition units, and for disseminating standardized procedures among all ground forces within the theater. CINCCENT used the liaison teams as a link with other Coalition forces, while the ARCENT commander used them as a network among subordinate and adjacent units. They also let the commander communicate his intent quickly in fast moving operations. The mobile CP, a scaled down version of the main CP, could displace to forward locations, improving ARCENT's control of battle operations. It also served as an alternate CP and had the communications and staff to support the commander, as necessary. More importantly, it provided an additional capability for the

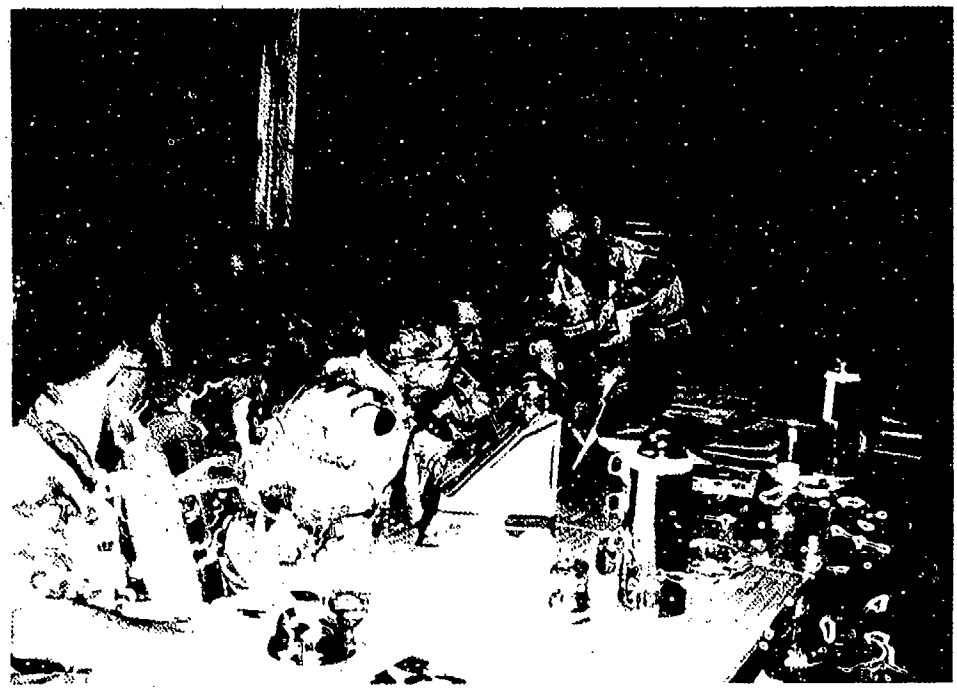


Figure K-2
AIRCENT Receives Update on Ground War Inside the Army Command Operations and Intelligence Center

commander to gather information, adding to his ability to quickly reallocate resources to solve short-term problems.

Integration of the three nodes provided effective C2 of Army forces: the Main CP maintained operational continuity and and monitored the balance of the army units; the liaison teams kept the commander informed of immediate developments; and the Mobile CP provided another means to focus on potential problems.

Air Force Command Relationships

The Commander, 9th Air Force, served as the CENTAF commander. He was designated CENTCOM Forward Commander from 6 to 26 August while CINCCENT organized the command and directed the deployment of forces to support Operation Desert Shield from his MacDill AFB headquarters. Since CENTAF was acting as the CENTCOM Forward, the vice commander, CENTAF, arrived to serve

temporarily as CENTAF commander in Saudi Arabia. A large part of the 9th Air Force staff also moved to help plan and deploy the forces. Rather than transfer personnel to 9th Air Force Headquarters at Shaw AFB, SC, to augment the CENTAF Rear staff, Headquarters TAC at Langley AFB, VA, assumed the responsibilities of CENTAF Rear on 12 August.

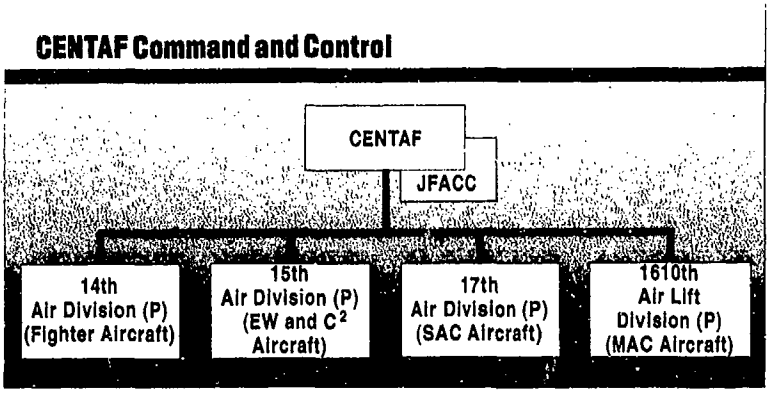


Table K-4
CENTAF Command Relationships

Managing the planned force required modification of the CENTAF organizational structure. USAF units ultimately were organized into provisional wings during Operation Desert Shield, with each initially reporting through the CENTAF staff to the CENTAF commander. An Air Division concept was created in December to form clearer command relationships between the wings and CENTAF. Control of USAF assets was divided into four provisional divisions, set up in accordance with mission specialities. The 14th Air Division (P) consisted of all fighter aircraft; the 15th Air Division (P) consisted of electronic warfare and C2 aircraft; the 17th Air Division (P) consisted of SAC aircraft; and the 1610th Air Lift Division (P) consisted of all Military Airlift Command aircraft. The Commander, 14th Air Division (P), also was Director of the Campaign Plans Division, which developed and planned the Strategic Air Campaign.

CINCCENT also designated CENTAF as the JFACC, with responsibility for coordinating all Coalition air forces to ensure focus of effort in the air campaign. The JFACC planned, coordinated, allocated, and tasked apportioned air sorties in coordination with other Service component commanders. The JFACC integrated area air defenses as the Area Air Defense Commander. The Commander, CENTAF, also designated as the Airspace Control Authority, managed theater airspace requirements.

The JFACC, in Riyadh, used a daily Master Attack Plan and Air Tasking Order (ATO) to carry out his responsibilities. This same mechanism served as the basis for

Figure K-3
The JFACC Was Implemented to Provide for Aviation Unity of Effort. This Was the First Time It Was Used in a Major Regional Conflict.

JFACC's pre-offensive air campaign planning. Normally transmitted at Immediate precedence, the daily ATO still required hours to arrive at the hundreds of addressees. As a result, couriers often were used to deliver the ATO on diskettes. Real-time control of aircraft missions was managed through the ground-based Tactical Air Control Center and the Airborne Command Element, operating from USAF AWACS aircraft orbiting inside Saudi airspace. While the JFACC concept had been discussed for several years, this was the first time it was used in a major regional conflict. The JFACC is discussed in greater detail in Chapter VI.

Navy Command Relationships

In early August, the commander of the US Seventh Fleet (SEVENTHFLT) was designated the NAVCENT commander. CMEF normally commands NAVCENT; however, the Navy wanted a more senior commander for Operation Desert Shield. These changing relationships required a steep learning curve with new people and command arrangements under the urgent pressures of planning and training for

large-scale combat, which seemed imminent.) Commander, SEVENTHFLT, deployed by air on 15 August to the AOR with key members of his staff. Taking up residence on board the *USS LaSalle* (AGF 3), the Commander, Joint Task Force Middle East (JTFME) flagship, he remained there until the SEVENTHFLT flagship, *USS Blue Ridge* (LCC 19), arrived 1 September. NAVCENT also assumed the command of the Fleet at sea, which included Navy and USMC elements and was designated as Task Force 150. At the same time, CMEF took over JTFME functions, and reported directly to NAVCENT. (CMEF maintained operational control of the extensive US Maritime Interception Force (MIF), as well as the US mine countermeasure forces and the Middle East Force surface combatant squadron.) The Persian Gulf and Red Sea aircraft carrier battle groups (CVBG) also were assigned to NAVCENT. Before Operation Desert Shield started, the JTFME, established in 1987, had served as the primary on-scene CENTCOM military commander in the Persian Gulf region.

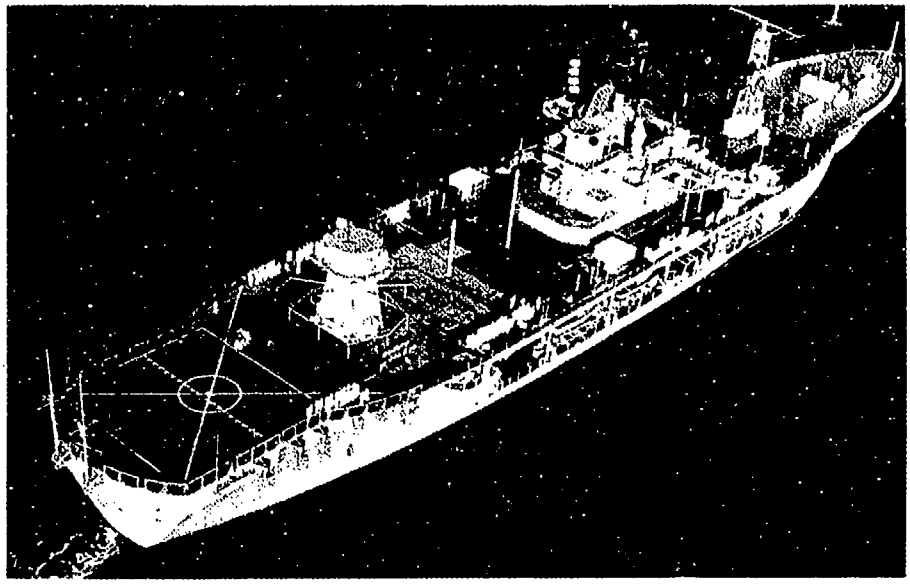


Figure K-4
The USS Blue Ridge, Seventh Fleet Flagship, Became the NAVCENT Command Ship Upon Arrival in the Gulf

NAVCENT brought a Fleet Coordinating Group (FLTCORGRU) with him from Japan and immediately installed it in Riyadh to work with the JFACC on all aspects of air operations. FLTCORGRU, whose purpose was to coordinate land and sea-based joint air operations, had worked extensively with the USAF in Western Pacific exercises. NAVCENT also provided a mobile satellite communications (SATCOM) capability to FLTCORGRU to improve communications between Riyadh and the Fleet.

Since NAVCENT operated from onboard ship, he established NAVCENT-Riyadh as a staff organization to provide continuous Navy representation at CENTCOM

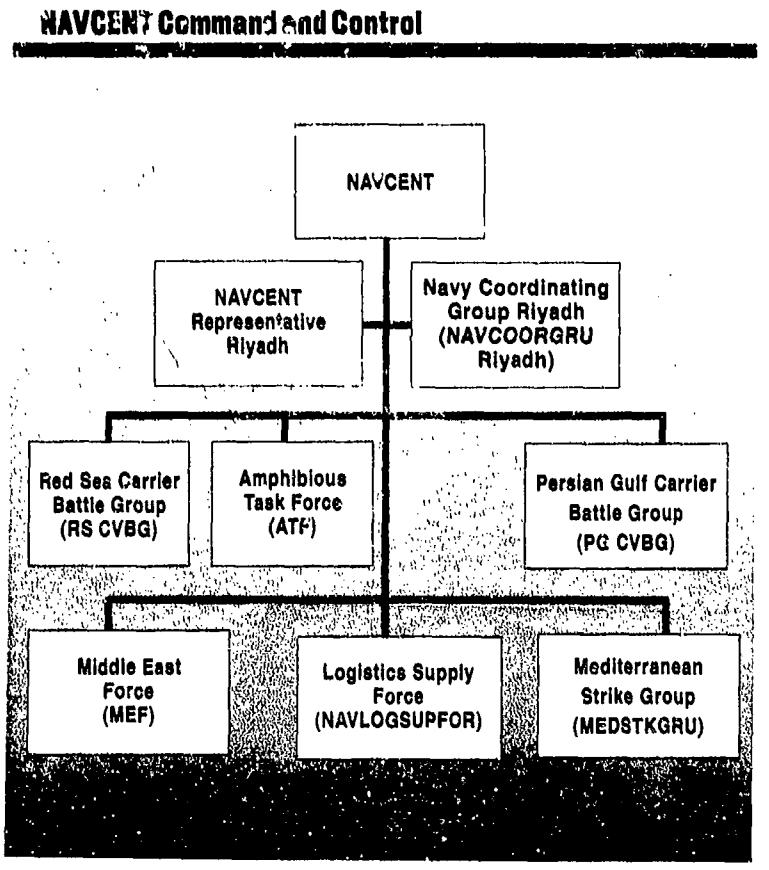


Table K-5
NAVCENT Command Relationships for Operation Desert Storm

headquarters. This mission was assigned initially to Commander, Carrier Group Three (COMCARGRU 3). During succeeding months, the NAVCENT-Riyadh staff was augmented substantially but remained small, relative to the ARCENT and CENTAF staffs. In November, the NAVCENT-Riyadh command was transferred from COMCARGRU 3 to Commander, Cruiser Destroyer Group 5. This change resulted in the Navy flag officer at NAVCENT-Riyadh's remaining relatively junior to other Service representatives, particularly CENTAF. This imbalance in size and seniority between the Navy and other staffs, coupled with the geographic separation with NAVCENT headquarters, made it difficult for NAVCENT-Riyadh to represent the interests of the Navy in the overall coordination and planning efforts.

Marine Corps Command Relationships

The commanding general of I MEF is also the MARCENT commander, responsible for both component and tactical command of Marine forces ashore. To carry out his component command duties, MARCENT assigned a deputy commander to Riyadh, designated MARCENT (Rear), to represent MARCENT. While MARCENT provided liaison officers (LNO) and staff officers to CINCCENT to coordinate tactical matters, the MEF commander did not feel the need to establish separate tactical and component command elements; instead, he retained responsibility for both functions. Later, the MARCENT commander reported he was in constant communication with CINCCENT and believed tactical and component issues could be resolved. CINCCENT's style of leadership gave considerable leeway to subordinate commanders.

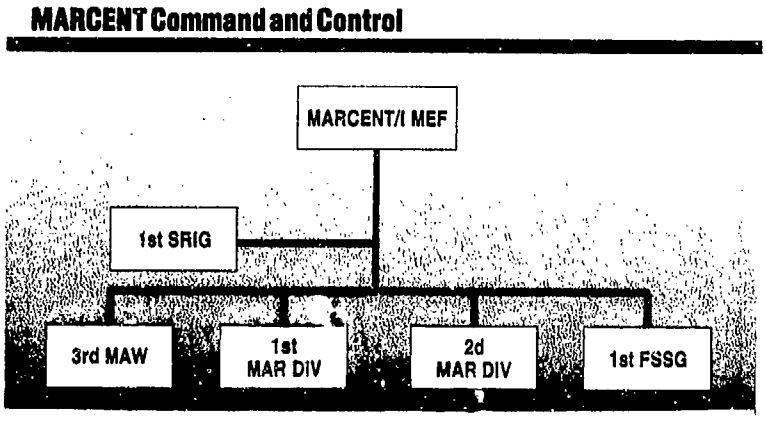


Table K-6
MARCENT Command Relationships

To coordinate fully with other component commanders, MARCENT provided LNO and communications to ARCENT and the JFACC, as well as adjacent Coalition units. Although there was only one commander, two staffs evolved to handle the different challenges of a component and a tactical command. An additional requirement surfaced with the arrival of amphibious forces in theater, particularly during the planning for an amphibious assault on the Kuwaiti shoreline. USMC forces ashore came under MARCENT command, while USMC forces afloat were under NAVCENT. Although plans envisioned that I MEF would command all Marines ashore, coordination of amphibious forces with USMC land operations before and during the initial stages of an amphibious assault presented unforeseen problems. Details of landing sites, airspace coordination, fire support coordination, tactical

Figure K-5
The 3rd Marine Air Wing Tactical Air Operations Center, Located North of Al-Jubayl, Controlled Aircraft Operating in the I MEF AOR

boundaries and control measures, as well as tasking for future operational planning had to be routed officially through a command chain that included CENTCOM and NAVCENT, a process sometimes complicated by the distances between the commanders and staffs. To resolve this difficulty, MARCENT located a forward headquarters (MARCENT (FWD)) with NAVCENT aboard the *USS Blue Ridge* in mid-January 1991. This small staff conducted detailed coordination with NAVCENT and ensured ground and amphibious plans were fully coordinated.

Internally, I MEF exercised both tactical and administrative command of all Marine forces ashore. These forces consisted of the 1st and 2nd Marine Divisions (MARDIV), the 3rd Marine Aircraft Wing, the 1st Force Service Support Group and the 1st Surveillance Reconnaissance and Intelligence Group. Faced with a significantly expanded Marine force, and the requirement to provide LNO and staff officers to adjacent and higher headquarters, the I MEF command element was augmented by personnel and equipment from organizations throughout the USMC. The Army and USAF provided communications equipment to I MEF to ensure interoperability. Structured for expeditionary and amphibious operations, the MEF found itself controlling the operations of a corps-sized force operating across extended inland distances. While this taxed the pre-war command structure, the

MEF command element adjusted rapidly . The need for a separate USMC component commander, as well as the structure of the USMC component command headquarters and the MEF command element, are being re-examined in light of these lessons.

Special Forces Command Relationships

SOCCENT was established to direct SOF elements from each military Service assigned to support CENTCOM. All SOF based in CONUS, including Army and USAF Psychological Operations (PSYOP) and CA elements, are assigned to SOCOM, a unified command established in 1986 to improve the operational capability and give joint focus to Special Operations. CINCSOC exercises OPCON of SOF, and as a supporting commander, provides SOF to combatant commanders who, in turn, exercise command authority over those forces. Throughout the crisis, SOCOM identified the forces required to support Operations Desert Shield and Desert Storm and assigned them OPCON to SOCCENT, less PSYOP and CA. As CA and PSYOP units arrived in Theater, they were detached from SOCOM and assigned to ARCENT. Reporting directly to SOCCENT were the Army Special Operations Task Force, the Naval Special Warfare Task Group , and Air Force Special Operations Command, Central Command.

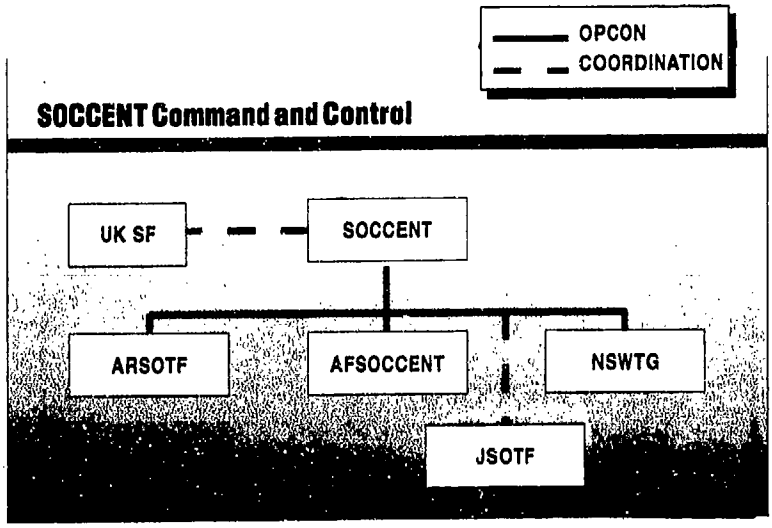


Table K-7
SOCCENT Command Relationships

SOCCENT began deploying to the theater in early August. The command was based briefly in Riyadh; it moved to King Fahd International Airport in mid-August.

As the force structure built up, and to improve operations with the multinational force arrayed across the northern Saudi border, a forward command center was established 300 miles north at the Army's 5th Special Forces Group (Airborne) headquarters, in King Khalid Military City. As Operation Desert Shield evolved into Operation Desert Storm, SOCCENT established a forward tactical operations and communications center for Combat Search and Rescue (CSAR) activities in 'Ar'ar, near the Iraqi-Saudi border. This location provided better coordination and communications with SOF assets flying CSAR missions in Kuwait and Iraq.

Although SOCCENT was a sub-unified command, it did not work alone. ARCENT and SOCCENT planners worked closely to select areas of operation and targets for SOF missions in Kuwait and Iraq. Likewise, SOCCENT and CENTAF also worked closely in planning missions and selecting special operations targets for offensive operations.

While SOCCENT exercised OPCON of SOF, the components retained responsibility for administrative and logistical support of their respective Service SOF. Navy SEALs assigned to Fleet units were under NAVCENT OPCON; those assigned to SOCCENT were made available to NAVCENT for CSAR. The AC-130 gunships from the 16th Special Operations Squadron and EC-130 *Volant Solos* from the 193rd Special Operations Group directly supported MARCENT and ARCENT forces during the ground campaign.

Figure K-6
HQ, 5th Special Forces Group (Airborne) Command Post

Other SOF deployed from Europe. Upon their arrival, OPCON was passed from Special Operations Command, Europe (SOCEUR), the EUCOM special operations sub-unified command, to SOCCENT.

Also located with SOCCENT headquarters was a coordinating element for the British Special Forces. British SOF remained under their own national command

organization and were not OPCON to CINCCENT. Nonetheless, they were fully integrated into the SOCCENT and CENTCOM plans and operations. (A detailed discussion of SOF operations is in Appendix J.)

COALITION FORCES RELATIONSHIPS

Forming working relationships with Coalition partners was a crucial aspect of US operations in Operation Desert Shield and a basis for subsequent operations in Operation Desert Storm. The political and military dimensions of building an effective coalition against Iraq were basic concerns to ensure successful multinational operations during Operation Desert Shield. It was important to have a force with as many nations as possible, particularly Arab states; however, Coalition force management stressed C3 and decision-making.

After the invasion of Kuwait, Saudi Arabia was preoccupied with marshaling enough forces from friendly nations against a potential Iraqi invasion. It soon was overwhelmed by the number and size of arriving forces. However, Iraq's failure to take advantage of the situation allowed the Saudis and their allies the time to develop a credible defense and modify command structures to use available forces more effectively. Establishing and implementing Coalition command relationships was difficult and a matter of great concern for all nations contributing forces to the Coalition. National, ethnic, and religious pride, along with politics and public perception, played as large a role in determining these relationships as did military requirements.

As additional Coalition forces arrived in Saudi Arabia, command relationships continued to evolve and defense concepts changed constantly. Over time, Coalition forces C2 was established with separate, but parallel, chains of command under the United States and Saudi Arabia. All forces ultimately remained under their respective national authority. The US-led western force had CINCCENT in COCOM of forces from the United States, OPCOM of forces from the UK, and other western nations and TACON of French forces. (The French forces, initially TACON to the Saudis, were placed TACON to ARCENT about mid-December 1990 in preparation for offensive operations.) The Saudi-led combined regional force component was called the Joint Force/Theater of Operations (later, Joint Forces Command (JFC)) and had OPCON of all Arab/Islamic forces. Through this structure, the National Command Authorities of western nations retained command of their forces, while Islamic nations authorized Saudi Arabia to exercise command of theirs.

Arab forces in the field were OPCON to either the Eastern or Northern Area Commands (EAC/NAC), depending on their location. By February, the Arab Coalition force commander exercised his authority through three operational theater commanders: JFC-E, JFC-N, and Forward Forces Command - 'Ar'ar (FFC-A), although the latter technically remained under JFC-N. Before establishment of this organization, there was only minimal coordination among Saudi forces. Establishing

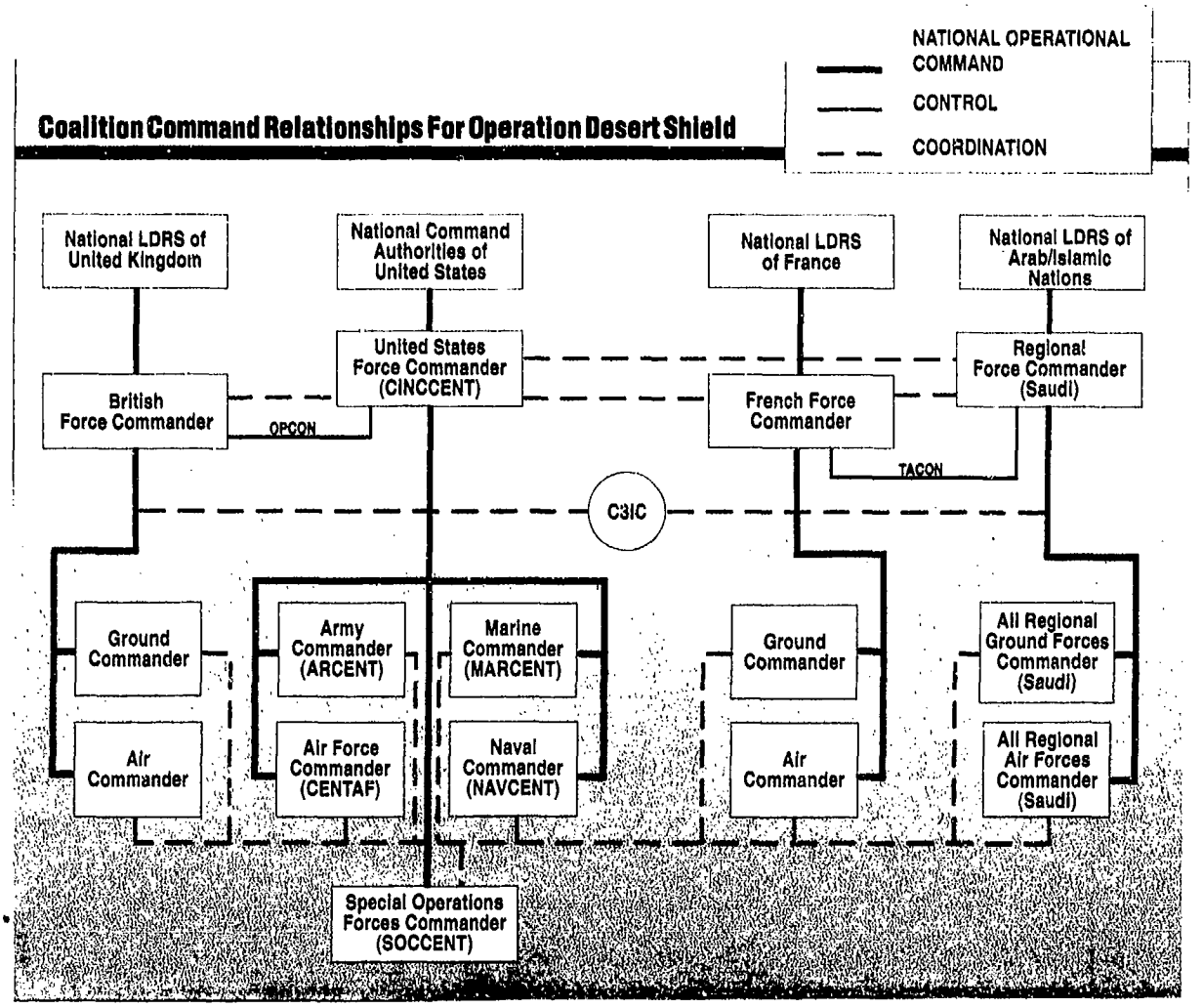


Table K-8
Coalition Command Relationships During Operation Desert Shield

the JFC was necessary to provide more effective means for C2 of Arab/Islamic regional forces. This also simplified matters for CINCCENT, because now he only had to coordinate with the Saudis for all regional forces. The EAC and NAC functioned as rear area commands and continued to provide logistic and administrative support.

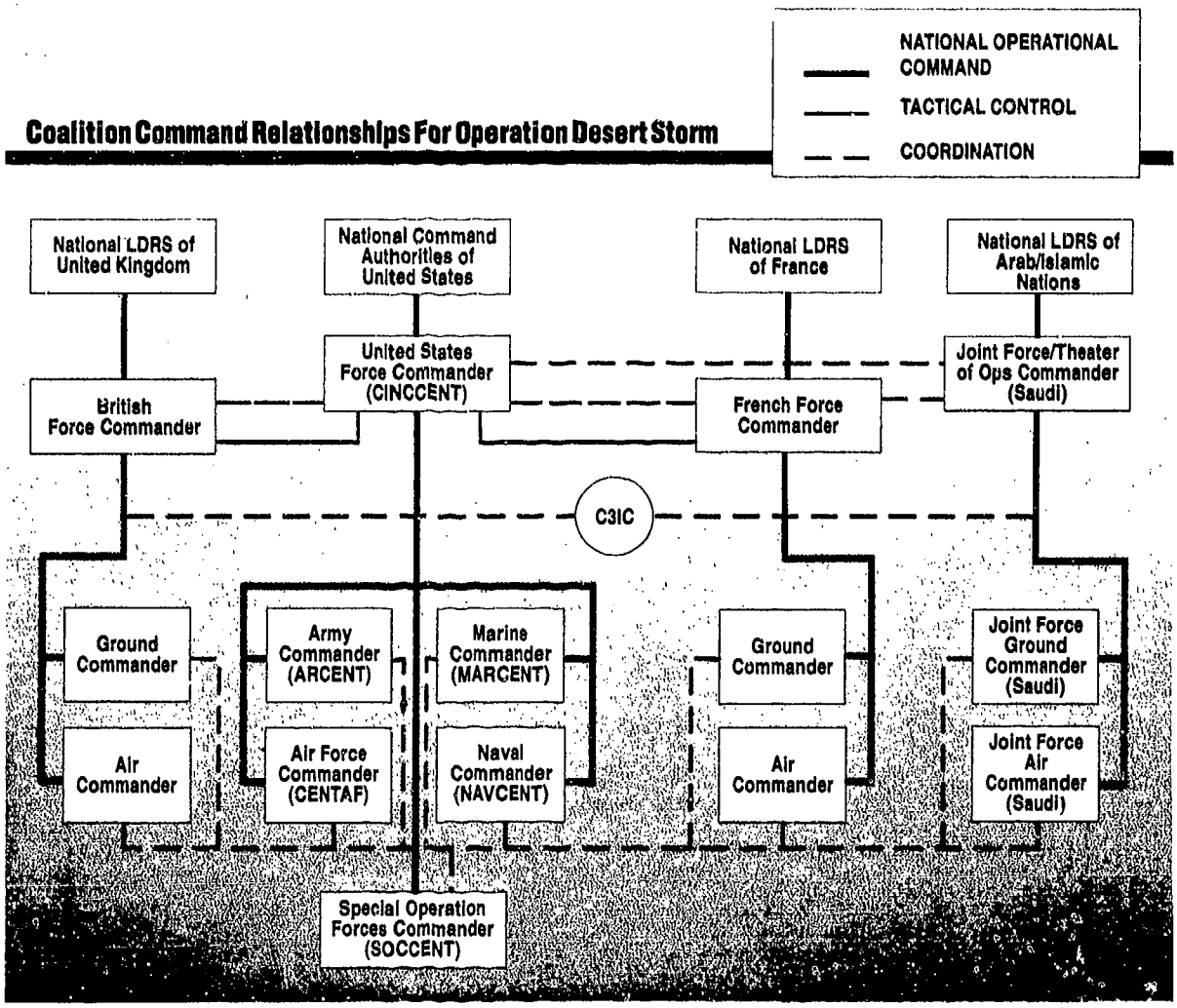


Table K-9
Coalition Command Relationships During Operation Desert Storm

All ground operations were coordinated in the Coalition Coordination, Communication, and Integration Center (C3IC) and through periodic commanders' conferences. The ground component commanders were CINCCENT and Commander, JFC. UK ground forces were OPCON to VII Corps and French ground forces were under the TACON to XVIII Airborne Corps. Coalition air forces were integrated into the theater air campaign as detailed in the ATO.

Arab/Islamic Coalition Command Relationships

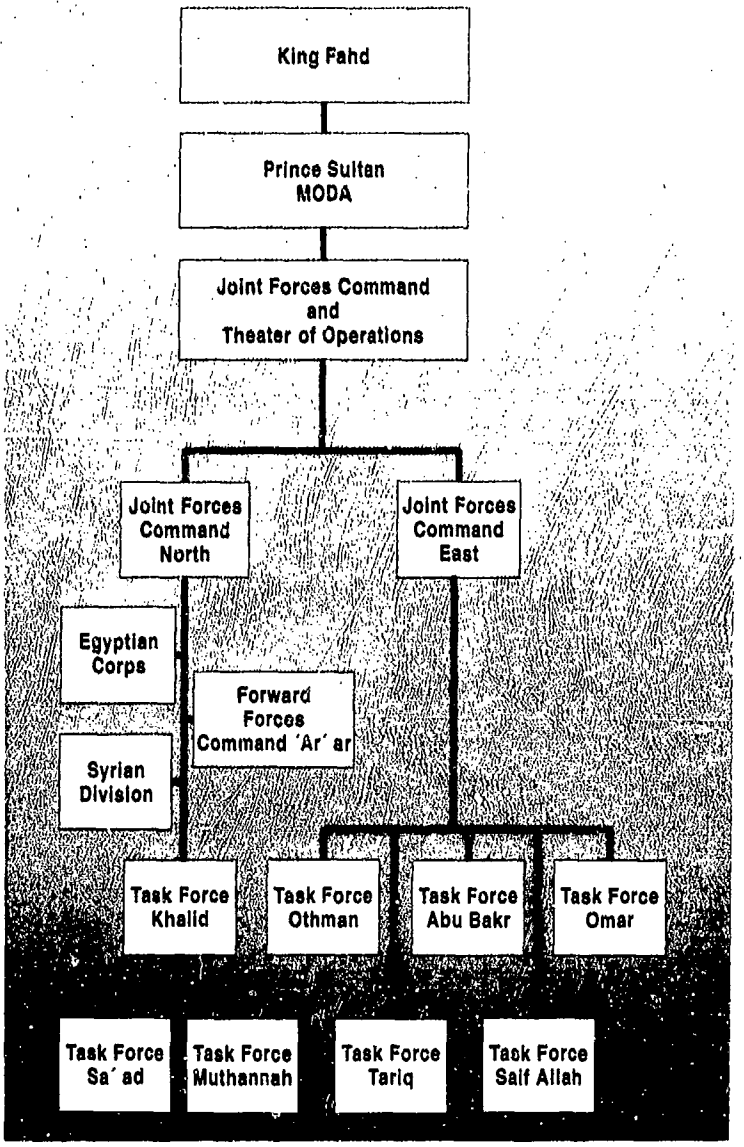


Table K-10
Arab/Islamic Coalition Command Relationships

Figure K-7
General Schwarzkopf and Lieutenant General Khalid Discuss Operations in CENTCOM War Room

Coalition Coordination, Communication, and Integration Center

Another vitally important challenge for the United States and Saudi Arabia was to forge a unified effort among Coalition ground forces without the benefits of a unified command. Unlike the North Atlantic Treaty Organization (NATO), there was no single commander or alliance to coordinate multinational activities. To facilitate the combined planning process and improve day-to-day integration of coalition operations, a combined operations center was needed. The ARCENT Commander, with extensive experience working with the Saudi Arabia National Guard (SANG), assumed responsibility in this task and quickly established the C3IC.

The C3IC was established on 13 August in Riyadh, in the National Defense Operations Center of the MODA headquarters building, the same complex that housed CENTCOM headquarters. It was directly adjacent to the CINCCENT war room, the CENTCOM Joint Operations Center, and the CENTCOM Joint Intelligence Center. It was operated by ARCENT and the Saudi Arabian Armed Forces. The initial C3IC task was to coordinate the activities of the Coalition ground forces assembling in Saudi Arabia. In December, as Operation Desert Shield matured and the Coalition grew, responsibility for the US operation of the center was transferred to the

CENTCOM staff, and its mission was primarily to prepare for operations to liberate Kuwait.

The C3IC served the link between the two major command structures that developed during Operation Desert Shield – the American, British and French (as well as air units from Italy and Canada) on one hand, and the Arab/Islamic (the JFC) forces on the other. The 24-hour center exercised no command authority, but was the conduit for all coordination between the Western and Arab/Islamic forces. It proved crucial to the success of Operation Desert Storm. During Operation Desert Shield, the C3IC became the clearinghouse for the coordination of training areas, firing ranges, logistic arrangements, frequency management, and planning activities. During Operation Desert Storm, the center coordinated the operations of the US/UK/French forces with those of the JFC-N, JFC-E,and FFC-A. This included coordination of boundary changes and movement of the fire support coordination line. Throughout the crisis, the C3IC also served as the focal point for the exchange of intelligence between the Saudis and US forces at the national, theater, and tactical levels. This included requests for both strategic and tactical reconnaissance to and from each command structure.

The Vice Deputy Commanding General, ARCENT and the Saudi JFC, each representing his command structure, directed the C3IC. The center was organized into Ground, Air Forces, Naval, Air Defense, Special Operations, Logistics, and Intelligence sections, each jointly manned by Saudi and American officers. These officers were the points of contact between their CENTCOM and Saudi General Staff functional elements. The French *Force Daguet*, the SANG, and the VII Corps each provided an LNO to the C3IC.

The C3IC provided briefings and updates daily on the Iraqi and allied situation to senior officers from all Coalition countries. Presiding officers at these briefings normally were CINCCENT or his deputy, and the JFC commander. Briefing responsibilities alternated between US and Saudi officers. This helped to involve all parties in the preparation process and, in so doing, improved understanding throughout the crisis.

COMMUNICATIONS

Joint Command, Control, and Communications (C3) Structure

The communications network established to support Operations Desert Shield and Desert Storm was the largest in history. A flexible and responsive C3 system was installed in record time – and it maintained a phenomenal 98 percent readiness rate. The final architecture provided connectivity with the NCA, US sustaining bases, CENTCOM, other Coalition forces, and subordinate component elements. This was not an easy task.

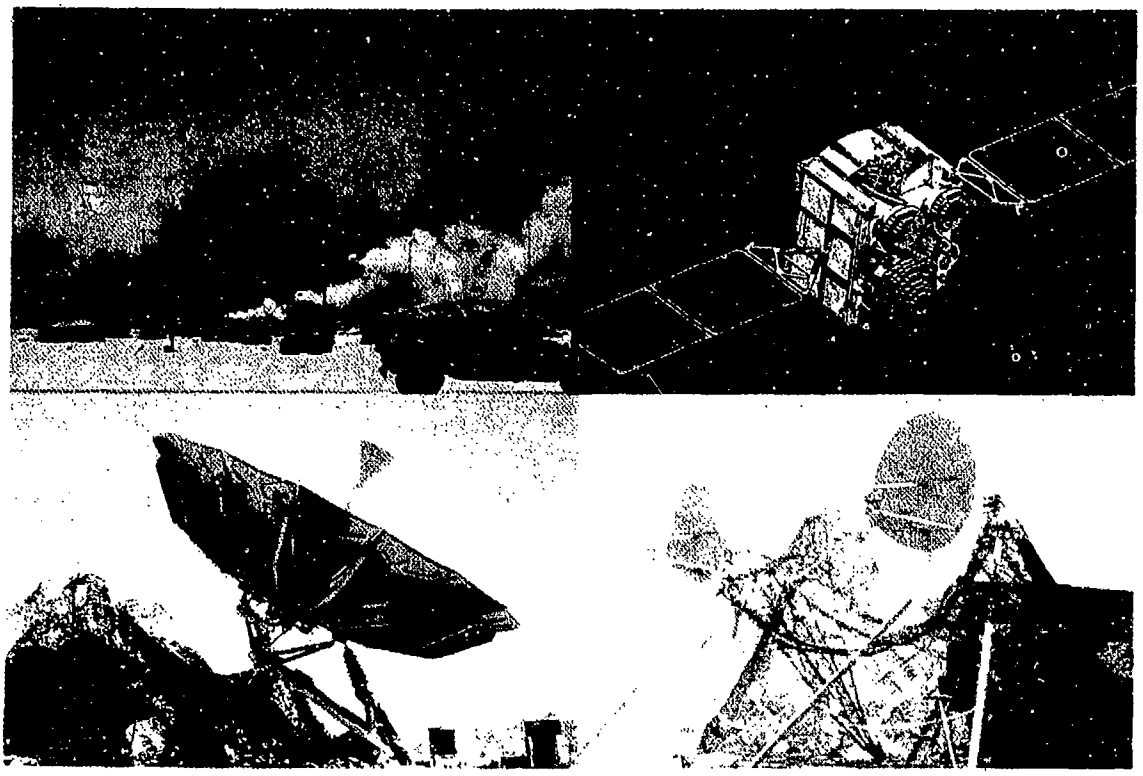


Figure K-8
A Sophisticated Network of Multimedia Communications Capability Had to be Built from the Ground Up to Tie the Coalition Forces Together so That Timely Command and Control Could Become a Reality

> ***"The services put more electronics communications connectivity into the Gulf in 90 days than we put in Europe in 40 years"***
>
> **Lieutenant General James S. Cassity**
> **J-6, Joint Staff**

In addition to equipment differences among various Coalition members, there were differences among US forces. Ultimately, several generations of equipment and many different command and staff elements were melded. At the height of the operation, this hybrid system supported more than 700,000 telephone calls and 152,000 messages a day. Additionally, more than 35,000 frequencies were managed

and monitored daily to ensure radio communication nets were free of interference from other users.

On 8 August, in support of the rapid deployment of US forces, CENTCOM deployed the first contingent of communications equipment and personnel to provide crucial links between the in-theater forces and CINCCENT at MacDill AFB. Included in the initial communications package was a super high frequency (SHF) multichannel satellite terminal, several ultra high frequency (UHF) single-channel tactical satellite (TACSAT) terminals, and associated terminal equipment, to provide secure voice, facsimile and Defense Switched Network (DSN), Automatic Digital Network (AUTODIN), and Worldwide Military Command and Control System connectivity to the initial deployed headquarters elements. The Joint Communications Support Element (JCSE) was among the first of these deployments. (The JCSE is responsible to the CJCS for providing tactical communications to JTF headquarters and SOCOM.) At the same time, communications equipment from the XVIII Airborne Corps, I MEF, and the 9th Air Force began arriving and links were established quickly.

Originally formed in 1962 under US Strike Command, the Joint Communications Support Element has evolved into its current organization under the Chairman, Joint Chiefs of Staff (CJCS) with the purpose of providing crucial tactical command, control, and communications support for contingency operations and joint exercises for all unified and specified commands at CJCS's direction. To meet its global, rapid deployment mission, a contingency support package can be deployed within 24 hours and the entire unit within 72 hours.

The rapidly deployable JCSE provided the primary communications support to CENTCOM and SOCCENT during the initial deployment. JCSE resources included UHF and SHF SATCOM radios, line-of-sight radios, High Frequency (HF) radios, and circuit and message switches. Throughout Operations Desert Shield and Desert Storm, JCSE communications provided continuous transmission and switching support for CENTCOM headquarters, linking the command with its components and the NCA. The final JCSE resources were deployed in mid-January in response to a requirement to support the CENTCOM Alternate CP, and to provide Ground Mobile Force/Defense Satellite Communications System (GMF/DSCS) satellite support to UK forces.

The Saudi national telephone service augmented early deploying communications packages. There were very limited in-place Defense Communications System (DCS) facilities anywhere in SWA and, although the Saudi telecommunications system is modern and reliable, it has neither the capacity nor

Figure K-9
JCSE Element Deployed Provided Communications Support for CENTCOM Headquarters, Linking the Command With Its Components and the NCA

the geographical dispersion to support a large military force. Available international telephone access also was only a small part of the total requirement.

Parallel to the rapid buildup of combat forces in SWA was the deployment of organic tactical communications systems from Army, USMC and USAF units to tie components and subordinate commands into a joint voice and message switching network. Because of the high demand for limited airlift resources, initial forces arrived with minimum essential communications capabilities, usually single channel UHF SATCOM and sporadic access to the local commercial telephone system using secure telephone units (STU-III). This level of communications support would have been insufficient to conduct operations had hostilities begun immediately. The network continued to expand, however, as air and surface transports brought more communications equipment into the theater. The arrival of heavy t[illegible]ospheric scatter and line-of-sight radio equipment (which provided the bulk of the intra-theater connectivity) improved multiple path routing, adding robustness to the joint network.

By November, there was more strategic connectivity (circuits, telephone trunks and radio links) in the AOR than in Europe. By the time Operation Desert

DOD Communications Systems

- **Automatic Digital Network (AUTODIN): The principal long-haul network for transmitting record or message traffic. Serves two major communities of users: general purpose and special intelligence.**
- **Defense Communications Systems (DCS): The backbone long-haul communications systems in support of the Department of Defense.**
- **Defense Data Network (DDN): Provides worldwide digital packet switching networks designed to meet DOD data communications requirements. A composite of four separate data networks that operate at different security levels.**
- **Defense Satellite Communications System (DSCS): Military wideband, multichannel super high frequency (SHF) satellite communications system. Backbone of defense satellite communications. Provides secure, long-haul, worldwide communications service in support of unique and vital DOD and non-DOD users.**
- **Defense Switched Network (DSN): Provides a switched network for end-to-end, long distance, common-user and dedicated telephone, data, and video service on a worldwide basis. Replaces the Automatic Voice Network (AUTOVON).**
- **Joint Tactical Communications Program (includes TRI-TAC): Joint Service program to develop and field tactical multichannel and switched communications equipment.**
- **Ultra High Frequency Satellite Communications (UHF SATCOM): Military UHF satellite communications systems provide the requisite single channel connectivity for tactical users.**
- **Worldwide Military Command and Control System (WWMCCS): Provides the National Command Authorities, the Chairman, Joint Chiefs of Staff, and commanders of unified and specified commands with the means for planning, directing, and controlling US military forces worldwide.**

Storm began, networks that included satellite and terrestrial communications links provided 324 DSN voice trunks into US and European DSN switches, along with 30 AUTODIN circuits to CONUS and European AUTODIN switches, supporting 286 communications centers. The Defense Data Network (DDN) was extended to the tactical level, providing high-speed packet switched data communications. At its peak, the joint communications network included 118 GMF satellite terminals, 12 commercial satellite terminals, 61 TRI-TAC voice and 20 TRI-TAC message switches.

(This was the first major operational employment of the jointly developed TRI-TAC equipment.)

Combined Command and Control Communications

US forces worked extensively with Saudi communications managers to plan and implement a communications infrastructure for C2 of Saudi and Islamic forces. Beginning in August, CENTCOM communications staffs helped the Saudis purchase more than 100 secure HF radios. These radios were an effective communication system from the Eastern and Northern province commands to the front line. In addition, the US provided other encryption systems to secure existing nonsecure radios and telephones. Interoperability was further improved when ARCENT liaison teams augmented the Saudi communications capability with US communications assets immediately before the ground war began. The US-augmented systems were the most reliable C2 systems for Saudi forces.

Coalition C3 was improved by the use of STU-IIIs, personal computers, and fax machines, as well as the sharing of national and commercial satellite resources, and the exchange of liaison teams to overcome language and technical problems. Exceptions to policy were required to allow use of some items by foreign Coalition members. The variety of equipment in use meant that the communications architecture had to be improvised as additional requirements became known. For example, an interoperable Coalition secure voice system was needed. A system that satisfied this requirement was constructed; however, while it was possible to build the structure around existing equipment, many innovative modifications and upgrades were required.

SATELLITE COMMUNICATIONS SYSTEMS (SATCOM)

> ***"When we started our deployment, we had only the most rudimentary communications infrastructure in Southwest Asia and the challenge of distance was daunting. Thanks to good planning and to our understanding of the importance of satellites, we quickly and smoothly transitioned to a mature tactical theater network."***
>
> **General Colin L. Powell**
> **Chairman, Joint Chiefs of Staff, December 1990**

For the first time in history, satellite communications for both inter- and intra-theater played a major role in the combat forces' deployment, support and C2. Even precision weapon systems depended on reliable, high speed data systems for success. Military satellite communications (MILSATCOM) formed the C2 backbone and highlighted the growing dependence on MILSATCOM to provide operational flexibility tailored to prioritized C2 needs. Central management of all MILSATCOM systems resulted in effective allocation of scarce resources and expedient solutions to crucial C2 needs, consistent with Coalition force operations. Examples of this include moving two satellites to the AOR to support intra-theater communications for VII Corps and I MEF; using UK satellite capacity for US tactical satellite terminals in support of dispersed UK and US forces; exchanging Service MILSATCOM assets among the Army, USAF, and Navy.

Multichannel Satellite Communications

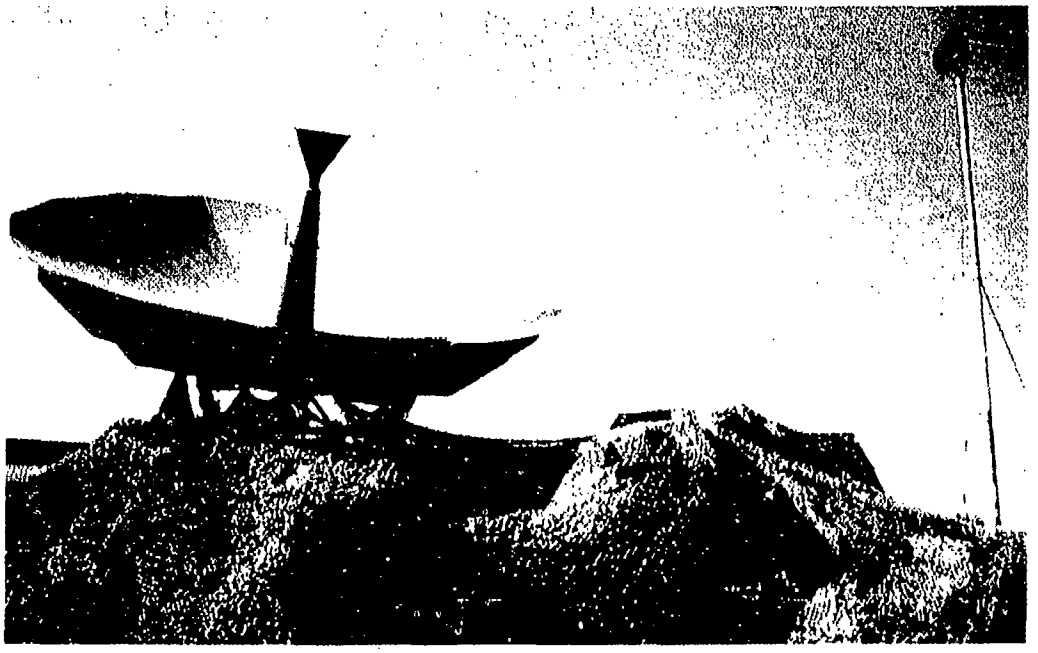


Figure K-10
A Multichannel Satellite Communications Terminal and Dish Are Employed in SWA

The rapid deployment, and need to conserve airlift for combat forces, coupled with a lack of an indigenous communications infrastructure, resulted in a heavy reliance on GMF satellite terminals using the DSCS. The GMF system was the primary

in-theater long-haul, multichannel communications capability available for deployed CENTCOM forces. DSCS is the military wideband SHF satellite communications system that was the principal multichannel transmission means for CENTCOM forces for both strategic and tactical operations. To meet the additional communications needs of augmentation forces that began deploying to the theater in November, a third satellite joined the DSCS constellation in December. This reserve DSCS II was repositioned from its Pacific orbit, augmenting the primary Indian Ocean DSCS II and the East Atlantic DSCS III satellite.

SHF Satellite Communications

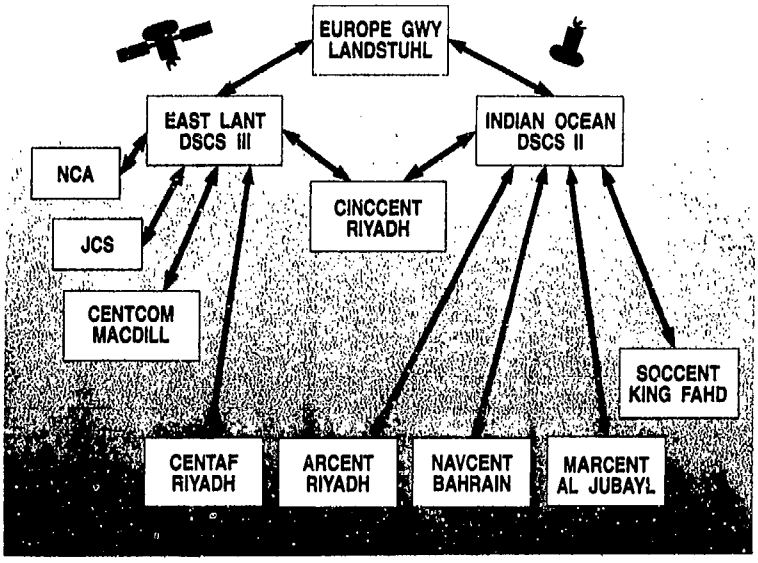


Figure K-11
SHF Satellite Communications (DSCS) Provided 75 Percent of All Inter-theater Connectivity

It also was clear that providing reliable and continuous communications presented a unique set of challenges – how to maintain communications with a rapidly moving force across vast distances. One solution was to use the DSCS multichannel satellite terminal with a mobile eight-foot antenna dish. At the beginning of the offensive, DSCS provided 75 percent of all inter-theater connectivity and was used extensively to support intra-theater requirements across long distances, not supportable by terrestrial systems. The DSCS capacity, however, was limited by available power and bandwidth. To make maximum use of GMF with DSCS, larger, less mobile 20-foot satellite antennas were used, especially at the fixed

headquarters and main logistics areas. Additionally, to meet surge demands, DSCS managers took steps to improve satellite performance. These measures included reallocating user priorities, refocusing the primary DSCS II narrow beam antenna over Saudi Arabia, and reconfiguring DSCS III antenna feeds and patterns to improve coverage of the AOR. In anticipation of increased requirements for DSCS when the offensive began, supplemental satellite communications support was arranged through commercial leases and capacity on SKYNET, the British military communications satellite, in accordance with a pre-existing US/UK satellite communications memorandum of understanding.

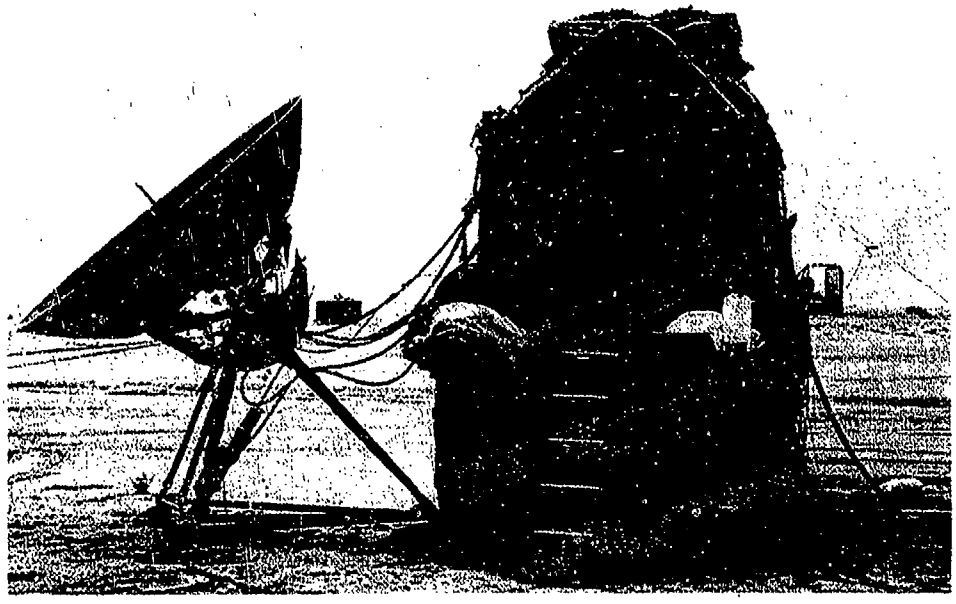


Figure K-12
SHF GMF Terminal With the 8-foot Mobile Antenna Operating Over DSCS Carried Voice and Data Circuits That Linked Bases Within Theater and Extended Connectivity to the Defense Network

UHF Satellite Communication

Military UHF SATCOMs provided requisite single channel connectivity for C2, intelligence dissemination and logistics support throughout the operation. The need to have UHF TACSAT capability to support combat forces across long distances was established early and the requirement grew steadily. UHF TACSAT was used as a

combat radio net where conventional FM radios did not provide the necessary range. During the deployment, initial UHF SATCOM usage grew until the 160-channel UHF constellation was nearly saturated with traffic. CENTCOM forces on ships, submarines, aircraft, and ground sites used hundreds of UHF MILSATCOM terminals. Deploying units augmented organic equipment with borrowed UHF TACSAT terminals.

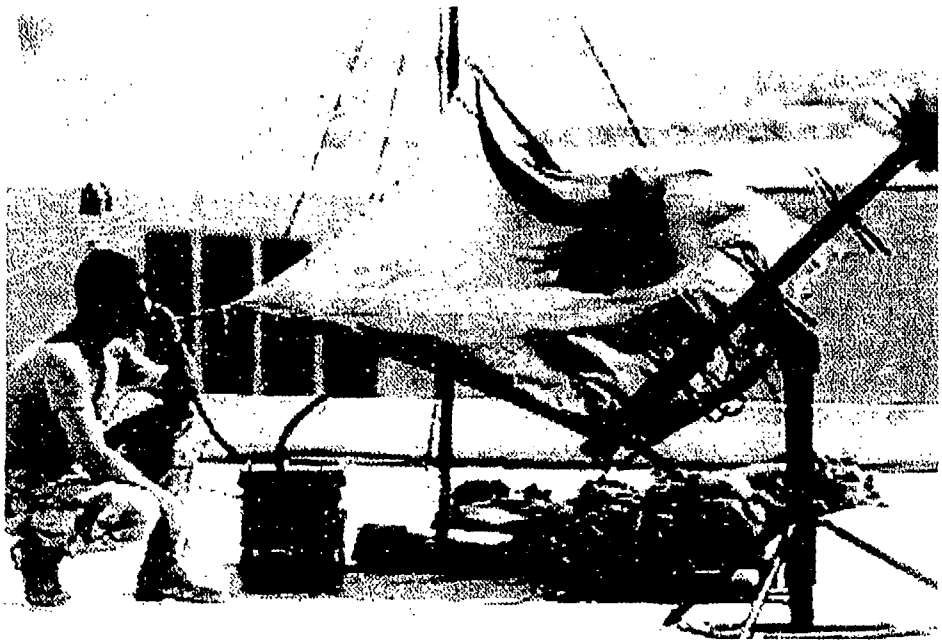


Figure K-13
UHF TACSAT Terminal Can Be Transported and Set Up Quickly to Provide Single Channel Secure Voice and Data

The Navy, in particular, places heavy reliance on UHF communications. Approximately 95 percent of the Navy's message traffic went over UHF satellite communications. These satellite systems were oversubscribed and fragile, despite having the demand assigned multiple access multiplexing system, which permits one satellite channel to be shared by multiple users simultaneously. UHF communications were used so extensively that on 28 November, Naval Space Command stated there was no additional UHF coverage available. This was because the fleet satellite used to support CENTCOM and other users in the AOR had been completely saturated. Additional users could not be supported without taking other users off. This limitation was eased somewhat in mid-December when a Lincoln Laboratories satellite, which used a different portion of the UHF spectrum, was made available to support US forces.

Rapid growth in requirements throughout the operation required continuous effort by the Joint Staff and CENTCOM staff to find space segment capacity to support the enormous demand for access.

All satellite communications, both military and commercial, were vulnerable to jamming had the enemy chosen to do so. Single-channel UHF communications systems, in particular, are extremely vulnerable due to the relative ease of jamming a transponder in any of the UHF satellites.

Leased Commercial Satellite Communications

Confronted with a substantial demand for multichannel capability, the JS, Defense Communications Agency (DCA) (renamed Defense Information Systems Agency in June 1991) and CENTCOM communicators used commercial satellites to supplement military requirements. At the CENTCOM J-6's direction, with JS support and assistance and in cooperation with DCA and the National Communications System (NCS), actions were taken to lease turnkey (ready to use) SATCOM communications services. Especially noteworthy were the commercial C-band and Ku-band earth terminals deployed to the AOR. These terminals provided leased circuits that interfaced with the joint and component tactical switched networks in the theater.

The NCS provided more than 350 circuits in support of Operations Desert Shield and Desert Storm. They were used for emergency and essential services; carried AUTODIN, DSN, DDN; and had dedicated voice and data circuits. Users included the Secretary of Defense, the Secretary of State, the White House Communications Agency, CENTCOM, the Service component commands, DCA, and SAC. More than a dozen commercial local and long-distance carriers participated. Additionally, commercial vendors offered a wide array of services, including voice and facsimile, at no charge or at reduced cost.

The initial complement of commercial satellite circuits established in August and September linked CENTCOM Forward and Rear, and Fort Bragg, NC, and Dhahran in support of the XVIII Airborne Corps. There was significant expansion in the following months, including leased terminals deployed to Saudi Arabia to provide service through INTELSAT. (This system also supported VII Corps communications to Europe.)

The joint Command, Control, Communications, and Intelligence (C3I) community examined other commercial satellite alternatives in anticipation of additional communications demands. However, initiatives were dismissed after it was determined that additional commercial communications were no longer needed or that their footprint did not adequately cover the area of interest.

Seeking improved data communications to relieve some of the overloaded military circuits to NAVCENT, the Navy arranged for commercial satellite

communications capability to be installed on selected ships operating in the AOR. This capability proved to be a vital link for coordinating the efforts of NAVCENT on the command ship *USS Blue Ridge* and NAVCENT-Riyadh, and for communicating directly with CINCCENT. Additionally, it played an important part in the real-time coordination of ATO inputs between Riyadh and the Persian Gulf battle force commander on board the *USS Midway* (CV 41).

Commercial SATCOM proved a valuable resource to satisfy the requirements for satellite communications and to accommodate as many non-warfighting requirements as possible to relieve the overburdened MILSATCOM system.

TACTICAL COMMUNICATIONS SYSTEMS

An extensive network of tactical voice and message switches was installed in the AOR to provide communications across extended distances. Using three generations of equipment during the buildup of forces in SWA, and achieving a coherent, fully interoperable network, was a unique challenge. It required numerous interfaces, intensive management, and substantial, innovative workarounds in both equipment and software.

Deployed systems consisted of the Army's all digital Mobile Subscriber Equipment (MSE), used at echelons corps and below, and the TRI-TAC switches used by the JCSE, USMC, USAF and Army at echelons above corps, with both a digital and analog capability. The Army and USMC also deployed the Improved Army Tactical Communications System (IATACS) and AN/GRC-201 Troposcatter Multichannel Radio System, respectively, which are older generation analog systems.

"The performance of the MSE system in the 1st Cav during Desert Shield has been superb. The dependability of the system is good and [it] has been operating 24 hrs/day in a harsh environment".

Commanding General, 1st Cavalry Division

"MSE is far superior to IATACS, especially in a highly mobile and intense conflict. During Operation Desert Storm, the division signaleers truly earned their combat pay."

Commanding General, 3rd Armored Division

MSE performed well, adding robustness to corps and division C3. It interfaced with tactical satellite and tropospheric scatter communications systems, enabling commanders to extend their span of control across great distances. Through established DSN gateways, an MSE-equipped unit moving through the desert could be reached by direct dialing from the United States. Ease of operation and rapid installation added flexibility and mobility. Twenty node switches (major centers) and more than 100 extension switches with associated radio and secure radio telephones from five signal battalions were deployed. The MSE contractor deployed a Regional Support Center which provided technical and logistics support throughout. Contractor representatives worked on-site with Army personnel at the unit level. Division signal units reported high reliability, low maintenance and the ability of MSE to keep pace with maneuver units while providing telephone and data service on-the-move. The requirement for a system to do this was of great concern before the ground offensive. MSE successfully interoperated with the TTC-42 voice switch, an element of the USMC Unit Level Circuit Switch (ULCS); with TRI-TAC equipment; and with NATO equipment, including the French RITA communications systems.

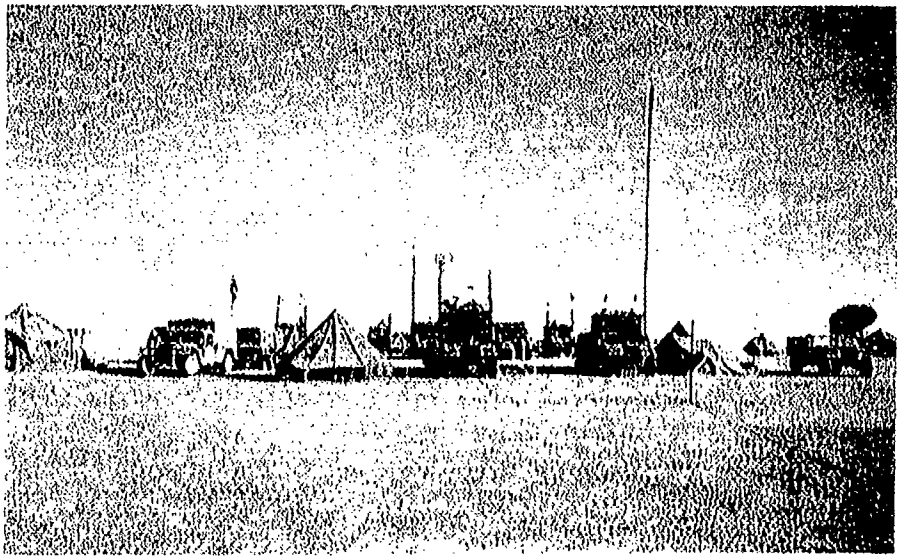


Figure K-14
MSE, Deployed for First Time in a Hostile, Desert Environment, Provides Essential Telecommunications Links for Military Units Moving Through the Battle Area

The new electronic counter-countermeasures capable Single Channel Ground and Airborne Radio System (SINCGARS) worked well. However, only a few Army and USMC units were equipped with this radio. Approximately 700 were deployed with

Figure K-15
Microwave Communications Relay Site
Providing Communications Link Between
XVIII Abn Corps and Rear Area

the Army and 350 with the Marines. They displayed an astounding 7,000 hours mean time between failure rate as well as a 30 percent range increase from older radios. SINCGARS is a tremendous improvement from the old VRC-12 family of radios in terms of reliability, maintainability, usable and dependable range, secure operations, and the ability to operate in extreme weather conditions. Other advantages are its resistance to jamming and the ability to transmit data as well as voice. SOF used SINCGARS throughout the war and were exceptionally pleased by the seven-pound weight savings compared with the older backpack radio.

EUCOM Communications Support

EUCOM involvement in the Gulf began in July, before the invasion of Kuwait. UHF TACSAT systems and operators were deployed to Doha, Qatar, to support SAC tanker operations during Operation ivory Justice, a SAC exercise. Shortly thereafter, during the early stages of Operation Desert Shield, EUCOM deployed many individual items of communications equipment and personnel to augment in-place communications units. Principal assets included SHF multichannel and UHF single channel tactical satellite systems, tropospheric scatter and tropo/satellite support radios, TRI-TAC voice and message switches, and secure FM radios. This rapid deployment not only underscored CINCEUR's commitment to support CENTCOM fully, but also reflected the changing political climate in Europe. Although unit readiness was, in some cases, severely downgraded by the transfer of crucial, mission-essential systems, the rapidly fading threat from the Warsaw Pact allowed this transfer without degrading the security of Central Europe. US Army, Europe further minimized the effect by taking much of the equipment being sent to SWA from prepositioned stocks.

Also, during this time, significant initiatives were undertaken with European allies to make them interoperable with the Coalition forces. Throughout the buildup in Operation Desert Shield (and all through Operation Desert Storm), many requests for assistance were supported. These included secure voice/data connectivity and GMF terminals and TACSAT antennas.

With the deployment of the VII Corps in December, a considerable number of support units also had to be deployed to meet the increase in communications requirements. These units included three of the four European-based Echelons-Above-Corps signal battalions, the USAF Operations Center, elements of a Combat Communications Group and Tactical Control Wing, and a Communications Security Logistic Support Unit.

In January, EUCOM installed a UHF TACSAT system in Israel, which provided connectivity to a network supporting the Secretary of Defense. The network proved so reliable that, during Operation Desert Storm, it also was used to relay Scud missile warnings.

Providing essential C3 support for Operation Proven Force proved a challenge. (Operation Proven Force was a EUCOM established JTF in Turkey to assist the Coalition forces in the liberation of Kuwait. It supported Operation Desert Storm by conducting offensive combat operations against targets in northern Iraq. Communications into the Turkish AOR had to be expanded substantially. Every satellite asset assigned to EUCOM was used to full capacity; prioritization of channels and terminals had to be carefully managed. A major communications effort involved expanding the capacity of the existing DCS transmission system in Turkey, as well as increasing the number of DSN voice trunks. Planned commercial upgrades

were accelerated through coordination with the Turkish Post, Telephone and Telegraph System to provide additional capacity. Overall, the communications capacity available to the US military in Turkey increased by 200 percent within weeks.

INTELLIGENCE AND RECONNAISSANCE COMMUNICATIONS SUPPORT

CINCCENT recognized intelligence communications as crucial to meet vital collection, analysis, processing, and dissemination functions. Intelligence functions expanded in scope and efficiency as the communications infrastructure grew from a few voice circuits to a broad variety of voice, data, and message links connecting the United States, the AOR and points within the AOR. The Defense Intelligence Agency, National Security Agency (NSA), Central Intelligence Agency, the Service headquarters intelligence staffs and other unified and specified commands made significant contributions to the growth of intelligence information exchange capabilities to support CINCCENT. Telecommunications paths were required to connect the computers and workstations at all intelligence processing echelons.

Weather Systems

Weather satellites played a key role during the war. US and Coalition forces used data from the Defense Meteorological Satellite Program (DMSP) spacecraft and civil weather satellites to predict rapidly changing weather patterns. Meteorological satellites were the most reliable source of information on weather in Iraq. The information they provided was used extensively to plan and execute attack missions, to determine wind direction and potential spread of chemical agents, and to alert US forces of sandstorms or other phenomena. This access to current weather data allowed US forces to capitalize further on night vision and infrared targeting capabilities. Navy weather personnel on board the aircraft carrier *USS Roosevelt* (CVN-71) made extensive use of INMARSAT to supplement existing environmental data links, greatly improving the quality of weather forecasting for carrier air operations. (DMSP is discussed in detail in Appendix T.)

Multi-Spectral Imagery

When US forces deployed to the Gulf, many maps of Kuwait, Iraq, and Saudi Arabia were old and inaccurate. To correct this deficiency, multi-spectral imagery (MSI) satellite systems were used to map the AOR, resulting in up-to-date, very precise maps of the area. There also were requirements to plan amphibious and

airborne operations, to track the movement of Iraqi forces, and to prepare for or practice strike operations – MSI helped meet these needs.

MSI satellites (e.g., the US LANDSAT) view specific areas of the earth and transmit images to ground stations. These images are more than black and white pictures; they show features of the earth beyond human visual detection capability. By using these MSI images, it is possible to identify shallow areas near coastlines or where equipment has traveled over the earth. MSI shows much that is hidden from normal view; everytime the ground is disturbed, which is almost unavoidable for a modern army, a spectral change occurs. This data is emphasized by comparing MSI computer images and instructing the computer to display changes. This type of information provided insights into Iraqi operations and was used to help plan the ground war.

NAVIGATION SYSTEMS

NAVSTAR Global Positioning System (GPS)

Use of space-based navigation and positioning was an unqualified success. The NAVSTAR Global Positioning System (GPS) played an important role in the success of the overall operation. Navigation and positioning data was provided to all Coalition forces. GPS proved an assured method of navigating in a featureless desert – one of the more difficult tasks the forces faced. GPS equipment was used to support a wide variety of missions, including:

- To provide mid-course guidance for the Stand-off Land Attack Missile, which allowed more efficient terminal sensor target acquisition.
- To improve navigation accuracy for F-16/B-52s.
- To improve emitter source location for RC-135s.
- To enhance deep penetration of enemy territory to rescue downed aircrews and other personnel.
- To make land navigation for ground forces easier and more precise.
- To reduce Patriot missile system radar emplacement times.
- To provide more precise methods for mapping and marking minefields, and to permit aerial mine-clearing under instrument flight rules.
- To provide precise navigational data for Tomahawk Land-Attack Missiles.

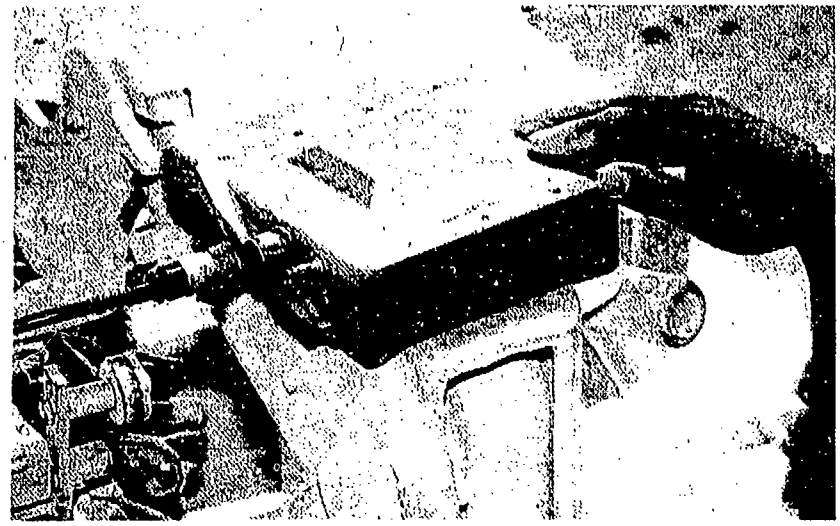


Figure K-16
First Combat Use of the Small, Lightweight GPS Receiver Commonly called "Slugger" by the Soldiers

The Services purchased thousands of commercial GPS receivers to provide GPS access. Initially deployed ground forces were without this navigation means. GPS receivers remained in short supply until an emergency procurement action enabled the Services to acquire commercial receivers. Almost 90 percent of the GPS receivers US forces used were commercial, non-crypto capable receivers. This heavy reliance on commercial receivers forced the US to keep the GPS Selective Availability (SA) feature turned off. SA is a GPS function that preserves highly precise GPS data for authorized users, and is accomplished by degrading the unencrypted navigation data to make it less accurate. In future conflicts, the US may face adversaries capable of exploiting GPS or using weapons systems with GPS. The CINCs and the Services agree that the current DOD policy on GPS-SA should remain unchanged – SA should remain on. A mix of military GPS receivers and commercial receivers, to meet diverse DOD requirements, is being considered to control cost while maintaining needed operational performance. (GPS is discussed in detail in Appendix T.)

Position Location Reporting System (PLRS)

The Position Location Reporting System is an automated navigational aid that provides accurate and reliable near-real-time position and navigation information in display form. It consists of a master station and basic user units (BUU) and is used for fire support planning, C2, and coordination. The USMC used this system extensively

As stated by the Assistant Signal Officer, 11th Air Defense Brigade when asked about GPS receivers: "If you mean those green position locators, they are lifesavers. Whenever we sent someone to another unit for coordination, we entered that unit's 10 digit coordinates and the SLGR (small lightweight GPS receiver) directs them to the command post. Before, we had people getting lost in the desert, but since we got the three GPS receivers, nobody has got lost."

throughout SWA. Each Marine Division maintained a master station that could monitor up to 370 BUUs used at all echelons, including the forward air controllers and reconnaissance teams. In addition to providing commanders with accurate and timely information about forces, the system contributed to fire support coordination, maneuver lane and corridor identification, convoy control, and the passing of short, free-text messages between users.

CONTROL OF COMMUNICATIONS RESOURCES, PROCEDURES, AND POLICY

Early in the operation, CENTCOM assumed control of the validation process for all long-haul strategic communications. Without this control, early deploying forces would have consumed most available resources. Centralized management of long-haul strategic communications, satellite capacity, and frequency spectrum allocations was vital to subsequent force deployments. Allocation of communications circuits on established networks also was centrally managed, resulting in substantial equipment savings. At the height of the operation, more than 2,500 joint circuits were sharing the transmission and switching capacity of two or more Services. Centralized control of procedures and policy (i.e., switch network routing tables and precedence assignments) also were used.

During the initial stages of the operation, it became apparent that a Joint Communications-Electronics Operating Instructions (JCEOI) were essential to manage the theater-wide use of tens of thousands of tactical combat net radios. CENTCOM and NSA compiled this document and distributed it in September. The rapid force structure growth, coupled with the rigid design of the JCEOI, made it difficult to publish the changes required as the force structure increased. Eventually, the JCEOI provided information to operate more than 12,000 different radio nets. Although there were some delays in the process during Operation Desert Shield, a JS working group has examined this issue and developed a JCEOI concept that will improve the system substantially for future crises.

Frequency Management

Frequency management challenges were enormous. There was no single controlling agency in Saudi Arabia for radio frequency allocation or control. Consequently, CENTCOM frequency managers had to coordinate with a wide variety of Saudi government and military agencies, none of which had a complete picture of frequency use in Saudi Arabia. Progress in frequency allocation and deconfliction was slow until the publication of the combined operations order for the defense of Saudi Arabia in early November. This OPORD designated the CENTCOM Frequency Management Office (FMO) as the single point of contact for all joint and combined forces. This resulted in improved cooperation among Coalition force frequency managers.

This FMO, augmented by numerous frequency managers operating in Washington, coordinated and assigned more than 35,000 frequencies for Coalition forces, to provide for nearly interference-free use of the electromagnetic spectrum. Included in these assignments were more than 7,500 HF nets, 1,200 Very High Frequency (VHF-AM) nets, and 7,000 UHF-AM nets. To manage the VHF-FM frequency spectrum, which is the primary combat net radio band for Army and USMC ground forces, CENTCOM (in close coordination with the components, JS, and the NSA) developed a theater-unique JCEOI which assigned daily changing frequencies and call signs.

COMMUNICATIONS INTEROPERABILITY

Operations Desert Shield and Desert Storm provided a fertile environment to validate and further develop joint communications doctrine and procedures, as well as to solve many technical problems. These efforts rapidly built upon work done by various C3 groups, established to meet the challenges of creating a joint interoperable communications environment. Equipment not designed or intended to interoperate when procured originally was in use to support missions that became increasingly integrated as the theater developed. In many cases, as interoperation requirements emerged, the Services and agencies developed innovative modifications or upgrades to make interfaces possible. One example of such a success was the software modification that enabled the USMC ULCS to interoperate fully with TRI-TAC circuit switches (AN/TTC-39A). However, in some cases, interoperability was lacking, and these problems were documented in numerous after-action reports. The Joint Tactical Command, Control,and Communications Agency's Joint Interoperability Test Center now has in place a test bed of different equipment which will be used to test for and resolve such interoperability problems.

Interoperability between Coalition forces was accomplished in several different ways. The use of STU-II (NATO) and STU-IIIA (interoperable with STU-II) was one solution. Other techniques included sharing of national and commercial satellite resources and exchange of liaison teams. Of major importance was the loan of five tactical satellite terminals (from USAF and JCSE assets) to the UK, which resolved critical strategic C2 shortfalls between the UK Command headquarters and its dispersed ground forces. The integration of the French RITA communications system to interoperate with the robust MSE network also was a success.

At the beginning of Operation Desert Shield, CINCCENT announced a requirement for secure voice interoperability within the Coalition Forces. The solution was found in assembling a combination of equipment for use by US forces with different parties. STU-IIIAs were used to interface with NATO allies equipped with STU-II equipment. Doctrinal exceptions were required to allow the use of STU-IIIs by selected foreign nationals. To communicate with the the non-NATO Coalition force members, NSA provided a commercial secure phone with enhanced security. Connectivity was provided by lending STU-II equipment to embassies and STU-IIIAs to US users.

SUMMARY

The best personnel, equipment, and plans are of little value without positive C3. Building a communications infrastructure virtually from scratch was one of the more significant challenges of the operations in SWA. Never has the demand for real-time information been so great or the challenge met so effectively. The C3 system was largely brought over with the forces and grew in capability as the forces arrived. A mix of long-haul military, tactical military, and commercial communications was used to support deployment and warfighting operations. Satellites, leased land lines and tactical equipment had to be woven into a sophisticated network to meet the communications needs of a dynamic and rapidly changing combat situation. The demand for, and subsequent use of, secure communications placed a heavy load on the system. Innovative use of STUs, personal computers, and fax machines allowed for timely, secure information transfer and fortified C3 capability. The ability to quickly disseminate information was testimony to the successful efforts of those who provided the logistical and technical base.

DSCS, the principal multichannel transmission means for CENTCOM forces, was the mainstay of the operation. The need for MILSATCOM to support national requirements was clearly demonstrated. Commercial systems, though essential, cannot provide the operational flexibility and security required to support the large volume of tactical C2 needs, nor accommodate the sensitivities associated with worldwide signal intelligence collection and dissemination. Because of the significant demand for communications connectivity, commercial satellites (e.g., INTELSAT) and allied satellites (UK SKYNET and NATO) added a surge capability to MILSATCOM systems. Heavy reliance was placed on single channel UHF systems for

C2, intelligence dissemination and logistics support. All satellite communications were vulnerable to jamming, intercept, monitoring, and spoofing. Deployment of MILSTAR satellites beginning in 1992 will significantly alleviate these shortfalls.

NAVSTAR GPS played a key role and has many applications in all functional war-fighting areas. Land navigation was the biggest beneficiary, giving Coalition forces a major advantage over the Iraqis.

Given technical interfaces and innovative workarounds, tactical communications systems proved interoperable and were robust enough to provide top-to-bottom connectivity throughout the Coalition. Three generations of tactical communications systems were deployed – MSE, TRI-TAC and IATACS. Of particular interest was the debut of the Army's MSE which performed well and added significant mobility and flexibility. SINCGARS demonstrated its effectiveness under harsh conditions in a combat environment, and is a significant improvement from the earlier version of the combat net radio.

Communications were part of the most successful and technologically sophisticated health, morale, and welfare service ever assembled in support of deployed US armed forces. Commercial satellite terminals provided almost 3,000 telephones for morale calls. More than 90 Military Affiliated Radio Stations (MARS) established in the AOR handled more than 3,000 phone patches and 8,000 MARS-grams a week. Desert Fax connectivity provided free facsimile service from CONUS and Europe to the AOR, handling more than 6,000 messages a day at the height of the war.

OBSERVATIONS

Accomplishments

- Organization of US forces and C3I in Operations Desert Shield and Desert Storm was successful and may provide a model for future regional conflicts.
- Joint doctrine and procedures provided a basis for integration of US forces.
- The US command organization was simpler and had more unity of command than some of those that preceded it. GNA greatly clarified CINC authority and the CINC's relationship with the Services and the NCA.
- US command relationship doctrine of COCOM, OPCON, TACON, and Support was validated. The command relationships established reinforced Title 10, US Code, requirements for strengthening the role of the CINC.
- The JFACC concept was implemented as a method to provide for planning, allocating, coordinating, and tasking air activity. The ATO was used for coordination and allocation of sorties. All components and other Coalition nations with air forces participated in the ATO process.
- The United States provided liaison teams to all major Coalition forces. These were a source of accurate, timely information. They also were deployed to improve interoperability and reduce the potential for fratricide. LNOs well-versed in fire support procedures, communications, and US military doctrine, are vital.
- The technical competence and innovativeness of US forces allowed them to find solutions to many technical challenges to establish a workable C3 system.
- Space systems played a crucial role for warning, surveillance, communications, navigation, weather, and multi-spectral imagery.
- Tactical systems such as MSE, TRI-TAC and SINCGARS, along with telephones, fax, and personal computers provided flexible connectivity and compatibility. The modernization efforts that resulted in these new systems allowed commanders to visualize, plan, and then execute the wide turning movements while maintaining unit alignment across vast distances.
- The JCSE's unique communications capability demonstrated that the design and concept of a joint communications support organization is sound and necessary.
- The DSCS was the principal multichannel transmission system for intra- and inter-theater communications during the early deployment. Initially, DSCS

provided 75 percent of all inter-theater connectivity and was used extensively to support intra-theater requirements.

- Secure voice systems (STU-II/III, KY-57, KY-68, and SVX-2400) and commercial telephone and fax systems were reliable and effective.
- The GPS was a success for US and Coalition land, sea, and air forces.
- Tactical Special Intelligence (SI) support to Naval forces afloat was improved through use of the UHF Tactical Intelligence communications system. The rapid reconfiguration of the system provided a medium for the delivery of SI information.
- US surveillance and C3 systems provided tactical warning and communications crucial in suppressing the Iraqi Scud threat.
- Commercial satellites such as INTELSAT provided the necessary flexibility and backup to MILSATCOM.
- Civilian maintenance and repair worked well.
- The commercial telecommunications industry provided superb support.

Shortcomings

- A comprehensive C3 interoperability plan between Services and other defense agencies had to be constructed with many workarounds.
- GPS is susceptible to exploitation, although the Iraqis did not do so. There is a need to continue to press for the production, distribution, and integration of GPS receivers incorporating SA decryption.
- Throughout the operation, DSCS connectivity remained fragile due to the age and condition of the satellites and some ground stations. Older DSCS satellites and DSCS ground terminals will require modernization. It may be advisable to increase the number of military satellites providing worldwide C2 coverage, also. Consideration should be given to procuring terminals capable of using the worldwide coverage provided by commercial satellites. Emphasis also is needed to build smaller, more mobile terminals transportable by a single C-130. (The XVIII Airborne Corps used a prototype GMF terminal with a lightweight, eight-foot antenna. The antenna requires less space than the current mobile eight-foot antenna.)
- The United States does not have a reactive space-launch capability; this prevents replacement or augmentation of critical satellites when failures occur or crises arise.

- The ATO transmission process was slow and cumbersome because of inadequate interoperability. This was particularly true in the Navy, due to the lack of SHF communications on their aircraft carriers to permit on-line integration with the USAF computer-aided force management system. UHF and HF communications paths were used, but were not satisfactory because of the large data flow required. As a result, couriers often were used to deliver the ATO diskettes. The Services are working to streamline the ATO process. The Navy has a long range plan to equip all carriers with SHF by FY 95.

- DSP provided Patriot batteries with sufficient warning but, in the future, an improved sensor will be needed.

- Most SATCOM was vulnerable to jamming, intercept, monitoring, and spoofing, had the enemy been able or chosen to do so. Single-channel UHF systems have limited capacity and are extremely vulnerable, due to the relative ease of jamming a transponder in any UHF satellite. Future corrective actions to counter jamming include use of the extremely high frequency MILSTAR satellite system when it is fielded and the installation of an antijam modem for SHF fixed-base satellite terminals and tactical ground mobile terminals.

- Services should continue support of JCS actions intended to expand the effective UHF tactical satellite communications capacity. Concepts such as embedded COMSEC should be pursued, also.

- There is a continuing need to field lightweight, easily deployable communications equipment that can provide multichannel voice and data service for early deploying units. The MSE light forces contingency communications package, consisting of downsized, digital MSE, is being fielded to selected light divisions, such as the 101st Airborne Division (Air Assault), 82nd Airborne Division, and 7th Infantry Division (Light), in the first quarter of FY 93.

- Operations Desert Shield and Desert Storm demonstrated the need to field a digital radio such as SINCGARS quickly, to replace the VRC-12 series radios which experienced extensive alignment, reliability, and availability problems. The Army and USAF will field an airborne SINCGARS version; the Navy will field multi-functional radios capable of full interoperability with SINCGARS.

Issues

- Deploying component headquarters should not be burdened with the details of deploying forces when their primary task is to prepare arriving forces for combat. While recognizing there are some deployment functions best accomplished in theater, overall deployment management effort should reside in a headquarters not preoccupied with the preparation for combat. Force deployment responsibilities need to be revalidated.

- Some component headquarters were dual-tasked. NAVCENT doubled as the Fleet Headquarters and MARCENT as the MEF Headquarters. Although this arrangement provided direct communication between CINCCENT and the tactical commander, the geographic separation of these headquarters from CENTCOM headquarters prevented planning and conferring with all component commanders on a regular basis and made coordination among components more difficult. Component command structures are being re-examined. NAVCENT (Rear) has relocated from Pearl Harbor to MacDill AFB.

- The CINC must exercise with component commanders with whom he will fight. Upon execution of Operation Desert Shield, the JTFME initially was designated NAVCENT. SEVENTHFLT subsequently was designated NAVCENT and, while it overcame many obstacles during transition and performed its mission well, the changing relationships created a steep learning curve with new people and command arrangements, including a new Navy Support Command. War fighting component commanders must be the same as peacetime.

- Establishing and implementing coalition command relationships was difficult. The United States must remain innovative and flexible in establishing command relationships.

- For future operations, planners must consider the challenges of operating within another nation's C3 infrastructure. Combatant commanders must have deployable C3 systems that work well with all US and allied forces.

- The ARCENT headquarters (in peacetime) was a planning headquarters and manned to meet the peacetime and initial wartime requirements. Staff elements deployed in increments and manning slots were filled and augmented as necessary. The peacetime manning levels and concepts for deployment are under review.

- Intelligence requirements grew to unprecedented levels, exceeding the communications capacity allocated to the intelligence agencies and functions. Deployment of service-unique systems for intelligence dissemination exacerbated this problem due to a lack of interoperability.

- There is a need for a comprehensive joint architecture from which supporting communications architecture can be built and interoperability issues resolved.

- Warning capabilities must be improved or warning support could be limited in future conflicts by the type of tactical missile used or by solar, weather, or geographical limitations.

- The only US MSI capability is the aging LANDSAT system under Commerce Department control. DOD is analyzing improved collection capabilities of

greater use to military users. A mission needs statement for remote earth sensing has been validated.

- The use of space-based support by operational and tactical commanders should be institutionalized into military doctrine and training, and routinely incorporated into operational plans.

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APPENDIX L

ENEMY PRISONER OF WAR OPERATIONS

"The treatment of Iraqi prisoners of war by US forces was the best compliance with the Geneva Convention by any nation in any conflict in history."

International Committee of the Red Cross, Riyadh, Saudi Arabia, April 1991

Figure L-1
Iraqi Prisoners of War

INTRODUCTION

The success of the enemy prisoner of war (EPW) operations during Operations Desert Shield and Desert Storm can be attributed, in part, to the lessons learned in the war in Vietnam. During that conflict, US Armed Forces dealt with the international transfer of US and Allied EPWs to an ally; conducted military liaison with the EPW camp authorities of that ally; coordinated with the International Committee of the Red Cross (ICRC), determined training requirements for EPW units; and, established the need for an enemy prisoner of war information system, centralized management, and accurate accountability. It is also due in great

measure to adherence to the various agreements and conventions dealing with enemy prisoners of war, displaced persons and refugees.

The most important requirements of international law pertaining to persons captured or detained during an armed conflict are detailed in the four Geneva Conventions for the Protection of War Victims. Specific requirements for the humane treatment and full accountability of prisoners of war are found in the 1949 Geneva Convention Relative to the Treatment of Prisoners of War (GPW). The 1949 Geneva Convention Relative to the Protection of Civilian Persons in Time of War (GC), governs similar treatment and accountability of civilians.

Treatment and accountability of EPWs generated international interest and concern. In addition to other concerns, religious and cultural sensitivities were a factor. All EPWs and displaced civilians captured by Coalition forces during Operations Desert Shield and Desert Storm were eventually turned over to Saudi control to insure that Arab prisoners were treated in accordance with Arab culture and Islamic religious practice.

During Operation Desert Storm, Coalition forces captured 86,743 EPWs. Approximately 69,822 EPWs and displaced civilians were processed through US operated facilities between January, when the first EPW was captured, and May 1991. (By agreement, the United States also accepted EPWs and displaced civilians from UK and France and transferred them to Saudi Arabian installations.) US forces provided food, shelter, and medical care to both EPWs and more than 1,400 civilian displaced persons or refugees during this period. Eight EPW died in US custody; all as a result of injuries or sickness contracted prior to capture. Five died from combat injuries, one from malnutrition/dehydration, and two from unknown causes. Three US transferred prisoners died in Saudi camps due to wounds received while interned in the Saudi controlled camps. These deaths were investigated and reported through command channels to the ICRC, as required by Articles 120, 122, and 123, GPW.

CUMULATIVE EPW AND DISPLACED CIVILIANS CAPTURED/SURRENDERED

United States Forces	**63,948***
Arab Forces	**16,921**
British Forces	**5,005**
French Forces	**869**
Total All Forces:	**86,743**

*** Displaced Civilians (1,492) are included in the US forces numbers.**

Interrogations of some detainees initially identified as EPWs determined that several were civilians who had not taken part in hostile actions against the Coalition

forces. In some cases, they had surrendered to the Coalition to receive food and lodging. Under Article 5 of the GPW, tribunals were conducted to determine whether civilians were entitled to be granted EPW status. For those detainees whose status was questionable, tribunals were conducted to verify status, based upon the individual's relationship to the military and participation in the war. A total of 1,196 tribunal hearings were conducted. As a result, 310 persons were granted EPW status; the others were determined to be displaced civilians and were treated as refugees. No civilian was found to have acted as an unlawful combatant. (US Forces released 12 displaced civilians to Safwan, a US operated refugee camp, and 874 civilians to Raffa, a Saudi refugee camp.)

Centralized EPW management began during Operation Desert Shield and continued throughout Operation Desert Storm. The US National Prisoner of War Information Center (NPWIC) was fully operational before the ground offensive began, and a new automated program for compiling information on and accounting for captured personnel (as required by the GPW) was fielded in Operation Desert Shield. Trained Reserve Component (RC) EPW units were activated, and camp advisory teams were sent to Saudi Arabia to establish liaison with Saudi units to provide technical assistance, and to maintain accountability for EPWs and displaced civilians transferred to the Saudis. (In accordance with Article 12, GPW, the United States retained residual responsibility for EPWs transferred to the Saudi Arabian government.)

AGREEMENTS

Agreements were concluded in theater to formalize EPW procedures between separate Services and Coalition partners. Early interservice agreements between the Army, Navy, and Marine Corps Component Commanders formalized procedures and apportioned responsibilities for EPWs and displaced persons.

US policy requires approval of a formal international agreement by the Assistant Secretary of Defense for International Security Affairs (ASD/ISA) and the State Department as a prerequisite to transferring EPWs to a Coalition partner. A government-to-government agreement was negotiated between Saudi Arabia and the United States authorizing the transfer of EPWs to Saudi custody. This document was signed formally on 15 January. Separate military-to-military agreements, authorized by the ASD/ISA and the State Department, were also negotiated. These negotiations resulted in the US/UK EPW transfer agreement of 31 January and US/French transfer agreement of 24 February. The agreements outlined the actions to be taken by capturing forces in processing EPWs and displaced civilians through US theater camps, and medical channels to Saudi facilities.

The agreement between the United States and Saudi governments provided the United States would transfer custody of EPW to Saudi control after EPW registration by US forces. This agreement also was applicable to EPW captured by

the French and British and processed by the US. The Saudis established camps where Iraqi prisoners were treated well and in accordance with Arab customs. This procedure, while somewhat burdensome to the Saudis, eliminated the potential of intra-Coalition friction over the issue of treatment of captured personnel.

The United States and Saudi Arabia also worked closely to ensure that all EPW facilities met international standards. As part of the agreement on the treatment of EPWs, the United States agreed to provide liaison teams to work with the Saudis. These teams were organized to provide management, logistics, and administrative assistance. Also, they were to maintain accountability of EPWs transferred to the Saudis by the United States.

The number of prisoners captured and the size of the area of operations frequently complicated the handling of EPWs. The size of the Saudi EPW camps, distance between Coalition camps and transportation availability often limited the number of EPWs the United States could transfer. This meant that EPW remained at US camps longer than planned. However, extensive coordination among Coalition forces minimized these difficulties.

Figure L-2
EPW Liaison Team in Action

FORCE STRUCTURE

Headquarters, Department of the Army (HQDA) serves as the Department of Defense (DOD) executive agent for the EPW program. HQDA develops plans, polices, procedures, and force structure compatible with Geneva Conventions

criteria to meet DOD requirements . HQDA also operates the NPWIC, the central agency for all information pertaining to prisoners of war.

Article 122, GPW, and Article 136, GC, require captors to establish a national information bureau as quickly as possible after the start of hostilities. The NPWIC, manned by Army Reserve (USAR) individual mobilization augmentees, volunteer Reservists, and retired personnel, served as a central repository for information related to EPW and displaced civilians captured or transferred to US forces. It also coordinated information with the ICRC pertaining to EPW held by Coalition forces and provided information pertaining to Americans (POW) in Iraqi hands. Additionally, the NPWIC consolidated information from the theater for dissemination to appropriate government agencies, Congress, and the ICRC (Figure L-3).

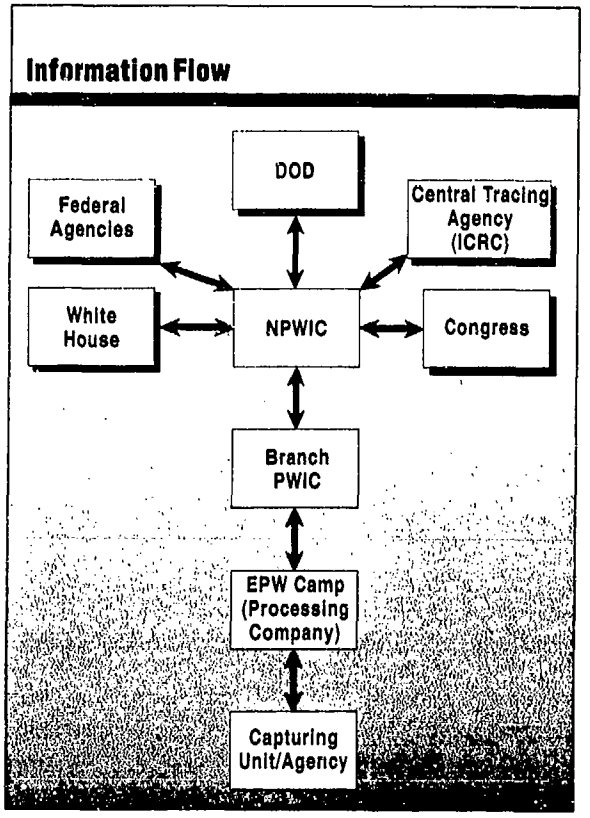


Figure L-3
EPW Information Flow

Information provided to the ICRC on each EPW included:

- Surname,first name, rank;
- Date of birth, place of birth;
- First name of father, maiden name of mother;
- Name and address of the person to be informed;
- Address for correspondence; and
- Army, regimental, or personal serial number, or equivalent.

In the KTO, ARCENT served as the Central Command (CENTCOM) executive agent for EPW operations, although staff responsibilities for EPW actions rested with the CENTCOM Provost Marshal. The 800th MP Brigade (PW), a USAR unit assigned to ARCENT, conducted the theater EPW mission. Planners estimated that there would be approximately 4,000 captured EPW within the first six months after hostilities began. During Operation Desert Shield, intelligence reports caused planners to question this estimate and figures were revised upwards until it was thought that as many as 100,000 EPWs could be captured within the first week of the ground war. As a result, ARCENT increased force structure and support requirements for EPWs. Substantial resources were required to confine and support that many EPWs.

Programmed forces were increased to a brigade-size element consisting of 61 subordinate units and a theater prisoner of war information center (PWIC). An advance element of the EPW structure, consisting of personnel from the Headquarters, 800th MP Brigade, the 401st and the 403rd EPW Camps, the 400th MP Battalion, five MP escort/guard companies, and the 313th PWIC deployed to the theater early in December to conduct extensive planning. Later in December and January, the remaining EPW structure deployed.

The full structure of the 800th MP Brigade was comprised of more than 7,300 personnel to include: five EPW camps, six EPW battalion headquarters, five processing units, 40 escort guard and guard companies, seven camp advisory teams, and the PWIC. Because of a lack of EPW capable units in the force structure, an Adjutant General company was converted to serve as an MP processing company and 22 MP combat support companies were converted to perform duties as either MP guard or escort guard units. Additionally, the 313th Military Intelligence (MI) Detachment, components of the 6th and 13th Psychological Operations (PSYOPS) Detachments, and the 300th Field Hospital were attached to the brigade.

CAMP CONSTRUCTION

Early discussions with Saudi Arabia were initiated to arrange host nation support (HNS) for supplies,transportation, and medical and facility support. An implementation plan was developed and coordinated with the Saudis and appropriate engineer and logistic assets to construct four 24,000 EPW camps. (The

Figures L-4 and L- 5
Military Police and Engineers Construct EPW Camps

original concept was for the United States to build six sites; however, the Saudis wanted the US to construct less since they planned to build four camps of their own.) Two camps were in the eastern part of the AOR southwest of Al-Mish'ab). These were called "Bronx". The other two farther west, north of King Khalid Military City were named "Brooklyn ". Together, these camps could house up to 100,000 EPWs.

Bronx was designated to support the USMC holding areas. Brooklyn supported the VII Corps and the XVII Airborne Corps and each accepted EPW from French and UK forces. The camps were required to escort, process, and intern EPWs

in a safe and secure environment. As previously described, US camps were required to transfer EPW to Saudi Arabia for detention until repatriation. (In addition to the theater camps, several holding facilities were established. For example, the Navy Seabees constructed a holding facility near Al-Kibrit which was capable of temporarily housing up to 40,000 EPWs. VII Corps, XVII Airborne Corps, the French and the British also established these types of facilities.)

Because initial construction of the camps was dependent upon the marshaling of resources that were in short supply and subject to competing demands, most camps were not complete when the first Iraqis were captured. The 22nd SUPCOM diverted resources to the EPW camp effort. Construction details were able to install approximately one mile of wire, eight guard towers, and two guard shacks each day. Intensive efforts ensured that camps were completed rapidly and in time to receive massive numbers of prisoners.

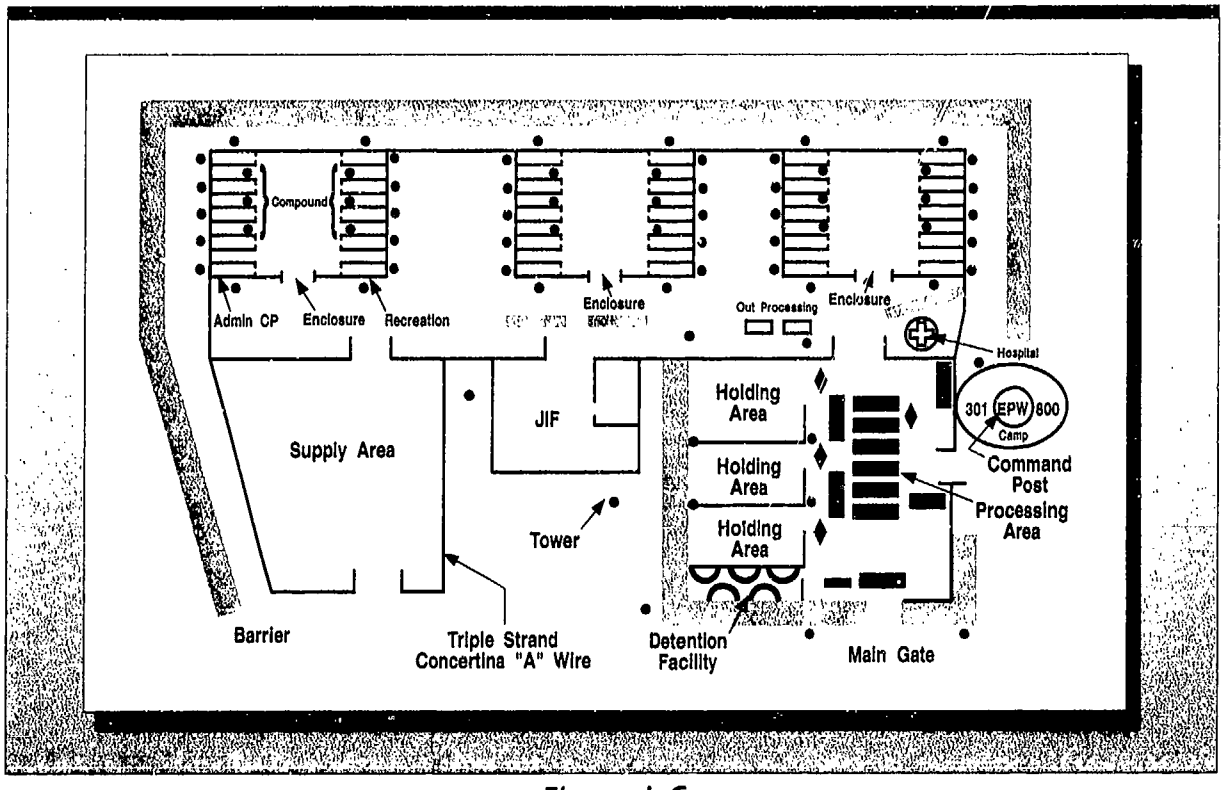
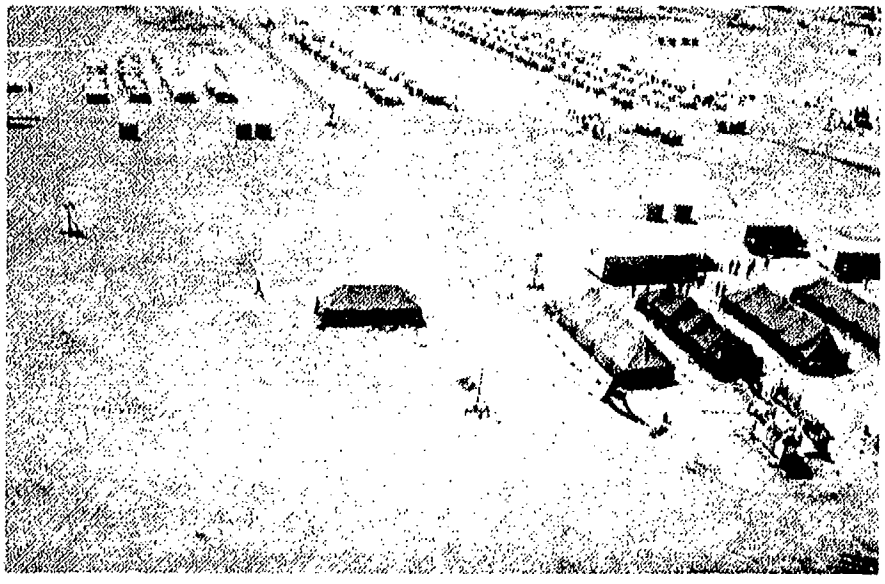


Figure L-6
US EPW Camp Layout

(U) Construction of these camps, each of which encompassed approximately four square kilometers, was completed by the joint efforts of the 416th Engineer Command, the 800th MP Brigade, and the Saudi Arabian Government. The term "camp" should not be interpreted to mean one large enclosure. In some cases,

Figures L-7 and L-8
Setting Up an EPW Camp

camps consisted of several enclosures and each enclosure had separate compounds. Figure L-6 depicts a US EPW camp layout. Logistics support was provided by the 22nd Support Command (SUPCOM) and HNS. At the outset, lack of understanding of the scope and magnitude of the operation caused slow growth of the camps initially. As priorities shifted and host nation support became more effective, the camps were inundated with supplies and materials. Construction and facilities support required 450 miles of chain link fencing; 35,000 rolls of concertina wire; 10,000 tents; 296 guard towers; 5,000 wash basins; 1,500 latrines; eight 210-kw generators; eight 50,000-gallon and 35 3,000-gallon water bladders; two tactical water distribution systems; 200,000 sets of clothing and bedding; 100,000 towels; footwear, and nuclear, biological and chemical protective masks; 140,000 sundry packs, 300,000 meals a day and 1.5 million gallons of water a day; and, five tons of lindan powder for delousing operations.



Figures L-9 and L-10
Aerial View of US EPW Camps

The effort to build, staff, and organize the EPW system was a major achievement possible only through the combined efforts of the United States and Saudi Arabia. The Geneva Conventions require EPWs be given the same or equivalent quarters, food and treatment as soldiers of the capturing forces. US and Saudi officials worked diligently to ensure that this requirement was fulfilled. As a

result of their efforts, many Iraqi EPWs had better living conditions in the internment sites than they had had in the Iraqi Army.

(U) Joint interrogation facilities (JIF), a PSYOPS detachment, and a field medical hospital also were established at each site. This was the first time this type of support had been dedicated to EPW operations. Linguist support for interrogation was provided initially by Military Intelligence personnel; however, when internment facilities competed with demands for intelligence collection, linguists were returned to intelligence collection efforts. Thus, site administrators sometimes were hard pressed to communicate with internees.

Solutions to this problem required innovation. In addition to using EPWs who could speak English, actions were taken through Civil Affairs channels to employ Kuwaiti volunteers trained in the United States. Two hundred volunteers were identified for use in the EPW camps before their departure from the United States. They were given training on the GPW, MP operations, and EPW handling techniques. Once these personnel arrived in theater, 137 were assigned EPW support duties. However, when hostilities ended, many Kuwaiti volunteers were anxious to return to Kuwait, and many did so. Actions were then taken to obtain linguistic support from the Saudis and other Coalition members. The attached PSYOPS detachment assisted in maintaining order by producing Arabic signs and audio tapes to provide instruction for inprocessing.

The requirements for medical personnel to process and care for EPWs grew as the EPW numbers increased. Additional medical assets were assigned to assist with EPW camp medical support.

SAUDI RESPONSIBILITIES FOR EPWS

The Saudi Arabia National Guard (SANG) was given the mission to administer the Saudi camp facilities. Four Saudi camps were planned: SA Camp #1 at Hafr Al-Batin; SA#2 near An-Nu'ariyah; SA#3 near Al-Artawiyah; and SA#4 near Tabuk. Camps 1 through 3 were designed to accommodate a population of 12,000 enlisted EPW each, Camp 4 was built to house 5,000 officer EPW. Construction required extensive logistical support; however, lessons learned from initial construction of US camps and the use of advisory teams assisted the Saudis. (Figure L-11 notes camp locations.)

SANG infantry forces lacked the training and experience of the specialized US EPW units. Thus, US forces provided training on processing procedures and internment of EPWs. Courses of instruction were developed with the assistance of the US Project Manager for the SANG. Language problems were solved through the use of a mix of military and volunteer civilian linguists. After training and establishing the camp structure, some US teams stayed on to assist in camp administration and the transfer of EPWs to the repatriation point.

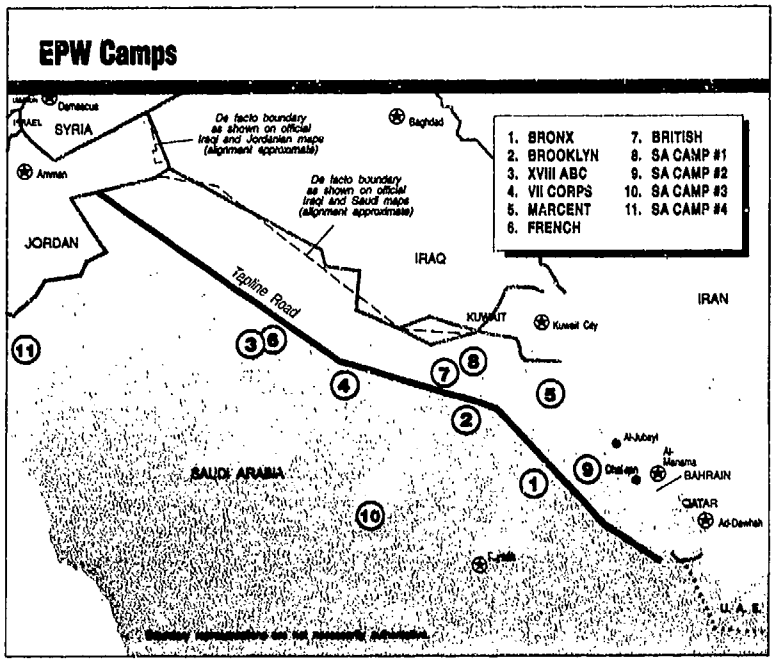


Figure L-11
EPW Camp Locations

UNITED KINGDOM AND FRENCH FACILITIES

Maryhill, the British camp, was near Al-Qaysumah and Clemence ,the French EPW camp was near Raffa. Maryhill was constructed to house 5,000 EPWs; Clemence was able to hold 500. Both the UK and the French established close working relationships with the VII Corps and XVII Airborne Corps MP brigades. They transferred EPWs to Corps temporary holding facilities to be processed and transported to the theater camps. The UK assigned Royal Military Police representatives to the 800th MP Brigade's headquarters to ease processing and movement of British-captured EPWs.

EPW HANDLING AND PROCESSING

Coalition forces treated EPWs and displaced civilians in accordance with respectively, the GPW and the GC. The GPW mandates humane treatment and full accountability for all EPWs from the moment of capture until repatriation, release, or death. The GC requires humane treatment for displaced civilians. The International Committee of the Red Cross (ICRC) was provided access to Coalition

EPW and displaced civilian facilities, confirmed Coalition compliance with the 1949 Geneva Convention, and reviewed findings in periodic meetings in Riyadh. Coalition forces cooperated fully with the ICRC on matters pertaining to EPWs. (Unfortunately, neither the ICRC nor any other humanitarian organization was successful in gaining Iraqi compliance with the Geneva Conventions, especially those pertaining to humane treatment and full accountability.)

Evacuation flow from the forward divisional combat areas to a theater EPW camp was conducted as shown in the EPW flow diagram (Figure L-12). Evacuation of EPW from the combat zone was done immediately after capture. In the combat zone, not only may EPWs become casualties, but the fluidity of battlefield movement, the wide dispersion of units, and the austerity of facilities requires rapid evacuation. Non-walking wounded and sick EPW were evacuated via medical channels but remained physically segregated from Coalition patients.

"On more than one occasion, the EPWs were so eager to reach the EPW camps that they volunteered to drive. Thus many EPW cooperated in the backhaul transportation mission. Also, two Iraqi soldiers gave themselves up after traveling by a commandeered Toyota truck behind a US convoy into the US sector near Hafr Al Batin."

Report from 800th Military Police Brigade

During the ground operations, ground forces were faced with enormous numbers of surrendering Iraqi soldiers. Coupled with the speed of the offensive, this created some problems. Normally, capturing forces conduct initial field processing which includes searching, segregation, safeguarding, providing immediate medical care, classifying, interrogating, and evacuating to rear camps. However, the sheer volume of surrendering Iraqis and the rapid pace of operations presented enormous challenges to initial EPW processing. Despite expedient processing measures, there were no reported or known incidents of maltreatment or misconduct on the part of coalition captors.

Divisional MP units accepted custody of EPWs brought into Division collection points. Corps MP units went to these points and transferred EPWs to the Corps holding facilities, pending movement by 800th MP brigade elements to the theater camps. Other EPWs began to flow from the forward division areas, through the Corps holding facilities to the Theater camps. Camp Bronx became the first operational US facility with the first EPWs arriving 23 January, within an hour after completing the first compound. Because logistics support was limited, US soldiers initially provided EPWs their own food, water, and blankets. EPWs initially were apprehensive about their captors, but this display of humanity allayed their fears. Accounts spread to EPWs brought in later, which may have helped ensure EPW cooperation.

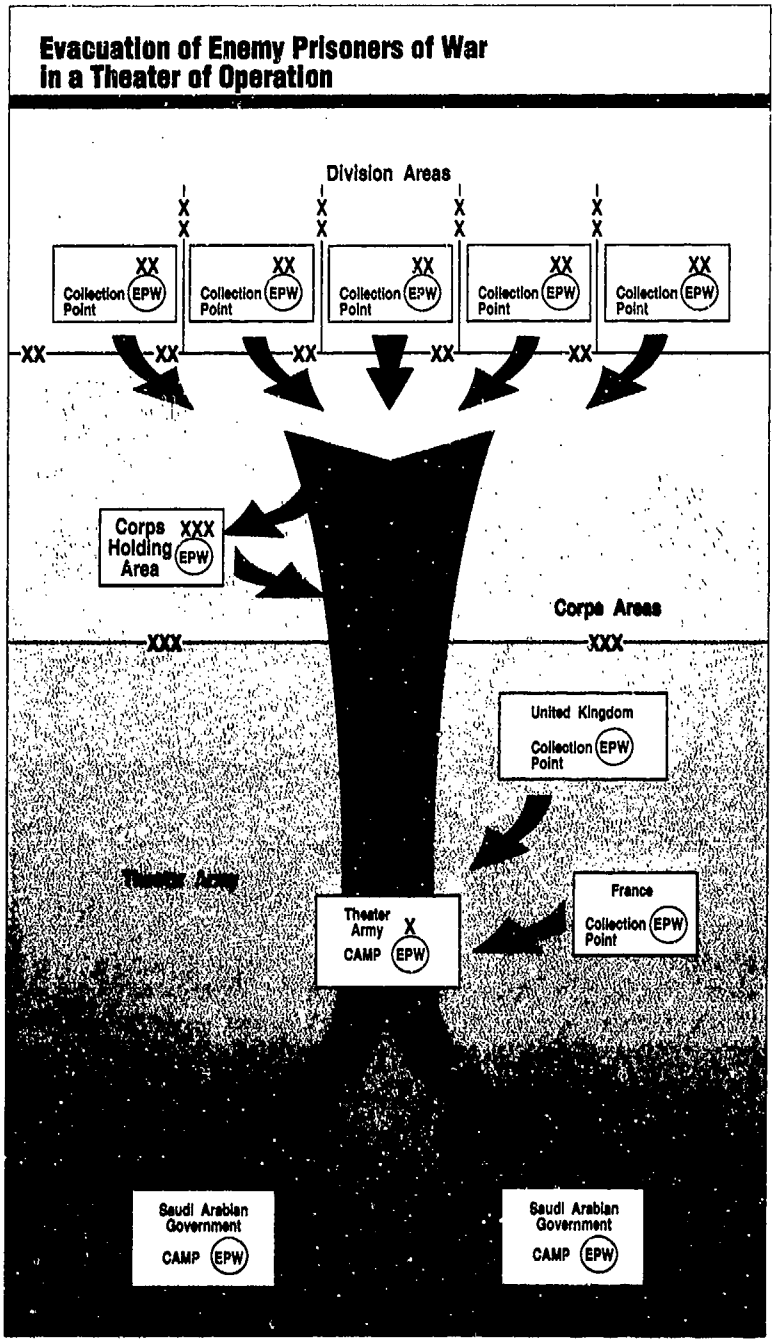


Figure L-12
Evacuation of EPW in a Theater of Operation

While initial groups of EPWs were fairly small, eventually they arrived in groups of up to 2,000. Upon arrival, they were unloaded from their transports, directed to holding area compounds where they were cared for and systematically processed for transfer to holding compounds within the camp enclosures. EPWs were transferred to holding compounds in small groups of about 50. They were given physical examinations, medically assessed, segregated by rank, and briefed on rules and expectations. Once processed into the camp, the EPWs were required to conform to a structured daily schedule consisting of work details, meals, and accountability procedures to maintain camp order and sanitation.

> ***"Iraqi prisoners of war are so surprised by good conditions in allied EPW camps and our knowledge and honor of the Muslim religion, that many want to stay and become workers in the camps."***
>
> **Commander, 22nd SUPCOM**

Rations for EPW were nourishing. The usual menu consisted of: Four slices of bread w/jam, cheese, 1/4 liter milk or juice for breakfast; 1 US meal ready to eat, North Atlantic Treaty Organization, or Saudi rations for lunch; and, beans, tomatoes, rice, meat (lamb or chicken), and tea for supper. Items prohibited by local and regional religious beliefs were not served to EPWs. US personnel removed these items from ration packets and replaced them with acceptable substitutes.

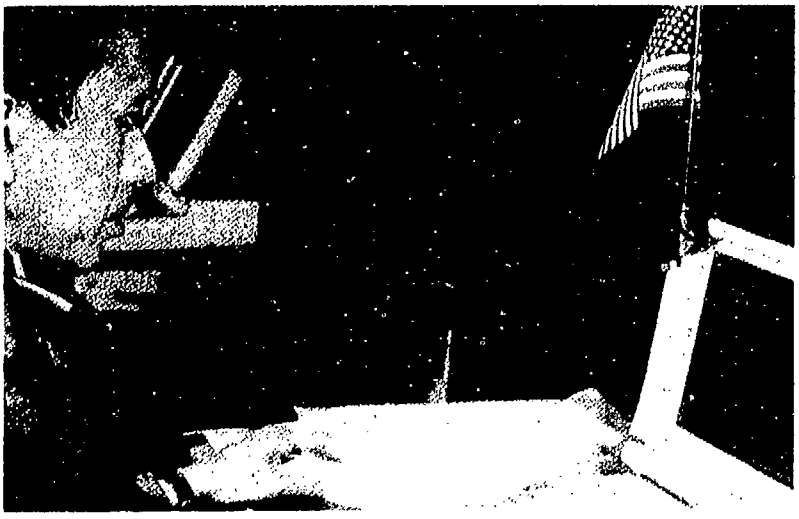


Figure L-13
Prisoner of War Information System Operations

The NPWIC and the theater EPW units used the Prisoner of War Information System (PWIS -2), an automated system designed to expedite processing and provide an information database on captured personnel. Fielding of the newly developed PWIS-2 system was accelerated during Operation Desert Shield. The system arrived in November with the first EPW processing unit deployed to SWA. Under the old manual system, an average of 190 EPW could be fully processed per day, per camp. With PWIS-2 automated processing procedures, Army EPW units eventually were processing more than 1,500 EPW a day, per camp. Processing accuracy was sustained at an unprecedented 99 percent level, although training, system connectivity and maintenance requirements initially limited capabilities. PWIS-2 information was transmitted from camps to the 800th MP brigade headquarters and entered into PWIC theater data files. This information was electronically sent to the NPWIC for accountability and was presented to the ICRC.

INTELLIGENCE OPERATIONS

Interrogation of EPWs provided valuable information. The 513th MI Brigade, augmented by Air Force, Marine, and some Arab interrogators, set up two Joint Intelligence Facilities (JIFs) and one Joint Debriefing Center for extensive EPW exploitation. These facilities screened more than 48,000 EPWs, and interrogated 526, including 13 Iraqi general officers. Interrogations provided the first confirmation of growing morale problems and waning of the will to fight. Information was also obtained about bomb damage assessment, targeting, and artillery plans and procedures.

Interrogations of Iraqi general officers resulted in several instructive assessments. As an example, they indicated the air campaign was very effective in hitting Iraqi supply vehicles and revealed that the B-52 bombing had great psychological effect.

Interrogations were limited by a lack of capable interrogators fluent in Arabic. There were not enough of these specialists to support all committed brigades and simultaneously operate division interrogation facilities. The lack of interrogators in the front line brigades deprived the units closest to the fight of useful information.

REPATRIATION

After the cease fire, expeditious repatriation of EPWs was a high priority and Coalition officials promptly began talks with Iraqi representatives on EPW exchanges. Iraq said it was anxious to return Coalition POWs, but was unwilling to accept large numbers of EPWs in return, saying it was not prepared to receive them.

In March, Coalition forces and Iraq signed a memorandum of understanding detailing administrative procedures for the repatriation of the remaining EPW, under ICRC auspices. On 4 March, Iraq released the first group of 10 Coalition POWs, six of whom were American. On 6 March, the US reciprocated by releasing 294 EPWs to the ICRC for repatriation to Iraq. This was the only repatriation the United States sponsored. All future repatriations were accomplished by the Saudi Arabian government. Follow-on repatriation procedures, coordinated with all parties, provided for repatriation of EPWs and displaced civilians to Iraq at a planned rate of approximately 5,000 a day. Repatriation of EPW not in medical channels occurred at Judaydat "Ar'ar, near the Jordan border. Those EPW in medical channels were flown directly to Iraq. By international convention, no EPW was forcibly repatriated. Coalition forces identified to the ICRC Iraqi EPW not desiring repatriation. When an Iraqi reached the exchange site, the ICRC reconfirmed willingness to be repatriated. Those who indicated they no longer desired to return to Iraq were returned to the custody of Saudi Arabia.

Two Iraqi EPWs, one an American citizen, the other an Iraqi citizen whose mother was an American citizen, requested expeditious parole. Each had been impressed into the Iraqi Army. The State Department favorably reviewed their request for humanitarian parole and they both were allowed to be reunited with relatives in the United States.

On 2 May 1991, the last EPW in US custody was transferred to the Saudi Arabian government. The Coalition repatriation began on 6 March and ended on 22 August. A total of 13,418 EPWs refused repatriation (13,227 remain at Camp Al-Artawiyah and 191 officer EPWs remain at Camp Tabuk). On 23 August, the ICRC announced the Iraqi EPW repatriation had been completed and that all Iraqi EPWs still refusing repatriation and remaining interned in Saudi Arabia should be treated as civilians protected under the Fourth Geneva convention. The Coalition governments have taken the position the Iraqi EPWs remaining in Saudi Arabia should be reclassified as refugees.

At the end of US custody of Iraqi EPW, ICRC officials advised the 800th MP Brigade the treatment of Iraqi EPW by US forces was the best compliance with the GPW in any conflict in history – a fitting tribute. Coalition measures to comply with the GPW had no significant adverse effect on planning and executing military operations; indeed by encouraging the surrender of Iraqi military personnel, they may have speeded and eased the operations.

OBSERVATIONS

Accomplishments

- The Coalition successfully built complex EPW camps, and processed and managed over 86,000 EPWs.
- Coalition members responsible for EPWs developed and maintained an effective working relationship with the ICRC.
- The NPWIC was activated before the offensive began, serving as the central manager for the Operations Desert Shield and Desert Storm EPW program, and the central US agency for information pertaining to POWs.
- The introduction of the automated PWIS allowed for accurate EPW accountability.

Shortcomings

- US EPW force structure should be deployed as soon as practical to develop HNS, contact with the ICRC, and to establish fully functional camp operations before the start of a conflict.
- Capture rate study data did not accurately forecast the situation in SWA.
- Planned use of US ground backhaul transportation assets could not support the large numbers of captured EPW.

Issues

- PWIS-2 system was limited by speed, equipment capacity and software, lack of training time before fielding in SWA, and inadequate power generation equipment and long-haul data-communication capabilities.
- Translator support for EPW MP and interrogation operations is a consideration for future operations. A shortage of Arabic translators early in the conflict caused processing, screening and camp management problems. This was corrected partially by the use of HNS, civilian volunteers, and English-speaking EPWs.
- Logistical support was hindered by the volume of EPWs, the competition for resources, procedural problems in ordering EPW logistical support, and an overburdened transportation system.

APPENDIX M

FIRE FROM FRIENDLY FORCES

"It was round the clock battle, a blow deep in the heart of enemy territory. It was fought at a furious pace, in rainstorms and sandstorms, with killing systems of ferocious ability. It left many soldiers of VII Corps, some of the Army's most accomplished practitioners of armored warfare, looking for help when picking out the good guys from the bad guys . . . ."

Army Times, 19 August 91

INTRODUCTION

Of the total of 613 US military battle casualties in Operation Desert Storm, 146 service personnel were killed in action, including 35 killed by fire from friendly forces, and 467 were wounded, including 72 by fire from friendly forces. Incidents also occurred involving US forces with non-US Coalition forces, as well as fire among non-US Coalition forces. Casualties from friendly fire are never acceptable and warrant relentless corrective action to preclude further occurrences. The Department of Defense has launched concerted efforts to reduce the chances of future casualties from fire from friendly forces -- although, given the confusion inherent in warfare, it will prove virtually impossible to entirely eliminate.

HISTORICAL PERSPECTIVE

Casualties from fire from friendly forces are not unique to Operation Desert Storm. For example, the number of incidents among air forces caused by aircraft and antiaircraft artillery in previous wars were serious enough to justify dedicated identification friend or foe (IFF) systems for these forces. An Army Training and Doctrine Command (TRADOC) study on ground fratricide published in the early 1980s sought to determine the approximate number of casualties from friendly fire and to determine the causes. In analyzing the causes in the previous major US conflicts, the TRADOC study reported about 26 percent were caused by target misidentifications, 45 percent by coordination problems, 19 percent by inexperienced troops and discipline problems, and 10 percent by unknown causes.

In contrast, during Operation Desert Storm, approximately 39 percent of the incidents (11 out of 28) appeared to be as a result of target misidentification.

Misidentification was a result of several factors -- weather and battlefield conditions being the most predominant reasons. Coordination problems also accounted for approximately 29 percent (8 out of 28) of friendly fire incidents. Of the remaining nine incidents that occurred, six were due to technical and/or ordnance malfunctions; three incidents had insufficient or inconclusive findings to determine cause.

Three factors help explain the higher proportion of casualties from friendly fire in Operation Desert Storm as opposed to previous conflicts. First, a more thorough investigation of these incidents was possible in Operation Desert Storm. The war was short, the number of incidents few, and more sophisticated investigations were conducted. Second, fire from friendly forces may loom large principally because the total number of casualties was so small. A third factor is the duration of the conflict. Some incidents occurred because of the lack of battle experience among frontline troops. One could expect this type incident to decrease markedly as experience grew.

This problem requires both a technical and a training solution. Enhanced optics and more sophisticated identification devices and thermal sights to match longer weapons killing range is one answer. Training that includes a focus on fire from friendly forces incidents is another. However, all solutions must be sensitive to the nature of the modern battlefield.

MODERN WARFARE AND FIRE FROM FRIENDLY FORCES

During Operation Desert Storm, the risk of mistakenly firing on friendly forces was increased by several factors more common to this war than to others. These included faster paced maneuvers across vast distances, often at night or in reduced visibility. The nature of the tactics used in this type of warfare is that they change the shape of the battlefield from the relatively orderly line-vs.-line arrangement of most previous wars to a nonlinear configuration. Where one line opposed another across contested ground, it was less complicated to prevent friendly forces from firing on one another, although such incidents did occur. On a battlefield that is nonlinear -- that is fluid -- forces are less certain of the positions of adjacent friendly elements and the enemy. The strip of contested ground that was relatively free of forces in the past now is likely to be wider and contain intermingled elements of both sides. While increasing the danger of fire from friendly forces, these tactics, are more effective and much less costly than attacks into modern defensive strongpoints.

Another difference between this war and previous ones was the great number of long-range engagements and engagements in limited visibility. Fire control systems -- sights and computers -- are far more capable than in the past. Weapons and ammunition are able to achieve high probabilities of hits and kills at greater ranges. The nature of the desert permitted engagement of targets at ranges

exceeding two and one half kilometers on a regular basis and in almost all weather conditions. Effective long-range fires do much to win battles with fewer casualties, but these engagements also place a premium on positive target identification.

In addition to increased ranges, desert warfare is characterized by periods of limited visibility. Weather conditions, such as the sand and rain storms that occurred during Operation Desert Storm, the dust and smoke of battle, and darkness often aid attacking forces by shielding them from enemy observation. It is reasonable to assume these conditions were, to some extent, responsible for relatively low Coalition casualties. However, these conditions also degrade somewhat the sighting systems air and ground forces use. In such conditions, state-of-the-art sights provide sufficient resolution to identify general targets, but often lack the resolution to provide clear identification of vehicle type. Long-range, limited-visibility engagements are part of the art of modern warfare.

Another factor is the requirement for rapid engagement decisions. Tank crews are routinely held to a standard of less than 10 seconds from the time a target is first detected until it is destroyed. Well trained crews complete the task in about six seconds. Combat targets are not passive and the history of tank-to-tank combat demonstrates that, where opponents have equally sophisticated fire control and equally lethal munitions, success usually belongs to the crew that fires first.

A final factor on the modern battlefield is the presence of Coalition forces equipped with different equipment. Coalition forces in the future may have equipment similar to that of the enemy. Likewise, potential future enemies could have military equipment purchased from long-term allies. There will be doubts as to the ownership of such equipment on the battlefield. Coalition warfare interjects a new difficulty into the challenges surrounding prevention of fire from friendly forces.

A more rapid paced, less structured battlefield with a mix of increasingly lethal equipment appears to be typical of modern conflict. New concepts and devices are necessary to operate successfully in these conditions. The risks of casualties from friendly fire has increased. However, by the same token, sophisticated weapons systems -- whether air or ground -- and innovative approaches to their use were key factors in the Coalition success.

FIRE FROM FRIENDLY FORCES INVOLVING UNITED STATES UNITS

Investigations have identified 28 incidents during Operation Desert Storm in which US forces inadvertently engaged other American forces, resulting in the deaths of 35 servicemen and the wounding of 72 others. Of the 28 US incidents, 16 were in ground-to-ground engagements, with 24 killed and 57 wounded, while nine were in air-to-ground engagements that resulted in 11 killed and 15 wounded.

Other incidents included one ship-to-ship, one shore-to-ship, and one ground-to-air engagement. However, no casualties resulted from these incidents.

Before the ground offensive began on 24 February, 15 servicemen were killed and 18 were wounded in nine fire from friendly forces incidents. The remaining 74 casualties occurred during the ground offensive, in which 20 servicemen were killed and 54 were wounded in 11 separate incidents.

Most casualties involved crews of armored vehicles struck by high-velocity, non-explosive tank rounds that rely on the force of impact to destroy the target. The number of deaths and injuries from these incidents would have been higher had it not been for the built-in safety and survivability features of the M1A1 tank and the M2/M3 fighting vehicle, such as fire suppression systems, blow out panels, hardened armor, and protective liners.

Of the 21 Army soldiers killed, one was an M1A1 tank crewman; 15 were Bradley Fighting Vehicle (BFV) crewmen; one was a crewman of a modified M113 armored personnel carrier; and four were soldiers on the ground. Of the 65 Army soldiers wounded, 49 were BFV crewmen, seven were tank crewmen, and nine were on the ground. Of the 14 Marines killed, 11 were Light Armored Vehicle (LAV) crewmen and three were on the ground. Of the six Marines wounded, two were LAV crewmen and four were on the ground or in trucks. One sailor was wounded while serving with a Marine Corps (USMC) reconnaissance unit. Of the nine air-to-ground incidents, one was from an Army AH-64,four were from Air Force (USAF) aircraft, one from USMC aircraft, and three from high speed antiradiation missiles from undetermined sources.

A complete discussion of these incidents was released by the Office of Assistant Secretary of Defense for Public Affairs on 13 August. These incidents represented all known and completed investigations of incidents involving fire from friendly forces as of that date.

Thorough investigations were conducted in each case to determine how the incidents happened, to prevent future incidents, and whether negligence was involved. Investigations included examination of damaged or destroyed equipment to determine angle of attack and the type of weapon involved. Projectiles sometimes leave distinctive signatures and, in those cases, determination was less difficult. However, in other instances, the damage caused by the projectile's impact was such that more time-consuming efforts were required. Equipment suspected to have fired on US forces was examined to determine mechanical problems. In several cases, investigators visited the battle sites to determine relative positions of vehicles and the nature of the terrain. Crews and other witnesses were interviewed. In effect, each incident was recreated and meticulously analyzed.

ACTIONS TAKEN TO PREVENT FIRE FROM FRIENDLY FORCES DURING THE CONFLICT

Technological Initiatives

After the first incident of losses on the ground due to fire from friendly aircraft, the Director of the Joint Staff required a review of current technology to develop a "quick fix" to the problem of firing on friendly forces. On 6 February, at the request of the Director of the Joint Staff, the Defense Advanced Research Projects Agency (DARPA) began work on a solution for Army and USMC ground combat vehicles. The Army, USMC, and USAF coordinated efforts, using off-the-shelf technology to achieve quick solutions for application during Operation Desert Storm. More than 60 proposals examining both air-to-ground and ground-to-ground problems were reviewed. These proposals represented 41 different technical approaches across five technology categories: thermal imagery, infrared imagery, laser, radio frequency, and visual techniques. Tests on various proposals were conducted between 15 and 22 February at Yuma Proving Ground and adjacent ranges.

Figure M-1
GPS Was Crucial to Command, Control, and Coordination

An intense government-industry effort produced the anti-fratricide identification device (AFID), also called the DARPA light. The AFID was available in

Saudi Arabia in very limited numbers on 26 February, 20 days after receipt of the initial joint staff request. The AFID is a battery-powered beacon that uses two high-powered infrared diodes to generate a signal, visible through standard third-generation night vision goggles from a distance of approximately five miles under normal night-viewing conditions. The light can be attached to vehicles with high-technology velcro. Because the Coalition forces had air supremacy, there was little concern that Iraqi aircraft could use the emitters to target Coalition vehicles. The AFID had a protective collar to keep the device from disclosing the vehicle's position to hostile ground forces.

Although not specifically designed to prevent fire from friendly forces, high technology navigational systems, such as the Global Positioning System (GPS), helped reduce the risks of inadvertently firing on friendly ground forces. The small, lightweight GPS receiver provided units with exact coordinates and locations on the ground. This information, together with knowledge of the coordinates and locations of adjacent units, helped control maneuver forces. In addition, GPS was instrumental in navigating across long distances and helped ensure that units advanced and maneuvered to designated checkpoints on time, and successfully converged on objectives without mingling with other maneuver forces. Although 4,490 commercial and 842 military GPS receivers were fielded to Southwest Asia; wider distribution would have aided greatly the command, control, coordination, and safety of ground units. A discussion of the GPS is in Appendices K and T of this report.

Training

Extensive training was conducted in the theater before Operation Desert Storm to prevent fire from friendly forces. Commanders and leaders at all levels emphasized procedures and standards to preclude these incidents. The causes and prevention of the incidents were discussed in detail by the Services as they prepared for offensive actions. Command and control (C2) measures, fire support coordination lines (FSCL), adjacent unit coordination, liaison teams, day/night operations, limited visibility considerations, rules of engagements (ROE), after action reviews (AAR), and commander's briefings were key topics.

Extensive and repeated rehearsals before the offensive campaign did much to reduce incidents. Large-and small-scale sand table exercises were conducted at every level, allowing leaders to walk through operations orders and plans to ensure there was proper coordination, and that units and commanders clearly understood the scheme of maneuver and where units would be during the ground offensive. The extensive live fire exercises conducted in-theater emphasized troop safety and continuous fire coordination.

Figure M-2 and M-3
Walk-Through Rehearsals and Commander's Backbriefs Were Essential In Reducing Fire From Friendly Forces Incidents

Figure M-4
Rehearsing Battle Drills Enhanced Troop Confidence

Control Measures

Identifying friendly forces requires extensive coordination. All standard control measures and some innovative ones were used; however, the speed of advance on a featureless desert posed new challenges. Nevertheless, control measures generally were successful in preventing friendly fire incidents. Results of investigations did not indicate lack of control measures as the most significant cause for these incidents, although it was a contributing cause in some cases.

The Services used widely recognized control measures such as Fire Support Coordination Line (FSCL), coordinated fire lines, boundaries, air-ground joint and combined procedures, and air defense engagement rules. Each measure has specific rules associated with it. Adherence to these rules does much to ensure that friendly forces do not fire on one another. Face-to-face contact enhances the effectiveness of these measures, and various liaison teams were exchanged between units. The fact there were no known ground-to-air incidents which resulted in casualties attests to the degree of coordination between air and ground units, and the fire discipline and adherence to air defense engagement rules demonstrated by air defense units on the ground.

Key to the effort to reduce the risk of firing on friendly forces was the liaison role of Forward Air Controllers (FACs), Special Operations Forces and Air Naval

Gunfire Liaison Company teams. These liaison parties, together with the exchange of liaison teams between ground units from battalion to Corps levels, were instrumental in preventing massive friendly fire incidents. They identified friendly units to the headquarters they represented and provided information on the locations of their units to the headquarters to which they were accredited. The importance of these teams on the modern battlefield cannot be overstated.

Airspace coordination and control was a top priority, implemented by using US Central Command's Airspace Coordination Center, under the Joint Force Air Component Commander (JFACC) acting as Airspace Control Authority. All Coalition forces were briefed on airspace coordination procedures. Air crew orientation and increased situational awareness were emphasized during these briefings. Airspace control sectors were coordinated with Saudi Arabia and other Coalition air forces. Airborne command and control systems, E-2C airborne early warning planes, and ground sector control centers provided coordination for ground and air forces. Additional control measures were established for deconfliction of air within the USMC area of responsibility. An example of these control measures was the High Density Airspace Control Zones which defined airspace used by a large number of aircraft. Kill boxes were another example; these were defined ground areas under the control of the Airborne Battlefield Command and Control Center.

Air-to-air rules of engagement were governed by the JFACC in his role as the Area Air Defense Commander. Procedures were distributed on a daily basis in the air tasking order (ATO). The ATO delineated the factors for determining whether a target was friendly or hostile. While the ATO was the central means for airspace deconfliction, it also specified aircraft IFF codes. Aircraft with IFF capabilities were required to operate these systems during flight operations. IFF codes were prescribed for a given time of day and geographic area. Where aircraft had no IFF transponder, or when an inoperable transponder was suspected, airspace corridors and altitude bands were established for safe passage and more stringent operational constraints were applied.

To improve ground-to-ground and air-to-ground identification and control, the inverted "V" and the VS-17 panel (a fluorescent orange cloth panel) were designated as standard vehicle markings for all Coalition forces. Ground vehicles were marked with VS-17 panels on the top and inverted "V" symbols on the sides. Inverted "V" symbols were made using fluorescent placards, white luminous paint, black paint, and thermal tape. However, the procedures and materiel Coalition forces used were only marginally effective.

ONGOING EFFORTS

Efforts to develop both short-and long-term solutions continue. The Army's Advanced Systems Concept Office at Fort Meade, MD, has delivered approximately 10,000 AFID units since the end of hostilities. These will be used by ground units for

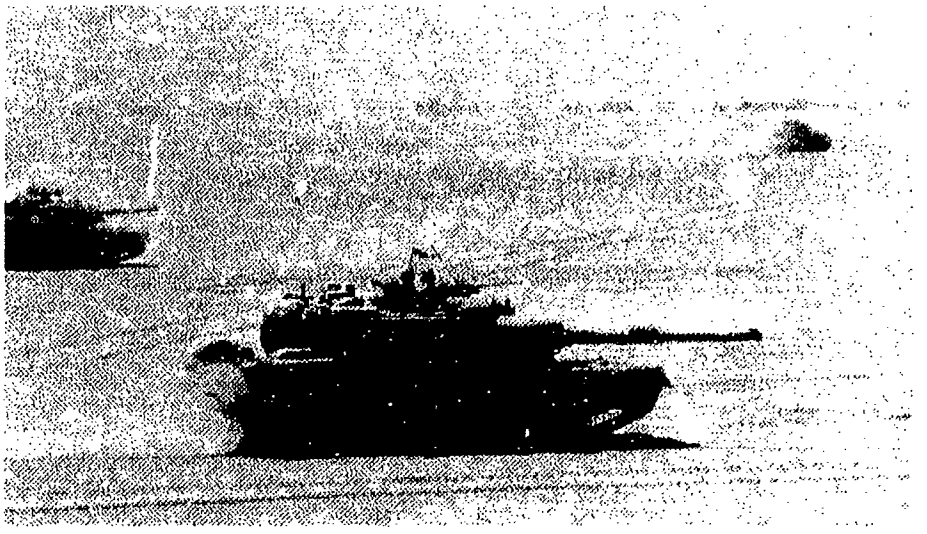


Figure M-5
Inverted "V" Markings Helped Identify Friendly Vehicles

further evaluation in reduction of losses to fire from friendly forces, C2 improvement, and future contingencies. Results of these evaluations and further technological improvements will continue to receive DOD attention.

Technology Initiatives

Efforts to develop both short and long term solutions continue. A TRADOC and Army Material Command Positive Combat Identification Task Force has been formed for extraordinary management of the combat identification issue. The effort is overseen by a general officer steering committee that includes representatives from each military Service.

Department of the Army has proposed a major R&D program for ground combat identification centered at the Army's Laboratory Command. This program is designed to examine a wide range of solutions to the problem.

Training

The risks of misidentification leading to fire from friendly forces can be reduced to some extent by training programs. This is an integral part of fratricide prevention efforts, such training is emphasized at each Service warfare training center. Lessons learned from the Gulf War have been incorporated into the exercises and in-depth AARs recognize and highlight incidents of friendly fire so incidents can be prevented.

At all three of the Army's Combat Training Centers (CTC), emphasis is placed on adjacent unit coordination, liaison teams, vehicle marking systems, troop leading procedures, risk assessments, rehearsals, vehicle recognition, fire control measures and fire support coordination. Observers/Controllers (personnel assigned to assess, evaluate, and control units being tested) have been trained to recognize specific events and incidents of fire from friendly forces and have been trained to coach units to prevent such incidents. AARs conducted after every training event highlight these incidents. Emerging data trends are identified, analyzed, and disseminated. An evaluation of quick-fix combat identification devices is scheduled at the National Training Center (NTC). This will be the first time the AFIDs will be used at a CTC. Analysis of the data will determine the effectiveness of these devices.

Several other initiatives in Army training to prevent fire from friendly forces also have been undertaken. At the NTC, "fratricide targets" have been introduced into both live-fire and force-on-force training. The live-fire target is a robotic M1A1. In maneuver training, an M1A1 moves from an out-of-sector area into an area where it is not expected to test force reactions. If a unit engages a target vehicle, the unit conducts an informal investigation to determine the cause. Results are discussed during AARs so lessons learned are understood and disseminated.

At the USMC Air-Ground Combat Center, the Combined Arms Exercise (CAX) program also includes fratricide-prevention training, particularly during live-fire exercises. Because all training is conducted with live ordnance during the CAX, fire support coordination procedures are clearly understood and friendly forces safety is of utmost importance. These exercises include both fixed and rotary-wing aircraft that conduct close air support and close-in fire support. Close coordination and understanding between air and ground units are emphasized to preclude fire from friendly forces.

USAF sponsored Red Flag Exercises and Naval Strike Warfare Center exercises routinely include fratricide prevention. Methods of prevention practiced by units during these exercises include deconfliction of aircraft by timing (ensuring that no more than one aircraft is at the same location at the same time when weapons and ordnance are being released), deconfliction of aircraft by routing around designated target areas, use of IFF codes and other electronic means which, when used by friendly aircraft, allow friendly recognition by electronic means.

In air-to-ground scenarios where USAF units participate in exercises with Army ground forces at the CTCs, use of FSCLs established by ground commanders and FAC parties are used. Positive control and coordination among the FAC, ground forces, and aircraft are stressed. Future initiatives may include more night, low- visibility training; more high-and medium-altitude training; and, more practice of higher altitude ordnance releases.

SUMMARY

The mistaken firing on friendly forces is not a new problem in warfare. Commanders and leaders at every level made extensive efforts to prevent it. While fire from friendly forces occurred, it should not detract from the bravery and performance of the superb soldiers, Marines, and sailors who were victims.

The characteristics of modern warfare demand a solution to the friendly fire problem. Solving the problem will be challenging. The more than 60 proposals examined during Operation Desert Storm for quick fix solutions to the fratricide problem indicate many ideas are available. No one single approach is likely to provide sufficiently reliable capability for all situations. An overall capability is needed, which consists of several techniques or approaches that can be integrated or can complement one another to improve the confidence of correct identification decisions in a variety of situations.

Ultimately, the optimum solution must be an approach that addresses the contributions of doctrine and procedures, organization, training, advanced technology and hardware.

OBSERVATIONS

Accomplishments

- Coalition forces took several actions to reduce the risk among Coalition forces of mistakenly firing on friendly forces both before the conflict began and afterward. Efforts to minimize these incidents included aggressive leadership, training, and techniques such as vehicle markings.

- Extraordinary government and industry efforts produced procedures and material in record time that would have made a positive contribution to reducing the risk of these incidents had the hostilities continued past 28 February.

Shortcomings

- Despite Coalition efforts, there were casualties and damage due to fire from friendly forces.

Issues

- A need exists for an identification system that identifies friendly vehicles from the air, as well as a ground-to-ground identification system, at extended ranges in reduced visibility and darkness without betraying these locations to hostile forces.

- More GPS receivers are needed for units and vehicles to ensure better control of maneuver forces,thereby minimizing the risk of firing on friendly forces.

- Continued efforts must be made to improve optics and thermal sights to match the extended killing range of weapons systems.

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APPENDIX N

CIVILIAN SUPPORT

"Civilian employees, despite seemingly insurmountable logistical problems, unrelenting pressure, and severe time constraints, successfully accomplished what this nation asked of them in a manner consistent with the highest standards of excellence and professionalism."

Senate Concurrent Resolution 36

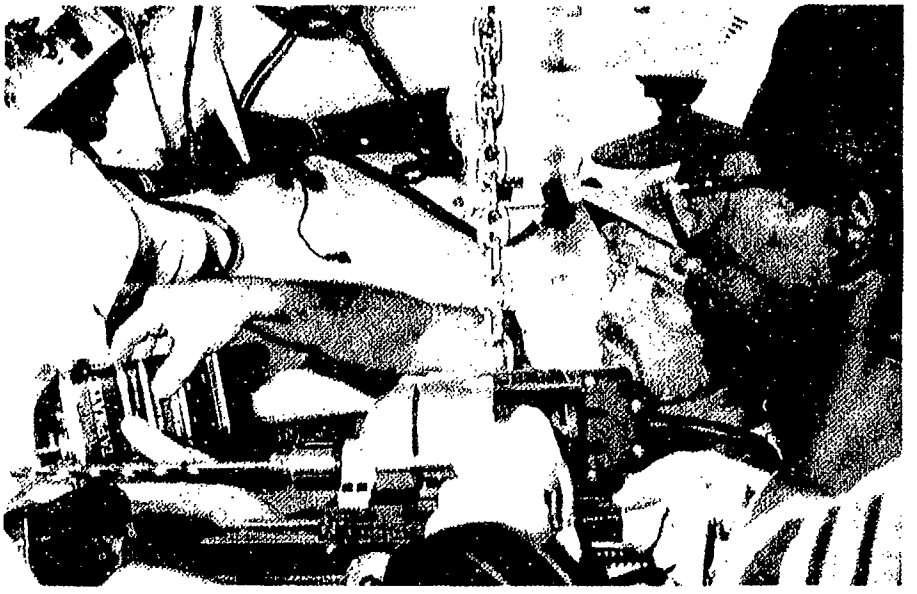

Figure N-1
Civilians Overhaul Turret of Armored Vehicle

INTRODUCTION

In Operations Desert Shield and Desert Storm, the United States employed civilians both as career civil service employees and indirectly as contractor employees. Civilians performed as part of the transportation system, at the forward depot level repair and intermediate level maintenance activities and as weapon systems technical representatives. Civilians worked aboard Navy ships, at Air Force (USAF) bases, and with virtually every Army unit. Only the Marine Corps (USMC) did not employ significant numbers of civilians in theater. This civilian expertise was invaluable and contributed directly to the success achieved.

By late February, US government civilians in Southwest Asia (SWA) numbered about 4,500, of which some 500 were merchant mariners employed by the Military Sealift Command (MSC). A large number of US civilians were employed by US contractors. A number of local nationals and third-country employees were hired by US and foreign contractors.

The civilian contribution to the Coalition success in Operations Desert Shield and Desert Storm must be viewed in a Total Force context, a force which includes civilians as well as military components. While the discussion which follows addresses and emphasizes the roles and performance of the civilian component serving in SWA, such emphasis must not be construed as denigrating or overlooking the contributions of the Continental US (CONUS) and Europe-based civilian Total Force component. The civilians in SWA accounted for about one percent of the entire force and were part of a much larger civilian support structure.

Department of Defense (DOD) employees served in communications, intelligence, commercial contracting, depot and intermediate level maintenance, weapon system modernization, graves registration and mortuary services. Additionally, they performed environmental impact assessments; morale, welfare, and recreation programs; and in liaison functions between forward deployed units and CONUS organizations. The contractors served mostly in the aviation trades and in weapon and automation systems and communications support. The ability to bring experts, government employee and contractor alike, quickly to the scene of a problem was a distinct advantage.

While the recitation of civilian roles and duties in this report is not exhaustive, it is illustrative of the degree to which the military has come to depend on the civilian employees and contractors. Many roles have been transferred to the civilian sector from the military because of force reductions, realignments and civilianization efforts. Civilians employed in direct support of Operations Desert Shield and Desert Storm were there because the capability they represented was not sufficiently available in the uniformed military or because the capability had been consciously assigned to the civilian component to conserve military manpower. It seems clear that future contingencies also will require the presence and involvement of civilians in active theaters of operations.

Although Central Command (CENTCOM) and DOD monitored the civilian personnel situation closely and provided policy guidance when necessary, civilian personnel requirements, management and administration were viewed as a Service component responsibility. Each Service and activity providing civilians to the Kuwait Theater of Operations (KTO) developed procedures which best suited its particular needs. The comprehensiveness of pre-Operation Desert Shield planning for the use of civilians in an active theater of operations varied widely among the organizations and activities. While generalizations are difficult in an operation of relatively short duration, those organizations best prepared were those that had more experience in posting civilians to overseas assignments. Several civilian personnel issues were identified; these will be discussed later.

ARMY CIVILIAN PERSONNEL

The Army, which had the greatest need for civilians in theater, had the most formal approach to preparing them for KTO duty: a five-day indoctrination and training program conducted initially at Aberdeen Proving Ground, MD, and later at Fort Jackson, SC. (The Army Corps of Engineers (COE) used facilities at Winchester, VA, to train its civilians). This period provided an opportunity for area indoctrination briefings, self-defense training, equipment training, issuance and inspection of individual equipment.

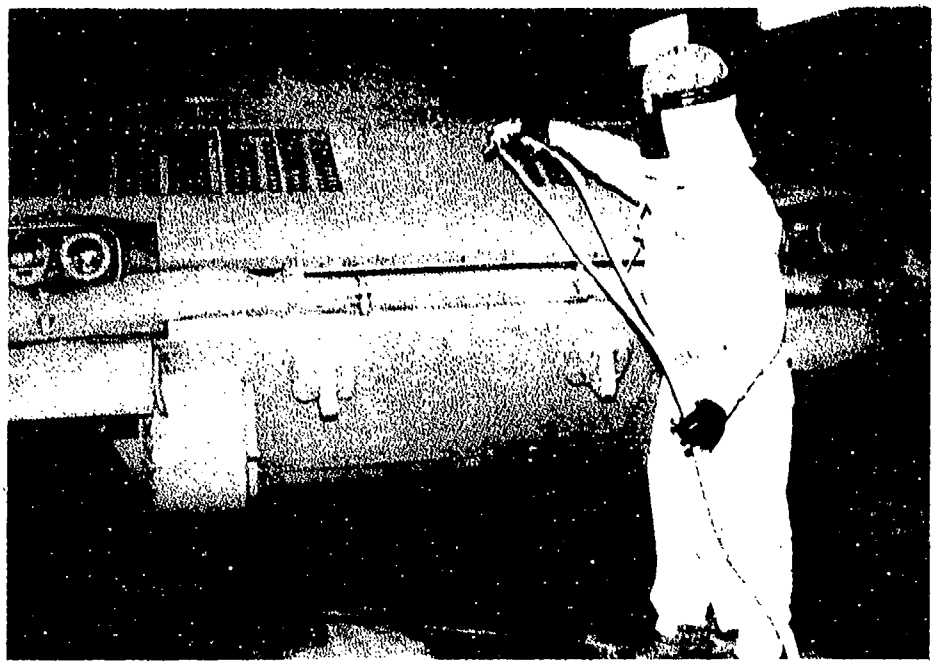

Figure N-2
Federal Civilian Paints Equipment

The Army Materiel Command (AMC) was the principal source of Army in-theater civilian support. Some 1,500 government and 3,000 contractor civilians were involved in new equipment issue as part of force modernization, and in maintenance of complex technical systems. AMC subordinate commands deploying civilians to the KTO did not provide adequate in-theater assistance for civilians arriving in country to ensure that reception, orientation, assignment assistance and personnel advisory services were provided. Eventually AMC established a civilian personnel advisor in Dhahran to assist civilians with problems.

The COE, with extensive and recent involvement in the Persian Gulf region, recognized the special requirements for special training, area familiarization, and

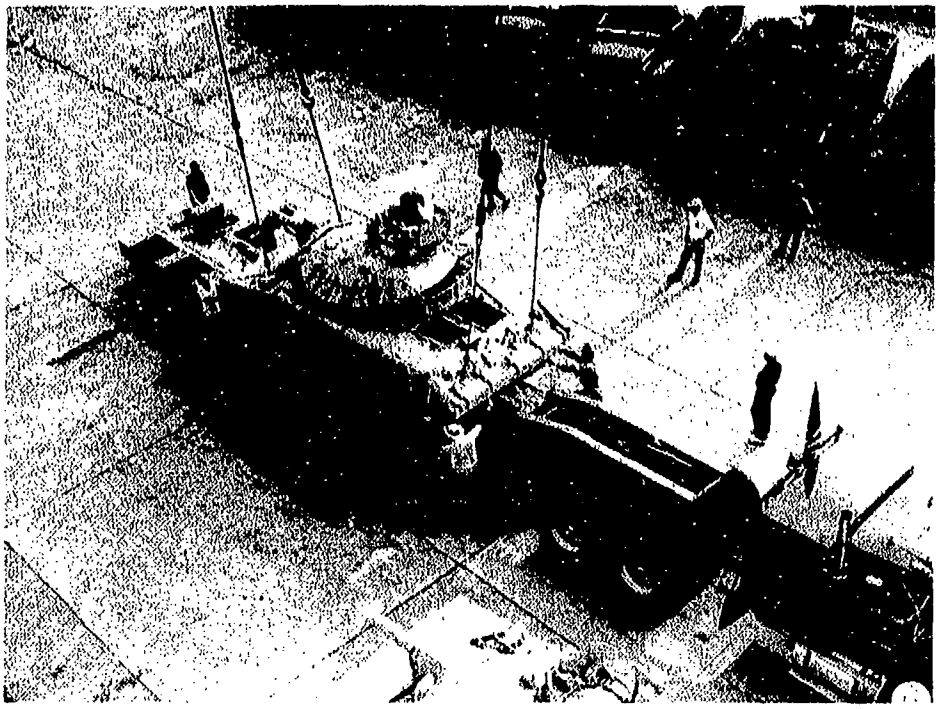

Figure N-3
COE Employee Providing Assistance

family support programs. COE developed several initiatives to satisfy those needs. At the end of the operation, the COE had some 1,600 volunteers waiting to fill spaces in Saudi Arabia.

AIR FORCE CIVILIAN PERSONNEL

The USAF employed few civilians in theater. When Operation Desert Shield began, approximately 80 of the Air Force Logistics Command (AFLC) employees already were assigned to an on-going logistics support project in Saudi Arabia. After Operations Desert Shield and Desert Storm deployments, the cumulative total of USAF civilians in SWA had grown to about 200. This number included 44 engineering and technical services personnel regularly assigned to the Tactical Air Force operating squadrons. The remaining civilian personnel were associated with aircraft repair, contracting, mortuary affairs, and fuel quality control. In addition to the 200 in SWA, civilian personnel from various AFLC and Tactical Air Command (TAC) activities were detailed to aircraft overhaul and maintenance activities in Europe in support of Operation Desert Storm.

USAF civilian employees were deployed directly from home stations. Civilian deployment processing, such as issuing individual equipment, personal protection

training, and indoctrination were accomplished by the employee's unit. Although different from the Army's centralized approach, it was consistent with USAF policy of decentralized deployment processing of military members.

NAVY AND MARINE CIVILIAN PERSONNEL

On average, the Navy had 500 to 600 civilian employees serving in theater with a similar number of MSC civilian mariners afloat. Those ashore were drawn mostly from the Navy Aircraft Depots, naval shipyards, and Navy field activities, and were engaged primarily in aircraft and ship repair. They performed duties ashore, but occasionally worked aboard ship when circumstances warranted. Twenty-five civilians supported USMC units on a temporary duty basis. Their specialties ranged from welding and heavy equipment operations to supply and quality assurance. Additionally, technical representatives from aircraft contracting firms accompanied 3rd Marine Aircraft Wing elements.

Figure N-4
Civilian Merchant Marine Ship Delivers Supplies

DEFENSE AGENCIES' CIVILIAN PERSONNEL

The Defense agencies (e.g., Communications, Intelligence, Logistics, Mapping, etc.) provided civilian support to in-theater forces. The Defense Logistics Agency (DLA) had the largest numbers of personnel in theater. Most performed fuel support functions, as they had before the crisis. In addition, DLA had some quality control specialists to assist in supply distribution and property disposal. Many of these specialities came from activities supporting Army forces in the European Command (EUCOM).

PLANNING AND OPERATIONS

Peacetime and mobilization planning guidance concerning the use of civilians in an active theater of operations has been published. For example, DOD Directive 1404.10 defines "Emergency Essential" civilian positions and provides DOD policy to ensure continued performance of these duties during crisis situations. This policy directive, first issued in 1985 and up-dated in April 1990, focuses on both DOD civilians stationed overseas, with or in support of military organizations, and DOD civilians expected to deploy with US forces. It also provides guidance for issuing of Geneva Conventions Identity Cards. The Services were implementing DOD Directive 1404.10 when Operation Desert Shield began.

At the beginning, relatively few civilians sent to support Operations Desert Shield and Desert Storm were serving in pre-designated Emergency Essential billets. While many DOD civilians sent to Saudi Arabia had previous experience in deploying on temporary duty, few had experience supporting operations in a wartime environment. Most civilians who deployed to the KTO did so on very short notice. Identifying emergency essential positions in peacetime lets the employing activity manage more effectively the necessary pre-deployment administrative requirements such as next-of-kin identification, issuance of Geneva Convention Identification Cards, taking and storing panographic dental X-Rays, and maintenance of current immunization and passport documentation.

It is not surprising there were very few disciplinary actions or serious breaches of conduct among the civilians supporting Operations Desert Shield and Desert Storm. Nearly all were volunteers and enjoyed professional status.

There is, however, some anecdotal evidence to suggest the need for improvements. For example, support and training for civilians, appropriate danger and other pays, medical care and family support should be reviewed. Civilian employees would play a substantial role in future contingencies, and commanders-in chief must have the authority to manage, control, discipline, and protect them.

Some problems may have been caused by a failure to recognize the role of civilians in the Total Force. The fact not all civilians were deployed as organized units also contributed to some perceived inequities. Selected examples of areas that require additional emphasis or review include the following.

Civilians traveling to SWA via military aircraft were accorded a movement priority after military personnel. In future operations, transportation authorities should consider the relative importance of ability to the overall mission and assign movement priorities accordingly. Another area involves free mail privileges. Free mail privileges accorded military personnel in SWA were denied to the civilians. Free mail privileges for civilians should be provided via legislative change.

Civilian personnel accountability was another concern that requires review. Military and civilian personnel accounting systems are separate with no simple way to incorporate civilians into the automated personnel management systems the deployed forces used. The result is that headquarters do not have timely and accurate information concerning the identification, location, and numbers of civilian personnel. Such information, when integrated with emergency essential planning, provides a basis for civilian personnel support planning.

Civilian pay and compensation procedures also require additional review. Civilian personnel pay directives do not differentiate between peacetime procedures and combat zone procedures, nor do they provide a simple means for coding the changed status of Reserve Component (RC) members recalled to active duty. Civilians in theater had to send weekly time sheets to parent commands by facsimile. This added to the heavy communications load discussed in Appendix K. There was no uniform approach for overtime accounting and compensation in the theater.

The absence of a standard civilian ID card resulted in different identification systems. This practice caused occasional problems at security checkpoints when the security guard, often a local national with limited ability to speak English, failed to recognize the validity of a particular card.

Danger or hazardous duty compensation was a particularly complicated and contentious issue. Beginning on 19 September, the uniformed military received hazardous duty compensation of $125/month prorated from the day of arrival in theater. Civilians exposed to the same hazards, did not receive danger pay until January. In this case danger pay of 25 percent was authorized, however, it may vary from 5 percent to 25 percent depending on the level of danger. Foreign post differential allowance (five percent to 25 percent of base pay, depending on the locale) is authorized for civilians serving outside CONUS to compensate for hardship conditions. Eligibility for employees on TDY began 42 days after arrival in theater. Eventually payment was made retroactive. Merchant mariners initially received $130 imminent danger pay a month; this subsequently was increased to 100 percent of base pay, but was received only when the ship was in the combat zone. Additionally, exclusion, for income tax purposes, of part of the military member's pay while serving in theater was not accorded civilians serving in theater.

The disparity between military and civilian award systems also became an issue during the war. The military commander has a wide range of awards at his disposal, and a great deal of flexibility for awarding them quickly. He does not have similar flexibility for recognizing superior performance for the civilians supporting the operation. Civilian awards may have a monetary dimension and they require greater administrative procedures which often impose significant delays. The prestige attached to government service would have been enhanced substantially had the on scene commander had the authority to present the lower level military awards (e.g., Commendation Medal or Meritorious Service Medal) or a civilian equivalent to civilian government employees. This subject is currently under study.

The guidance for treating civilian war zone casualties lacks the specificity provided by the Services for handling military fatalities. For example, military fatalities are returned with a military escort. Perhaps civilian casualties should be similarly treated.

DOD published policy discussing family support opportunities, but this was not implemented consistently. Family assistance organizations, activities, and services for military members were not consistently available to family members of deployed civilians.

AMERICAN RED CROSS PERSONNEL

The American Red Cross (ARC) supported Operations Desert Shield and Desert Storm as it has in every war since its inception. Field workers in the United States, Europe, and SWA played a vital role in helping commanders with personnel emergency matters and managing messages concerning family members. The first Red Cross staff person arrived in Saudi Arabia on 12 August. The number of Red Cross personnel serving in theater eventually reached 158; those in theater and in CONUS processed more than 200,000 messages. Red Cross chapters played an important role in providing access to military resources for families of RC troops as well as support groups for all military families. DOD needs to assure that Red Cross personnel receive the same support as DOD civilian personnel.

OBSERVATIONS

Accomplishments

- Civilians, contractors, and other non-military personnel performed crucial combat support and combat service support functions. This participation contributed directly to the high degree of success of Operations Desert Shield and Desert Storm.

- Civilian employees and contractor personnel brought many special skills necessary to support Operations Desert Shield and Desert Storm.

Shortcomings

- Civilian mobilization planning was sometimes not adequate. Current full-time mobilization planners do not always consider the need and requirements of civilians deployed in support of contingency operations. This hampers the efforts to train, equip, and manage civilians designated to support contingency operations.

- Preparedness exercises did not always challenge the civilian personnel and support system to identify and prepare for support of contingency operations.

- Family assistance organizations, activities, and services for military members were not consistently available to family members of deployed civilians.

- CENTCOM assigned no overall employee coordinator to monitor issues common to all components such as theater entrance requirements, ID cards, pay, benefits, training, equipping, and processing within the theater.

- The absence of a standard civilian ID card resulted in some components' using pre-existing ID cards, creation of ID cards, and some elements not having any form of standard identification. This practice caused occasional problems at security check-points.

Issue

- Although DOD and the Services assumed some responsibility, the issue of the extent of responsibility, rights, adequate guidelines for deployment, and administration of contractor personnel needs clarification for future deployments.

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APPENDIX O

THE ROLE OF THE LAW OF WAR

"Decisions were impacted by legal considerations at every level, [the law of war] proved invaluable in the decision-making process."

General Colin Powell,
Chairman, Joint Chiefs of Staff

BACKGROUND

The United States, its Coalition partners, and Iraq are parties to numerous law of war treaties intended to minimize unnecessary suffering by combatants and noncombatants during war. The US military's law of war program is one of the more comprehensive in the world. As indicated in this appendix, it is US policy that its forces will conduct military operations in a manner consistent with US law of war obligations. This appendix discusses the principal law of war issues that arose during Operation Desert Storm.

As defined in Joint Publication 1-02, Department of Defense (DOD) Dictionary of Military and Associated Terms (1 December 1989), the law of war is "That part of international law that regulates the conduct of armed hostilities. It is often termed the law of armed conflict." While the terms are synonymous, this appendix will use "law of war" for consistency. Both concepts of *jus ad bellum* and *jus in bello* are covered in this appendix.

In addition to the United Nations Charter, with its prohibition against the threat or use of force against the territorial integrity or political independence of any state, treaties applicable to the Persian Gulf War include:

- Hague Convention IV and its Annex Respecting the Laws and Customs of War on Land of 18 October 1907 ("Hague IV").

- Hague Convention V Respecting the Rights and Duties of Neutral Powers and Persons in Case of War on Land of 18 October 1907 ("Hague V").

- Hague Convention VIII Relative to the Laying of Automatic Submarine Contact Mines of 18 October 1907 ("Hague VIII").

- Hague Convention IX Concerning Bombardment by Naval Forces in Time of War of 18 October 1907 ("Hague IX").

- Geneva Protocol for the Prohibition of the Use of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare of 17 June 1925 ("1925 Geneva Protocol").

- Convention on the Prevention and Punishment of the Crime of Genocide of 9 December 1948 ("the Genocide Convention").

- The four Geneva Conventions for the Protection of War Victims of August 12, 1949:

  - Geneva Convention for the Amelioration of the Condition of Wounded and Sick in Armed Forces in the Field ("GWS").

  - Geneva Convention for the Amelioration of the Wounded, Sick and Shipwrecked Members of Armed Forces at Sea (hereinafter "GWS [Sea]).

  - Geneva Convention Relative to the Treatment of Prisoners of War ("GPW").

  - Geneva Convention Relative to the Protection of Civilian Persons in Time of War ("GC").

- Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict of 14 May 1954 ("1954 Hague"). Since Iraq, Kuwait, France, Egypt, Saudi Arabia, and other Coalition members are parties to this treaty, the treaty was binding between Iraq and Kuwait, and between Iraq and those Coalition members in the Persian Gulf War. Canada, Great Britain, and the United States are not parties to this treaty. However, the armed forces of each receive training on its provisions, and the treaty was followed by all Coalition forces in the Persian Gulf War.

The United States is a party to all of these treaties, except the 1954 Hague Cultural Property Convention. While Iraq is not a party to Hague IV, the International Military Tribunal (Nuremberg, 1946) stated with regard to it that:

> The rules of land warfare expressed in . . . [Hague IV] undoubtedly represented an advance over existing International Law at the time of their adoption . . . but by 1939 these rules...were recognized by all civilized nations and were regarded as being declaratory of the laws and customs of war.

As customary international law, its obligations are binding upon all nations. Neither is Iraq a party to Hague V, Hague VIII, or Hague IX. However, the provisions of each cited herein are regarded as a reflection of the customary practice of nations, and therefore binding upon all nations.

The United States, other Coalition members, and Iraq are parties to the 1925 Geneva Protocol which prohibits the use of chemical (CW) or bacteriological (biological) weapons (BW) in time of war. Both Iraq and the United States filed a reservation to this treaty at the time of their respective ratifications. Iraq's

reservation accepted the 1925 Geneva Protocol as prohibiting first use of CW or BW weapons; the United States, having unilaterally renounced the use of BW in 1969, accepted without reservation the prohibition on BW and first use of CW. (The United States also is a party to the Convention on the Prohibition of Development, Production and Stockpiling of Bacteriological [Biological] and Toxin Weapons and on Their Destruction of 10 April 1972; Iraq is not.) All nations party to the Persian Gulf conflict, including Iraq, are parties to the four 1949 Geneva Conventions for the protection of war victims. The precise applicability of these treaties will be addressed in the discussion of each topic in this appendix.

Three other law of war treaties were not legally applicable in the Persian Gulf War, but nonetheless bear mention. They are:

- 1977 Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques ("ENMOD Convention"). While the United States and many of its Coalition partners are parties to this treaty, Iraq has signed but not ratified the ENMOD Convention; therefore it was not legally applicable to Iraqi actions during the Persian Gulf War.

- 1977 Protocol I Additional to the Geneva Conventions of 12 August 1949 ("Protocol I"). From 1974 to 1977 the United States and more than 100 other nations participated in a Diplomatic Conference intended to supplement the 1949 Geneva Conventions and modernize the law of war. That conference produced two new law of war treaties: Protocol I deals with the law of war in international armed conflicts, while Protocol II addresses the law of war applicable to internal armed conflicts. Iraq and several Coalition members, including the United States, Great Britain, and France, are not parties to Protocol I; therefore it was not applicable during the Persian Gulf War. For humanitarian, military, and political reasons, the United States in 1987 declined to become a party to Protocol I; France reached a similar decision in 1984.

- 1980 Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons. Iraq and most of the Coalition partners, including the United States, are not parties to this treaty; it had no applicability in the Persian Gulf War. However, US and Coalition actions were consistent with its language. Iraqi actions were consistent with the treaty except as to its provisions on land mines and booby traps.

ROLE OF LEGAL ADVISERS

The Office of General Counsel of the Department of Defense (DOD), as the chief DOD legal office, provided advice to the Secretary of Defense, the Deputy Secretary of Defense, the Under Secretary of Defense for Policy, other senior advisers to the Secretary and to the various components of the Defense legal community on all matters relating to Operations Desert Shield and Desert Storm, including the law

of war. For example, the Secretary of Defense tasked the General Counsel to review and opine on such diverse issues as the means of collecting and obligating for defense purposes contributions from third countries; the Wars Powers Resolution; DOD targeting policies; the rules of engagement; the rules pertinent to maritime interception operations; issues relating to the treatment of prisoners of war; sensitive intelligence and special access matters; and similar matters of the highest priority to the Secretary and DOD. In addition, military judge advocates and civilian attorneys with international law expertise provided advice on the law of war and other legal issues at every level of command in all phases of Operations Desert Shield and Desert Storm. Particular attention was given to the review of target lists to ensure the consistency of targets selected for attack with United States law of war obligations.

TAKING OF HOSTAGES

Whatever the purpose, whether for intimidation, concessions, reprisal, or to render areas or legitimate military objects immune from military operations, the taking of hostages is unequivocally and expressly prohibited by Article 34, GC.[1]

Applicability of the GC was triggered by Iraq's invasion of Kuwait on 2 August; thereafter Iraq was an Occupying Power in Kuwait, with express obligations. Under articles 5, 42, and 78, GC, Iraq could intern foreign nationals only if internal security made it "absolutely necessary" (in Iraq) or "imperative" (in Kuwait). Iraq asserted no rights under any of these provisions in defense of its illegal taking of hostages in Iraq and Kuwait.

United Nations Security Council (UNSC) Resolution 664 (18 August) overrode authority inconsistent with its obligations under the GC that Iraq might have claimed to restrict the departure of US citizens and other third-country nationals in Kuwait or Iraq, and clarified the legal status of noncombatants.

Hostage taking by Iraq can be divided into four categories:

- The taking of Kuwaiti nationals as hostages and individual and mass forcible deportations to Iraq, in violation of Articles 34 and 49, GC;

- The taking of third-country nationals in Kuwait as hostages and individual and mass forcible deportations from Kuwait to Iraq, in violation of Articles 34 and 49, GC;

[1] The United States is party to the International Convention Against Taking of Hostages of 17 December 1979, under which hostage taking is identified as an act of international terrorism.

• The taking of foreign nationals within Iraq as hostages, with individual and mass forcible transfers, in violation of Articles 34 and 35, GC; and

• Compelling Kuwaiti and other foreign citizens to serve in the armed forces of Iraq, in violation of Article 51, GC.

The taking of hostages, their unlawful deportation, and compelling hostages to serve in the armed forces of Iraq constitute Grave Breaches (that is, major violations of the law of war) under Article 147, GC.

US and other hostages in Iraq, including civilians forcibly deported from Kuwait, were placed in or around military targets as "human shields", in violation of Articles 28 and 38(4), GC. Use of Coalition prisoners of war (POWs) to shield military targets from attack will be considered in the section of this appendix on the treatment of POWs; other abuses of protected civilians will be addressed in the sections on Treatment of Civilians in Occupied Territory and War Crimes.

Iraq released US and other third-party hostages (i.e., other than Kuwaiti citizens) held in either Kuwait or Iraq in December. Because they were permitted to depart well before offensive combat operations began, Iraq's initial taking of hostages from such nations had no effect on US or Coalition force planning or execution of military operations.

Although it was known that some Kuwaiti nationals were being held in Iraq before offensive combat operations began, their presence did not appreciably affect Coalition force planning or execution of military operations. Thus, although the President had declared the United States would not be deterred from attacking legitimate targets because Iraq may have placed protected persons in their vicinity, it does not appear that any Kuwaiti nationals were placed at risk in that fashion after Iraqi release of its third party hostages. Iraq did use its own civilian population for this purpose, however, as will be explained in the section on targeting, collateral damage and collateral civilian casualties.

Kuwaiti nationals (and other residents of Kuwait) were taken hostage and forcibly deported from Kuwait to Iraq by retreating Iraqi troops as the Coalition forces' liberation of Kuwait reached its final phase. Although the plight of those hostages was a source of great concern to US and other Coalition forces, the fact of their seizure did not have a significant effect on the planning or execution of Coalition military operations.

TREATMENT OF CIVILIANS IN OCCUPIED TERRITORY

The GC governs the treatment of civilians in occupied territories. As previously indicated, all parties to the conflict, including Iraq, are parties to this convention. The treaty's application was triggered by the Iraqi invasion, and was specifically recognized in UNSC resolutions that addressed that crisis.

An earlier law of war treaty that remains relevant is Hague IV, which contains regulations relating to the protection of civilian property (public and private) in occupied territory; in contrast, the GC sets forth the obligations of an occupying power in providing protection for civilians in occupied territory. Cultural property in Kuwait also was protected by the 1954 Hague Cultural Property Convention.

Iraqi actions read like a very long list of violations of Hague IV, GC, and the 1954 Hague Cultural Property Convention. From the beginning of its invasion of Kuwait, Iraq exhibited an intent not only to refuse to conduct itself as an occupying power, but to deny that it was an occupying power. Its intention was to annex Kuwait as a part of Iraq, and remove any vestige of Kuwait's previous existence as an independent, sovereign nation. (Its transfer of a part of its own civilian population into occupied Kuwait for the purpose of annexation and resettlement constitutes a violation of Article 49, GC.)

A case can be made that Iraqi actions may violate the Genocide Convention, which defines genocide as any of the following acts committed with the intent to destroy, in whole or in part, a national, ethnical, racial or religious group:

- Killing members of the group;
- Causing serious bodily or mental harm to members of the group;
- Deliberately inflicting on the group conditions of life calculated to bring about its physical destruction in whole or in part;
- Imposing measures intended to prevent births within the group; or
- Forcibly transferring children of the group to another group.

Iraq carried out every act of the types condemned by the Genocide Convention, except for forcibly transferring children. Many Kuwaiti citizens were deported forcibly to Iraq; many others were tortured and/or murdered. There were instances of Kuwaiti women of child-bearing age being brutally rendered incapable of having children. Collective executions of innocent Kuwaiti civilians took place routinely. Kuwaiti public records were removed or destroyed, apparently to prevent or impede the reconstitution of Kuwait if Kuwait were liberated. Kuwaiti identification cards and license plates were revoked and replaced with Iraqi credentials, identifying Kuwait as Iraq's 19th province.

In violation of Hague IV and the 1954 Hague Cultural Property Convention, cultural, private and public (municipal and national) property was confiscated; pillage was widespread. (Confiscation of private property is prohibited under any circumstance, as is the confiscation of municipal public property. Confiscation of movable national public property is prohibited without military need and cash compensation, while immovable national public property may be temporarily confiscated under the concept of usufruct – the right to use another's property so long as it is not damaged.)

Iraqi confiscation appears to have been primarily, if not entirely, part of a program:

- Of erasing any record of the sovereign state of Kuwait;

- Of looting directed by the Iraqi leadership to provide consumer goods for the Iraqi public; and

- Of looting by individual Iraqi soldiers, which was tolerated by Iraqi military commanders and higher civilian and military authorities.

Civilians who remained in Kuwait were denied the necessities for survival, such as food, water, and basic medical care, in violation of Articles 55 and 56, GC. Kuwaiti doctors were forcibly deported to Iraq; Filipino nurses working in the hospitals were raped repeatedly by Iraqi soldiers. Kuwaiti civilians were not permitted any medical care unless they presented Iraqi identification cards; presentation of an Iraqi identification card by a Kuwaiti citizen seldom resulted in any genuine medical care. Medical supplies and equipment in Kuwaiti hospitals necessary for the needs of the civilian population of Kuwait were illegally taken, in violation of Article 57, GC, in brutal disregard for Kuwaiti lives. For example, there are reports that infants died in Kuwaiti hospitals after Iraqis removed them from their incubators, which were shipped to Iraq.

The slightest perceived offense could lead to torture and execution of the purported offender, often in front of family members. Torture and murder of civilians is prohibited by Article 32, GC. Iraqi policy provided for the collective punishment of the family of any individual who served in or was suspected of assisting the Kuwaiti resistance. This punishment routinely took the form of destruction of the family home and execution of all family members. Collective punishment is prohibited expressly by Article 33, GC.

The Iraqi occupation remained brutal until the very end; civilians were murdered in the final days of that occupation to eliminate witnesses to Iraqi repression. The Government of Kuwait estimates that 1,082 civilians were murdered during the occupation. Many more were forcibly deported to Iraq; several thousand remain missing. On their departure, Iraqi forces set off previously placed explosive charges on Kuwait's oil wells, a vengeful act of wanton destruction.

Coalition forces acted briefly as an occupying power. When the Operation Desert Storm ground offensive began, Coalition forces moved into Iraq. Physical seizure and control of Iraqi territory triggered the application of Hague IV and the GC. Both treaties initially had little practical application, since Coalition forces occupied uninhabited desert. As hostilities diminished, the internal conflict that erupted in Iraq caused thousands of civilians to flee the fighting (such as in Al-Basrah, between Iraqi military units and Shi'ite forces) and to enter territory held by Coalition forces. Allied forces provided food, water and medical care to these refugees. As Coaltion forces prepared to withdraw from Iraq, no international relief agency was ready to assume this relief effort. Consequently, refugees were offered the opportunity to move to the refugee camp at Rafha, Saudi Arabia. Approximately 20,000 refugees (including more than 8,000 from the Safwan area) accepted this offer.

In the conflict's latter phases, public and private international relief agency representatives entered the area of conflict, often without sufficient advance notification and coordination with Coalition authorities. While relief agencies undoubtedly were anxious to perform humanitarian missions, their entry onto the battlefield without the advance consent of the parties to the conflict is not consistent with Article 9, GWS (a provision common to all four 1949 Geneva Conventions), Article 125, GPW, and Article 63, GC. It impeded Coalition efforts to end hostilities as rapidly as possible, and placed these organizations' members at risk from the ongoing hostilities. Coalition aviation units searching for mobile Scud missile launchers in western Iraq were inhibited in their efforts to neutralize that threat by vehicles from those organizations moving through Scud missile operating areas that otherwise were devoid of civilians. The lack of timely, proper coordination by relief agencies with Coalition forces adversely affected air strikes against other Iraqi targets on other occasions. While well-intentioned, these intrusions required increased diligence by Coalition forces, placed Coalition forces at increased risk, and were factors in the failure to resolve the Scud threat.

Whether in territory Coalition forces occupied or in parts of Iraq still under Iraqi control, US and Coalition operations in Iraq were carefully attuned to the fact those operations were being conducted in an area encompassing "the cradle of civilization," near many archaeological sites of great cultural significance. Coalition operations were conducted in a way that balanced maximum possible protection for those cultural sites against protection of Coalition lives and accomplishment of the assigned mission.

While Article 4(1) of the 1954 Hague Convention provides specific protection for cultural property, Article 4(2) permits waiver of that protection where military necessity makes such a waiver imperative; such "imperative military necessity" can occur when an enemy uses cultural property and its immediate surroundings to protect legitimate military targets, in violation of Article 4(1). Coalition forces continued to respect Iraqi cultural property, even where Iraqi forces used such property to shield military targets from attack. However, some indirect damage may have occurred to some Iraqi cultural property due to the concussive effect of munitions directed against Iraqi targets some distance away from the cultural sites.

Since US military doctrine is prepared consistent with US law of war obligations and policies, the provisions of Hague IV, GC, and the 1954 Hague Convention did not have any significant adverse effect on planning or executing military operations.

TARGETING, COLLATERAL DAMAGE AND CIVILIAN CASUALTIES

The law of war with respect to targeting, collateral damage and collateral civilian casualties is derived from the principle of discrimination; that is, the necessity for distinguishing between combatants, who may be attacked, and noncombatants, against whom an intentional attack may not be directed, and between legitimate military targets and civilian objects. Although this is a major part of the foundation on which the law of war is built, it is one of the least codified portions of that law.

As a general principle, the law of war prohibits the intentional destruction of civilian objects not imperatively required by military necessity and the direct, intentional attack of civilians not taking part in hostilities. The United States takes these proscriptions into account in developing and acquiring weapons systems, and in using them in combat. Central Command (CENTCOM) forces adhered to these fundamental law of war proscriptions in conducting military operations during Operation Desert Storm through discriminating target selection and careful matching of available forces and weapons systems to selected targets and Iraqi defenses, without regard to Iraqi violations of its law of war obligations toward the civilian population and civilian objects.

Several treaty provisions specifically address the responsibility to minimize collateral damage to civilian objects and injury to civilians. Article 23(g) of the Annex to Hague IV prohibits destruction not "imperatively demanded by the necessities of war," while Article 27 of that same annex offers protection from intentional attack to "buildings dedicated to religion, art, science, or charitable purposes, historic monuments, hospitals, and places where the sick and wounded are collected, provided they are not being used at the time for military purposes." Similar language is contained in Article 5 of Hague IX, while the conditions for protection of cultural property in the 1954 Hague Cultural Property Convention were set forth in the preceding discussion on the treatment of civilians in occupied territory. In summary, cultural and civilian objects are protected from direct, intentional attack unless they are used for military purposes, such as shielding military objects from attack.

While the prohibition contained in Article 23(g) generally refers to intentional destruction or injury, it also precludes collateral damage of civilian objects or injury to noncombatant civilians that is clearly disproportionate to the military advantage gained in the attack of military objectives, as discussed below. As previously indicated, Hague IV was found to be part of customary international law in the course of war crimes trials following World War II, and continues to be so regarded.

An uncodified but similar provision is the principle of proportionality. It prohibits military action in which the negative effects (such as collateral civilian casualties) clearly outweigh the military gain. This balancing may be done on a target-by-target basis, as frequently was the case during Operation Desert Storm, but also may be weighed in overall terms against campaign objectives. CENTCOM conducted its campaign with a focus on minimizing collateral civilian casualties and damage to civilian objects. Some targets were specifically avoided because the value of destruction of each target was outweighed by the potential risk to nearby civilians or, as in the case of certain archaeological and religious sites, to civilian objects.

Coalition forces took several steps to minimize the risk of injury to noncombatants. To the degree possible and consistent with allowable risk to aircraft and aircrews, aircraft and munitions were selected so that attacks on targets within populated areas would provide the greatest possible accuracy and the least risk to civilian objects and the civilian population. Where required, attacking aircraft were accompanied by support mission aircraft to minimize attacking aircraft aircrew distraction from their assigned mission. Aircrews attacking targets in populated areas were directed not to expend their munitions if they lacked positive identification of their targets. When this occurred, aircrews dropped their bombs on alternate targets or returned to base with their weapons.

One reason for the maneuver plan adopted for the ground campaign was that it avoided populated areas, where Coalition and Iraqi civilian casualties and damage to civilian objects necessarily would have been high. This was a factor in deciding against an amphibious assault into Kuwait City.

The principle of proportionality acknowledges the unfortunate inevitability of collateral civilian casualties and collateral damage to civilian objects when noncombatants and civilian objects are mingled with combatants and targets, even with reasonable efforts by the parties to a conflict to minimize collateral injury and damage.

This proved to be the case in the air campaign. Despite conducting the most discriminate air campaign in history, including extraordinary measures by Coalition aircrews to minimize collateral civilian casualties, the Coalition could not avoid causing some collateral damage and injury.

There are several reasons for this. One is the fact that in any modern society, many objects intended for civilian use also may be used for military purposes. A bridge or highway vital to daily commuter and business traffic can be equally crucial to military traffic, or support for a nation's war effort. Railroads, airports, seaports, and the interstate highway system in the United States have been funded by the Congress in part because because of US national security concerns, for example; each proved invaluable to the movement of US military units to various ports for deployment to Southwest Asia (SWA) for Operations Desert Shield and Desert Storm.

Destruction of a bridge, airport, or port facility, or interdiction of a highway can be equally important in impeding an enemy's war effort.

The same is true with regard to major utilities; for example, microwave towers for everyday, peacetime civilian communications can constitute a vital part of a military command and control (C2) system, while electric power grids can be used simultaneously for military and civilian purposes. Some Iraqi military installations had separate electrical generators; others did not. Industries essential to the manufacturing of CW, BW and conventional weapons depended on the national electric power grid.

Experience in its 1980-1988 war with Iran caused the Government of Iraq to develop a substantial and comprehensive degree of redundancy in its normal, civilian utilities as back-up for its national defense. Much of this redundancy, by necessity, was in urban areas. Attack of these targets necessarily placed the civilian population at risk, unless civilians were evacuated from the surrounding area. Iraqi authorities elected not to move civilians away from objects they knew were legitimate military targets, thereby placing those civilians at risk of injury incidental to Coalition attacks against these targets, notwithstanding efforts by the Coalition to minimize risk to innocent civilians.

When objects are used concurrently for civilian and military purposes, they are liable to attack if there is a military advantage to be gained in their attack. ("Military advantage" is not restricted to tactical gains, but is linked to the full context of a war strategy, in this instance, the execution of the Coalition war plan for liberation of Kuwait.)

Attack of all segments of the Iraqi communications system was essential to destruction of Iraqi military C2. C2 was crucial to Iraq's integrated air defense system; it was of equal importance for Iraqi ground forces. Iraqi C2 was highly centralized. With Saddam Hussein's fear of internal threats to his rule, he has discouraged individual initiative while emphasizing positive control. Iraqi military commanders were authorized to do only that which was directed by highest authority. Destruction of its C2 capabilities would make Iraqi combat forces unable to respond quickly to Coalition initiatives.

Baghdad bridges crossing the Euphrates River contained the multiple fiber-optic links that provided Saddam Hussein with secure communications to his southern group of forces. Attack of these bridges severed those secure communication links, while restricting movement of Iraqi military forces and deployment of CW and BW warfare capabilities. Civilians using those bridges or near other targets at the time of their attack were at risk of injury incidental to the legitimate attack of those targets.

Another reason for collateral damage to civilian objects and injury to civilians during Operation Desert Storm lay in the policy of the Government of Iraq, which purposely used both Iraqi and Kuwaiti civilian populations and civilian objects as shields for military objects. Contrary to the admonishment against such conduct

contained in Article 19, GWS, Articles 18 and 28, GC, Article 4(1), 1954 Hague, and certain principles of customary law codified in Protocol I (discussed below), the Government of Iraq placed military assets (personnel, weapons, and equipment) in civilian populated areas and next to protected objects (mosques, medical facilities, and cultural sites) in an effort to protect them from attack. For this purpose, Iraqi military helicopters were dispersed into residential areas; and military supplies were stored in mosques, schools, and hospitals in Iraq and Kuwait. Similarly, a cache of Iraqi Silkworm surface-to-surface missiles was found inside a school in a populated area in Kuwait City. UN inspectors uncovered chemical bomb production equipment while inspecting a sugar factory in Iraq. The equipment had been moved to the site to escape Coalition air strikes. This intentional mingling of military objects with civilian objects naturally placed the civilian population living nearby, working within, or using those civilian objects at risk from legitimate military attacks on those military objects.

The Coalition targeted specific military objects in populated areas, which the law of war permits; at no time were civilian areas as such attacked. Coalition forces also chose not to attack many military targets in populated areas or in or adjacent to cultural (archaeological) sites, even though attack of those military targets is authorized by the law of war. The attack of legitimate Iraqi military targets, notwithstanding the fact it resulted in collateral injury to civilians and damage to civilian objects, was consistent with the customary practice of nations and the law of war.

The Government of Iraq sought to convey a highly inaccurate image of indiscriminate bombing by the Coalition through a deliberate disinformation campaign. Iraq utilized any collateral damage that occurred – including damage or injury caused by Iraqi surface-to-air missiles and antiaircraft munitions falling to earth in populated areas – in its campaign to convey the misimpression that the Coalition was targeting populated areas and civilian objects. This disinformation campaign was factually incorrect, and did not accurately reflect the high degree of care exercised by the Coalition in attack of Iraqi targets.

For example, on 11 February, a mosque at Al-Basrah was dismantled by Iraqi authorities to feign bomb damage; the dome was removed and the building dismantled. US authorities noted there was no damage to the minaret, courtyard building, or dome foundation which would have been present had the building been struck by Coalition munitions. The nearest bomb crater was outside the facility, the result of an air strike directed against a nearby military target on 30 January. Other examples include use of photographs of damage that occurred during Iraq's war with Iran, as well as of prewar earthquake damage, which were offered by Iraqi officials as proof of bomb damage caused by Coalition air raids.

Minimizing collateral damage and injury is a responsibility shared by attacker and defender. Article 48 of the 1977 Protocol I provides that:

In order to ensure respect for and protection of the civilian population and civilian objects, the Parties to the conflict shall at all times distinguish between the civilian population and combatants and between civilian objects and military objectives and accordingly shall direct their operations only against military objectives.

Paragraph one of Article 49 of Protocol I states that "'Attacks' means acts of violence against the adversary, whether in offense or defense." Use of the word "attacks" in this manner is etymologically inconsistent with its customary use in any of the six official languages of Protocol I. Conversely, the word "attack" or "attacks" historically has referred to and today refers to offensive operations only. Article 49(1) otherwise reflects the applicability of the law of war to actions of both attacker and defender, including the obligation to take appropriate measures to minimize injury to civilians not participating in hostilities.

As previously indicated, the United States in 1987 declined to become a party to Protocol I; nor was Protocol I in effect during the Persian Gulf War, since Iraq is not a party to that treaty. However, the language of Article 48 and 49(1) (except for the erroneous use of the word "attacks") is generally regarded as a codification of the customary practice of nations, and therefore binding on all.

In the effort to minimize collateral civilian casualties, a substantial responsibility for protection of the civilian population rests with the party controlling the civilian population. Historically, and from a common sense standpoint, the party controlling the civilian population has the opportunity and the responsibility to minimize the risk to the civilian population through the separation of military objects from the civilian population, evacuation of the civilian population from near immovable military objects, and development of air raid precautions. Throughout World War II, for example, both Axis and Allied nations took each of these steps to protect their respective civilian populations from the effects of military operations.

The Government of Iraq elected not to take routine air-raid precautions to protect its civilian population. Civilians were not evacuated in any significant numbers from Baghdad, nor were they removed from proximity to legitimate military targets. There were air raid shelters for less than 1 percent of the civilian population of Baghdad. The Government of Iraq chose instead to use its civilians to shield legitimate military targets from attack, exploiting collateral civilian casualties and damage to civilian objects in its disinformation campaign to erode international and US domestic support for the Coalition effort to liberate Kuwait.

The presence of civilians will not render a target immune from attack; legitimate targets may be attacked wherever located (outside neutral territory and waters). An attacker must exercise reasonable precautions to minimize incidental or collateral injury to the civilian population or damage to civilian objects, consistent with mission accomplishment and allowable risk to the attacking forces. The defending party must exercise reasonable precautions to separate the civilian population and civilian objects from military objectives, and avoid placing military

objectives in the midst of the civilian population. As previously indicated, a defender is expressly prohibited from using the civilian population or civilian objects (including cultural property) to shield legitimate targets from attack.

The Government of Iraq was aware of its law of war obligations. In the month preceding the Coalition air campaign, for example, a civil defense exercise was conducted, during which more than one million civilians were evacuated from Baghdad. No government evacuation program was undertaken during the Coalition air campaign. As previously indicated, the Government of Iraq elected instead to mix military objects with the civilian population. Pronouncements that Coalition air forces would not attack populated areas increased Iraqi movement of military objects into populated areas in Iraq and Kuwait to shield them from attack, in callous disregard of its law of war obligations and the safety of its own civilians and Kuwaiti civilians.

Similar actions were taken by the Government of Iraq to use cultural property to protect legitimate targets from attack; a classic example was the positioning of two fighter aircraft adjacent to the ancient temple of Ur (as depicted in the photograph in Volume II, Chapter VI, "Off Limits Targets" section) on the theory that Coalition respect for the protection of cultural property would preclude the attack of those aircraft. While the law of war permits the attack of the two fighter aircraft, with Iraq bearing responsibility for any damage to the temple, Commander-in-Chief, Central Command (CINCCENT) elected not to attack the aircraft on the basis of respect for cultural property and the belief that positioning of the aircraft adjacent to Ur (without servicing equipment or a runway nearby) effectively had placed each out of action, thereby limiting the value of their destruction by Coalition air forces when weighed against the risk of damage to the temple. Other cultural property similarly remained on the Coalition no-attack list, despite Iraqi placement of valuable military equipment in or near those sites.

Undoubtedly, the most tragic result of this intentional commingling of military objects with the civilian population occurred in the 13 February attack on the Al-Firdus Bunker (also sometimes referred to as the Al-'Amariyah bunker) in Baghdad. Originally constructed during the Iran-Iraq War as an air raid shelter, it had been converted to a military C2 bunker in the middle of a populated area. While the entrance(s) to a bomb shelter permit easy and rapid entrance and exit, barbed wire had been placed around the Al-Firdus bunker, its entrances had been secured to prevent unauthorized access, and armed guards had been posted. It also had been camouflaged. Knowing Coalition air attacks on targets in Baghdad took advantage of the cover of darkness, Iraqi authorities permitted selected civilians – apparently the families of officer personnel working in the bunker – to enter the Al-'Amariyah Bunker at night to use the former air raid shelter part of the bunker, on a level above the C2 center. Coalition authorities were unaware of the presence of these civilians in the bunker complex. The 13 February attack of the Al-'Amariyah bunker – a legitimate military target – resulted in the unfortunate deaths of those Iraqi civilians who had taken refuge above the C2 center.

An attacker operating in the fog of war may make decisions that will lead to innocent civilians' deaths. The death of civilians always is regrettable, but inevitable when a defender fails to honor his own law of war obligations – or callously disregards them, as was the case with Saddam Hussein. In reviewing an incident such as the attack of the Al-'Amariyah bunker, the law of war recognizes the difficulty of decision making amid the confusion of war. Leaders and commanders necessarily have to make decisions on the basis of their assessment of the information reasonably available to them at the time, rather than what is determined in hindsight.

Protocol I establishes similar legal requirements. Articles 51(7) and 58 of the 1977 Protocol I expressly prohibit a defender from using the civilian population or individual civilians to render certain points or areas immune from military operations, in particular in an attempt to shield military objectives from attack or to shield, favor or impede military operations; obligate a defender to remove the civilian population, individual civilians and civilian objects under the defender's control from near military objectives; avoid locating military objectives within or near densely populated areas; and to take other necessary precautions to protect the civilian population, individual civilians and civilian objects under its control against the dangers resulting from military operations.

It is in this area that deficiencies of the 1977 Protocol I become apparent. As correctly stated in Article 51(8) of Protocol I, a nation confronted with callous actions by its opponent (such as the use of "human shields') is not released from its obligation to exercise reasonable precaution to minimize collateral injury to the civilian population or damage to civilian objects. This obligation was recognized by Coalition forces in the conduct of their operations. In practice, this concept tends to facilitate the disinformation campaign of a callous opponent by focusing international public opinion upon the obligation of the attacking force to minimize collateral civilian casualties and damage to civilian objects – a result fully consistent with Iraq's strategy in this regard. This inherent problem is worsened by the language of Article 52(3) of Protocol I, which states:

> In case of doubt whether an object which is normally dedicated to civilian purposes, such as a place of worship, a house or other dwelling or a school, is being used to make an effective contribution to military action, it shall be presumed not to be so used.

This language, which is not a codification of the customary practice of nations, causes several things to occur that are contrary to the traditional law of war. It shifts the burden for determining the precise use of an object from the party controlling that object (and therefore in possession of the facts as to its use) to the party lacking such control and facts, i.e., from defender to attacker. This imbalance ignores the realities of war in demanding a degree of certainty of an attacker that seldom exists in combat. It also encourages a defender to ignore its obligation to separate the civilian population, individual civilians and civilian objects from military objectives, as the Government of Iraq illustrated during the Persian Gulf War.

In the case of the Al-Firdus bunker, for example – repeatedly and incorrectly referred to by the Government of Iraq and some media representatives as a "civilian bomb shelter" – the Coalition forces had evidence the bunker was being used as an Iraqi command and control center and had no knowledge it was concurrently being used as a bomb shelter for civilians. Under the rule of international law known as military necessity, which permits the attack of structures used to further an enemy's prosecution of a war, this was a legitimate military target. Coalition forces had no obligation to refrain from attacking it. If Coalition forces had known that Iraqi civilians were occupying it as a shelter, they may have withheld an attack until the civilians had removed themselves (although the law of war does not require such restraint). Iraq had an obligation under the law of war to refrain from commingling its civilian population with what was an obviously military target. Alternatively, Iraq could have designated the location as a hospital, safety zone, or a neutral zone, as provided for in Articles 14 and 15, GC.

ENEMY PRISONER OF WAR PROGRAM

This section contains similar information to that contained in Appendix L, but is a more condensed version of that appendix, with emphasis on the legal aspects of the Enemy Prisoner of War (EPW) program. Appendix L used the same base information as Appendix O, but expands to include more operational issues.

Coalition care for EPWs was in strict compliance with the 1949 Geneva convention relative to the treatment of Prisoners of War (hereafter "GPW"). Centralized management of EPW operations began during Operation Desert Shield and continued throughout Operation Desert Storm. The US National Prisoner of War Information Center (NPWIC) became operational before ground operations began and a new automated information program for preserving, cataloging, and accounting for captured personnel (as required by the GPW) was fielded in Operation Desert Shield. Trained Reserve Component (RC) EPW units were activated, and camp advisory teams were sent to Saudi Arabia to account for and to provide technical assistance on custody and treatment of US-transferred EPWs.

EPWs captured by Coalition forces during Operations Desert Shield and Desert Storm were maintained in either a US or Saudi EPW camp. The United States accepted EPWs captured by the United Kingdom (UK) and France, while Saudi Arabia managed a consolidated camp for those EPWs captured by the remaining Coalition forces.

The Army, as the DOD Executive Agent for EPW operations, processed 69,822 Iraqi EPWs captured by British, French, and US forces between 18 January, when the first EPW was captured, and 2 May, when the last EPW in US custody was transferred to Saudi Arabian control. In terms of campaign length vis-a-vis EPWs captured, this was the most extensive US EPW operation since World War II. US forces captured 62,456 EPWs during the conflict. Additionally, 1,492 displaced civilians were

evacuated to Saudi Arabia through EPW channels. Some of these initially were believed to be EPWs; others were evacuated for their own safety. French and British forces captured an additional 5,874 EPWs and transferred them to US control. The Arab Command captured 16,921 EPWs. Always of international interest and concern, the humane treatment of and full accountability for EPWs and displaced civilians during this conflict received heightened attention because of religious and cultural sensitivities.

US and other Coalition forces treated EPWs and displaced civilians in accordance with the 1949 Geneva Conventions for the Protection of War Victims. The first three conventions mandate humane treatment and full accountability for all prisoners of war from the moment of capture until their repatriation, release, or death. The fourth convention (GC) requires humane treatment for displaced civilians. The International Committee of the Red Cross (ICRC) was provided access to Coalition EPW facilities and reviewed their findings with Coalition representatives in periodic meetings in Riyadh, Saudi Arabia. While US and Coalition forces worked closely with the ICRC on EPW matters throughout Operation Desert Storm, neither the ICRC nor any other human rights organization played any other role affecting the course of the war. The ICRC was ineffective in providing any protection for US and Coalition POWs in Iraq's custody.

NPWIC was established at the Pentagon during Operation Desert Shield using active duty personnel and became fully operational with Reserve staffing on 21 January. Its mission was to account for EPWs in US custody and to ensure compliance with the 1949 Geneva Conventions. Article 122, GPW requires a captor to establish a National Information Bureau within the shortest time possible after the onset of hostilities. The NPWIC, manned by Army Reserve Individual Mobilization Augmentees, volunteer Reservists and retired personnel, served as a central repository for information relative to EPWs captured by or transferred to US forces, and coordinated information pertaining to EPWs and US POWs in Iraqi hands with the ICRC.

The US and Saudi governments concluded an agreement which allowed the US to transfer captured EPWs to Saudi control after processing by US EPW elements. This agreement was applicable to EPWs captured by the French and British, as those EPWs were processed and maintained in US EPW camps. The US provided camp advisory teams to work with the Government of Saudi Arabia to assist in compliance with the 1949 Geneva Conventions, to facilitate logistic and administrative cooperation, and to maintain accountability for US-transferred EPWs. The size of the host nation EPW camps limited the number of EPWs the United States could transfer, and required that EPWs remain longer in US EPW camps. After active hostilities ended, in order to transfer all EPWs still under US control, the Brooklyn (West) EPW camp, along with its EPWs, was transferred to the Saudi Arabian National Guard.

To help accomplish its multiple missions, the NPWIC and theater EPW units used the Prisoner of War Information System (PWIS-2), an automated system to speed processing and to provide a database of information on captured personnel.

The development of PWIS-2 was accelerated during Operation Desert Shield to allow the US to process the massive numbers of EPWs projected from the Kuwaiti Theater of Operations. The system arrived in the field in November with the first EPW unit in SWA. Under the previous manual system, an average of eight EPW could be fully processed per hour per camp. With PWIS-2, EPW units were processing up to 1,500 EPWs per day per camp. Accuracy was at an unprecedented level of 99.9 percent.

Eight EPWs died while in US custody, all as a result of injuries or sickness contracted before capture. One died of malnutrition/dehydration, five as a result of injuries or wounds, and two from unknown causes. Three US-transferred EPWs died in Saudi Arabian camps from wounds received in the Saudi camp, either during an EPW riot or inflicted by another EPW. These deaths were investigated and reported to the ICRC, as required by Articles 120, 122, and 123, GPW.

When Operation Desert Storm began, psychological operations were undertaken to encourage maximum defection or surrender of Iraqi forces. Leaflets to be used as safe conduct passes were widely disseminated over and behind Iraqi lines with great success.

Photographs and videotapes of the first Iraqi EPWs captured were taken and shown by the public media. The capture or detention of EPWs is recognized as newsworthy events and, as such, photography of such events is not prohibited by the GPW. However, Article 13, GPW does prohibit photography that might humiliate or degrade any EPW. Media use of photographs of EPWs raised some apprehension in light of formal US condemnation of the forced videotapes of US and Coalition POWs being made and shown by Iraq. CENTCOM and other DOD officials also expressed concern for the safety of the family of any Iraqi defector who might be identified from media photographs by Iraqi officials. Because of these sensitivities, and consistent with Article 13, GPW, DOD developed guidelines for photographing EPWs. These guidelines limited both the opportunities for photography and the display of EPW photographs taken, while protecting Iraqi EPWs and their families from retribution by the Government of Iraq.

Operation Desert Storm netted a large number of persons thought to be EPWs who were actually displaced civilians. Subsequent interrogations determined that they were innocent civilians who had taken no hostile action against Coalition forces. In some cases, individuals had surrendered to Coalition forces to receive food, water, and lodging, while others were captured because they appeared to be part of hostile forces. Tribunals were conducted to verify the status of detainees. Upon determination of their status as innocent civilians, detainees were transferred from US custody to Safwan, a US-operated refugee camp, or to Rafha, a Saudi Arabian refugee camp.

In March, Coalition forces and Iraqi military representatives signed an agreement for the repatriation of prisoners of war, to be conducted under ICRC auspices. Repatriation of EPWs not in medical channels occurred at Judaydat 'Ar-'ar, near the Jordanian border. Those in medical channels were flown directly to Baghdad on ICRC aircraft.

TREATMENT OF PRISONERS OF WAR

US and Coalition personnel captured by Iraq were POWs protected by the GWS (if wounded, injured, or sick) and GPW. All US POWs captured during the Persian Gulf War were moved to Baghdad by land after their capture. With some exceptions, depending on their location at the time of capture, their route usually was through Kuwait City to Al-Basrah and then on to Baghdad. Those taken to Kuwait City and Al-Basrah usually were detained there for no more than a few hours or overnight. Limited interrogation of POWs occurred in these cities. Although some were physically abused during their transit to Baghdad, most were treated reasonably well.

On arrival in Baghdad, most Air Force, Navy, and Marine POWs were taken immediately to what the POWs referred to as "The Bunker" (most probably at the Directorate of Military Intelligence) for initial interrogation. They then were taken to what appeared to be the main long-term incarceration site, located in the Iraqi Intelligence Service Regional Headquarters (dubbed "The Biltmore" by the POWs). Since this building was a legitimate military target, the detention of POWs in it was a violation of Article 23, GPW; POWs thus were unnecessarily placed at risk when the facility was bombed on 23 February.

In contravention of Article 26, GPW, all US POWs incarcerated at the "Biltmore" experienced food deprivation. US POWs also were provided inadequate protection from the cold, in violation of Article 25, GPW.

After the 23 February bombing of the "Biltmore" by Coalition aircraft, the POWs were relocated to either Abu Abu Ghurayb Prison (dubbed "Joliet Prison") or Al-Rashid Military Prison ("The Half-Way House"), both near Baghdad. The Army POWs, on the other hand, were believed to have been sent directly to the Al-Rashid Military Prison, where they remained until their repatriation. All US POWs were repatriated from the Al-Rashid Military Prison. The detention of prisoners of war in a prison generally is prohibited by Article 22, GPW.

All US POWs suffered physical abuse at the hands of their Iraqi captors, in violation of Articles 13, 14, and 17, GPW. Most POWs were tortured, a grave breach, in violation of Article 130, GPW. Some POWs were forced to make public propaganda statements, in violation of Article 13. In addition, none was permitted the rights otherwise afforded them by the GPW, such as the right of correspondence authorized by Article 70. Although the ICRC had access to Iraqi EPWs captured by the Coalition, ICRC members did not see Coalition POWs until the day of their repatriation.

Lack of access to non-US Coalition POW debriefs precludes comment on their treatment. From US POW debriefings, it is known that several Coalition POWs, especially the Saudi and Kuwaiti pilots, were abused physically by their Iraqi captors, in violation of Articles 13 and 17, GPW.

Iraqi POW handling procedures and treatment of Coalition POWs were reasonably predictable, based on a study of Iraqi treatment of Iranians during the eight-year Iran-Iraq war. Iraqi mistreatment of Coalition POWs constituted a Grave Breach of the GPW, as set forth in Article 130 of that treaty.

REPATRIATION OF PRISONERS OF WAR

Article 118, GPW, establishes a POW's right to be repatriated. In conflicts since the GPW's adoption, this principle has become conditional: Each POW must consent to repatriation rather than being forced to return. This proved to be the case after hostilities in this war ended.

No EPW was forcibly repatriated. Coalition forces identified to the ICRC those Iraqi EPWs not desiring repatriation. Once an Iraqi EPW scheduled for repatriation reached the repatriation site, the ICRC reconfirmed his willingness to be repatriated. Those who indicated they no longer desired to return to Iraq were returned to the custody of the detaining power.

On 4 March, Iraq released the first group of 10 Coalition prisoners of war, six of whom were US personnel. The United States simultaneously released 294 Iraqi EPWs for repatriation to Iraq. Of the 294, 10 refused repatriation at the repatriation site and were returned to US custody.

Iraq and the Coalition forces continued repatriation actions through August 1991, at which time 13,318 Iraqi EPWs who refused repatriation remained under Saudi control. On 5 August 1991, Iraqi EPWs still refusing repatriation were reclassified as refugees by the United States (in coordination with Saudi Arabia and the ICRC), concluding application of the GPW.

When US custody of Iraqi EPWs ended, ICRC officials informed the 800th Military Police Brigade (PW) that the treatment of Iraqi EPWs by US forces was the best compliance with the GPW by any nation in any conflict in history. Coalition measures to comply with the GPW had no adverse effect on planning and executing military operations; if anything, by encouraging the surrender of Iraqi military personnel, they improved those operations.

USE OF RUSES AND ACTS OF PERFIDY

Under the law of war, deception includes those measures designed to mislead the enemy by manipulation, distortion, or falsification of evidence to induce him to react in a manner prejudicial to his interests. Ruses are deception of the enemy by

legitimate means, and are specifically allowed by Article 24, Annex to Hague IV, and Protocol I. As correctly stated in Article 37(2) of Protocol I:

> Ruses of war are not prohibited. Such ruses are acts which are intended to mislead an adversary or to induce him to act recklessly but which infringe no rule of [the law of war] and which are not perfidious because they do not invite the confidence of an adversary with respect to protection under that law. The following are examples of ruses: the use of camouflage, decoys, mock operations and misinformation.

Coalition actions that convinced Iraqi military leaders that the ground campaign to liberate Kuwait would be focused in eastern Kuwait, and would include an amphibious assault, are examples of legitimate ruses. These deception measures were crucial to the Coalition's goal of minimizing the number of Coalition casualties and, in all likelihood, resulted in fewer Iraqi casualties as well.

In contrast, perfidy is prohibited by the law of war. Perfidy is defined in Article 37(1) of Protocol I as:

> Acts inviting the confidence of an adversary to lead him to believe that he is entitled to, or is obliged to accord, protection under the [law of war], with intent to betray that confidence . . . .

Perfidious acts include the feigning of an intent to surrender or negotiate under a flag of truce, or the feigning of protected status through improper use of the Red Cross or Red Crescent distinctive emblem.

Perfidious acts are prohibited on the basis that perfidy may damage mutual respect for the law of war, may lead to unnecessary escalation of the conflict, may result in the injury or death of enemy forces legitimately attempting to surrender or discharging their humanitarian duties, or may impede the restoration of peace.

There were few examples of perfidious practices during the Persian Gulf War. The most publicized were those associated with the battle of Ras Al-Khafji, which began on 29 January. As that battle began, Iraqi tanks entered Ras Al-Khafji with their turrets reversed, turning their guns forward only at the moment action began between Iraqi and Coalition forces. While there was some media speculation that this was an act of perfidy, it was not; a reversed turret is not a recognized indication of surrender *per se*. Some tactical confusion may have occurred, since Coalition ground forces were operating under a defensive posture at that time, and were to engage Iraqi forces only upon clear indication of hostile intent, or some hostile act.

However, individual acts of perfidy did occur. On one occasion, Iraqi soldiers waved a white flag and laid down their weapons. When a Saudi Arabian patrol advanced to accept their surrender, it was fired upon by Iraqi forces hidden in buildings on either side of the street. During the same battle, an Iraqi officer approached Coalition forces with his hands in the air, indicating his intention to

surrender. When near his would-be captors, he drew a concealed pistol from his boot, fired, and was killed during the combat that followed.

Necessarily, these incidents instilled in Coalition forces a greater sense of caution once the ground offensive began. However, there does not appear to have been any centrally directed Iraqi policy to carry out acts of perfidy. The fundamental principles of the law of war applied to Coalition and Iraqi forces throughout the war. The few incidents that did occur did not have a major effect on planning or executing Coalition military operations.

WAR CRIMES

Iraqi war crimes were widespread and premeditated. They included the taking of hostages, forcible deportation, torture and murder of civilians, in violation of the GC; looting of civilian property in violation of Hague IV; looting of cultural property, in violation of the 1954 Hague Cultural Property Convention; indiscriminate attacks in the launching of Scud missiles against cities rather than specific military objectives, in violation of customary international law; violation of Hague VIII in the method of using sea mines; and unnecessary destruction in violation of Article 23(g) of the Annex to Hague IV, as evidenced by the unlawful and wanton release of oil into the Persian Gulf and the unlawful and wanton sabotage of hundreds of Kuwaiti oil wells. The latter acts also constitute a violation of Article 53, GC and a Grave Breach under Article 147, GC.

As indicated earlier, the United States, Iraq, and the members of the Coalition that liberated Kuwait are parties to several law of war treaties. Each assumes good faith in its application and enforcement. Common Article 1 of the four 1949 Geneva Conventions for the Protection of War Victims requires that parties to those treaties "respect and ensure respect" for each of those treaties. The obligation to "respect and ensure respect" was binding upon all parties to the Persian Gulf War. It is an affirmative requirement to take all reasonable and necessary steps to bring individuals responsible for war crimes to justice. In a separate article common to the four 1949 Geneva Conventions, no nation has the authority to absolve itself or any other nation party to those treaties of any liability incurred by the commission of a Grave breach (Article 50, GWS; Article 51, GWS (Sea); Article 130, GPW; and Article 147, GC).

The United States has one of the more comprehensive law of war programs in existence. DOD Directive 5100.77 is the foundation for the US military law of war program. It contains four policies:

- The law of war and obligations of the US Government under that law . . . [will be] observed and enforced by the US Armed Forces.

- A program, designed to prevent violations of the law of war . . . [will be] implemented by the US Armed Forces.

- Alleged violations of the law of war, whether committed by or against US or enemy personnel, . . . [will be] promptly reported, thoroughly investigated, and, where appropriate, remedied by corrective action.

- Violations of the law of war alleged to have been committed by or against allied military or civilian personnel shall be reported through appropriate military command channels for ultimate transmission to appropriate agencies of allied governments.

The Joint Staff, each military department, the unified and specified commands, and subordinate commands have issued implementing directives. It is within this framework that war crimes investigations were conducted in the course of Operations Desert Shield and Desert Storm.

Each service has issued directives to implement DOD Directive 5100.77 with respect to the reporting and investigation of suspected violations of the law of war committed by or against its personnel. DOD Directive 5100.77 appoints the Army as the DOD Executive Agent for administering the DOD Law of War Program with respect to alleged violations of the law of war committed against US personnel. Army Chief of Staff Regulation 11-2 assigns to the Army Judge Advocate General (JAG) responsibility for investigating, collecting, collating, evaluating, and reporting in connection with war crimes alleged to have been committed against US personnel.

Collection of information on Iraqi war crimes began on 3 August, after media reports that US citizens in Kuwait had been taken hostage by Iraqi forces and forcibly deported to Iraq. As previously indicated, these acts constitute a Grave Breach of the GC. Collection of information continued as reports of other Iraqi war crimes were received.

Interagency meetings in late August established a process for informal coordination on war crimes issues, and ensured policy makers were kept informed. On 15 October, the President warned Iraq of its liability for war crimes. The United States was successful in incorporating into UNSC Resolution 674 (29 October) language regarding Iraq's accountability for its war crimes, in particular its potential liability for Grave Breaches of the GC, and inviting States to collect relevant information regarding Iraqi Grave Breaches and provide it to the Security Council.

Initial collection of information on Iraqi war crimes was carried out by the Army JAG's International Affairs Division and CENTCOM's Staff Judge Advocate in Riyadh. Although US hostages in Iraq were released in December, Iraqi abuses in Kuwait continued at such a pace that it became apparent a greater effort would be necessary with regard to collection of evidence and investigation of war crimes. The Army JAG accordingly recommended the mobilization of two Reserve Component Judge Advocate international law detachments. The 199th JAG Detachment was

deployed to SWA, while the 208th JAG Detachment served within the Office of the JAG as the War Crimes Documentation Center. The former, in cooperation with the governments of Saudi Arabia and Kuwait, collected information on war crimes committed in Kuwait. The latter collected information from a variety of sources, including other agencies of the US Government, the media, and private sources.

Following Iraq's breach of international peace and security by its invasion of Kuwait, the UNSC, in Resolution 667, decided to take further concrete measures "in response to Iraq's continued violation of the [UN] Charter, of resolutions of the Council and of international law." Specific Iraqi war crimes include:

- The taking of Kuwaiti nationals as hostages, and their individual and mass forcible deportation to Iraq, in violation of Articles 34, 49 and 147, GC.

- The taking of third-country nationals in Kuwait as hostages, and their individual and mass forcible deportation to Iraq, in violation of Articles 34, 49, and 147, GC.

- The taking of third-country nationals in Iraq as hostages, and their individual and mass forcible transfer within Iraq, in violation of Articles 34, 35, and 147, GC.

- Compelling Kuwaiti and other foreign nationals to serve in the armed forces of Iraq, in violations of Articles 51 and 147, GC.

- Use of Kuwaiti and third country nationals as human shields in violation of Articles 28 and 38(4), GC.

- Inhumane treatment of Kuwaiti and third country civilians, to include rape and willful killing, in violation of Articles 27, 32 and 147, GC.

- As noted previously, possible violation of the Genocide Convention, through acts committed with the intent to destroy, in whole or in part, a national group (that is, the Kuwaiti people).

- The transfer of its own civilian population into occupied Kuwait, in violation of Article 49, GC.

- Torture and other inhumane treatment of POWs, in violation of Articles 13, 17, 22, 25, 26, 27, and 130, GPW.

- Using POWs as a shield to render certain points immune from military operations, in violation of Article 23, GPW.

- Unnecessary destruction of Kuwaiti private and public property, in violation of Article 23 (g), Annex to Hague IV.

- Pillage, in violation of Article 47, Annex to Hague IV.

- Illegal confiscation/inadequate safeguarding of Kuwaiti public property, in violation of Article 55, Annex to Hague IV, and Article 147, GC.

- Pillage of Kuwaiti civilian hospitals, in violation of Articles 55, 56, 57, and 147, GC.

- In its indiscriminate Scud missile attacks, unnecessary destruction of Saudi Arabian and Israeli property, in violation of Article 23 (g), Annex to Hague IV.

- In its intentional release of oil into the Persian Gulf and its sabotage of the Al-Burqan and Ar-Rumaylah oil fields in Kuwait, unnecessary destruction in violation of Articles 23 (g) and 55, Annex to Hague IV, and Articles 53 and 147, GC.

- In its use of drifting naval contact mines and mines lacking devices for their self-neutralization in the event of their breaking loose from their moorings, in violation of Article 1, Hague VIII.

Iraq is a party to the 1925 Geneva Protocol, which prohibits use of CW/BW. Iraq, through its reservation at the time of ratification, pledged no first use of either CW or BW. Although Iraq did not use CW/BW in this war, it violated this treaty in its 1980-88 war against Iran. During the Persian Gulf War, Iraq threatened the use of CW/BW and deployed CW. Although prepared to do so, Iraqi forces did not use either of these weapons of mass destruction during this conflict, perhaps in part due to the success of Coalition efforts to destroy Iraqi CW/BW capabilities, Iraqi C2, and Iraq's inability to move its weapons to forward sites.

Article 29, GC, states that "The Party to the conflict in whose hands protected persons may be, is responsible for the treatment accorded to them by its agents, irrespective of any individual responsibility which may be incurred." Similarly, Article 12, GPW, declares that "Prisoners of war are in the hands of the enemy Power, but not of the individuals or military units who have captured them. Irrespective of the individual responsibilities that may exist, the Detaining Power is responsible for the treatment given them." Responsibility for the treatment (and mistreatment) of civilian detainees and POW in Iraqi hands, clearly lay with the Government of Iraq and its senior officials.

Criminal responsibility for violations of the law of war rests with a commander, including the national leadership, if he (or she):

- Orders or permits the offense to be committed, or

- Knew or should have known of the offense (s), had the means to prevent or halt them, and failed to do all which he was capable of doing to prevent the offenses or their recurrence.

In addition, the invasion of Kuwait was ordered by Saddam Hussein and is a crime against peace for which he, as well as the Ba'ath Party leadership and military high command, bear direct responsibility.

The crimes committed against Kuwaiti civilians and property, and against third party nationals, are offenses for which Saddam Hussein, officials of the Ba'ath Party, and his subordinates bear direct responsibility. However, the principal responsibility rests with Saddam Hussein. Saddam Hussein's C2 of Iraqi military and security forces appeared to be total and unequivocal. There is substantial evidence that each act alleged was taken as a result of his orders, or was taken with his knowledge and approval, or was an act of which he should have known.

It is important to note that, with the possible exception of the Coalition's need to direct considerable effort toward the hunt for Iraqi Scud missiles, no Iraqi action leading to or resulting in a violation of the law of war gained Iraq any military advantages. This "negative gain from negative actions" in essence reinforces the validity of the law of war.

ENVIRONMENTAL TERRORISM

Between seven and nine million barrels of oil were set free in the Gulf by Iraqi action. Five hundred ninety oil well heads were damaged or destroyed. 508 were set on fire, and 82 were damaged so that oil was flowing freely from them.

There has been international examination of these acts. From 9 to 12 July 1991, the Government of Canada, working with the UN Secretary General, hosted a conference of international experts in Ottawa to consider Iraq's wanton acts of destruction and their law of war implications. There was general agreement the actions constituted violations of the law of war, namely:

- Article 23g of the Annex to Hague IV, which forbids the destruction of "enemy property, unless . . . imperatively demanded by the necessities of war;" and

- Article 147 of the GC, which makes a Grave Breach the "extensive destruction . . . of property, not justified by military necessity and carried out unlawfully and wantonly."

The Ottawa Conference of Experts also noted UNSC Resolution 687 (3 April 1991), which reaffirmed that Iraq was liable under international law to compensate any environmental damage and the depletion of natural resources.

Other treaties the Conference of Experts considered were the ENMOD Convention and the 1977 Protocol I, articles 35 and 55 of which contain provisions for the protection of the environment. It was the general conclusion of the experts

that the former did not apply to actions of the kinds perpetrated by Iraq, while the latter was not applicable during the Persian Gulf War for reasons previously stated.

Even had Protocol I been in force, there were questions as to whether the Iraqi actions would have violated its environmental provisions. During that treaty's negotiation, there was general agreement that one of its criteria for determining whether a violation had taken place ("long term") was measured in decades. It is not clear the damage Iraq caused, while severe in a layman's sense of the term, would meet the technical-legal use of that term in Protocol I. The prohibitions on damage to the environment contained in Protocol I were not intended to prohibit battlefield damage caused by conventional operations and, in all likelihood, would not apply to Iraq's actions in the Persian Gulf War.

The Ottawa Conference of Experts did not conclude that new laws or treaties were required; rather, it was the belief of those present that respect for and enforcement of the existing law of war was of greatest importance.

It is not clear why Iraq released oil into the Persian Gulf. Conceivably, Iraq had hoped to interfere with Coalition naval operations in the Gulf, perhaps to impede expected amphibious operations. By threatening desalinization plants, Iraq also may have hoped to disrupt Coalition military operations and Saudi civilian life dependent on a steady flow of fresh water. As it turned out, the cooperative efforts of the Coalition members, the US Coast Guard, and the US National Oceanic and Atmospheric Administration resulted in the oil slick's having a negligible effect on the operations of Coalition naval forces.

Perversely, Iraq's actions did necessitate responsive Coalition operations to protect the environment that inflicted further damage on Kuwaiti property. Specifically, the flow from the Al-Ahmadi terminal was stopped by aerial destruction of vital equipment near the terminal.

As the first Kuwaiti oil wells were ignited by Iraqi forces, there was public speculation the fires and smoke were intended to impair Coalition forces' ability to conduct both air and ground operations, primarily by obscuring visual and electro-optical sensing devices. Review of Iraqi actions makes it clear the oil well destruction had no military purpose, but was simply punitive destruction at its worst. For example, oil well fires to create obscurants could have been accomplished simply through the opening of valves; instead, Iraqi forces set explosive charges on many wells to ensure the greatest possible destruction and maximum difficulty in stopping each fire. Likewise, the Ar-Rumaylah oil field spreads across the Iraq-Kuwait border. Had the purpose of the fires been to create an obscurant, oil wells in that field on each side of the border undoubtedly would have been set ablaze; Iraqi destruction was limited to oil wells on the Kuwaiti side only. As with the release of oil into the Persian Gulf, this aspect of Iraq's wanton destruction of Kuwaiti property had little effect on Coalition offensive combat operations. In fact, the oil well fires had a greater adverse effect on Iraqi military forces.

CONDUCT OF NEUTRAL NATIONS

Neutrality normally is based on a nation's proclamation of neutrality or assumption of a neutral posture with respect to a particular conflict. Iran and Jordan each issued proclamations of neutrality during the Persian Gulf crisis and, as described, refrained from active participation in the war. Other nations, such as Austria and Switzerland, enjoy relative degrees of international guarantees of their neutrality.

Neutrality in the Persian Gulf War was controlled in part by the 1907 Hague V Convention; but traditional concepts of neutral rights and duties are substantially modified when, as in this case, the United Nations authorizes collective action against an aggressor nation.

It was the US position during the Persian Gulf crisis that, regardless of assertions of neutrality, all nations were obligated to avoid hindrance of Coalition operations undertaken pursuant to, or in conjunction with, UNSC decisions, and to provide whatever assistance possible. By virtue of UNSC Resolution 678 (29 November), members were requested "to provide appropriate support for the actions undertaken" by nations pursuant to its authorization of use of all necessary means to uphold and implement prior resolutions. The language of UNSC Resolution 678 is consistent with Articles 2(5), 2(6), 25, and 49 of the UN Charter. Article 2(5) states:

> All Members shall give the United Nations every assistance in any action it takes in accordance with the present Charter, and shall refrain from giving assistance to any state against which the United Nations is taking preventive or enforcement action.

Article 2(6) provides:

> The Organization shall ensure that states which are not Members of the United Nations act in accordance with these Principles so far as may be necessary for the maintenance of international peace and security.

Article 25 provides:

> The Members of the United Nations agree to accept and carry out the decisions of the Security Council in accordance with the present Charter.

Article 49 declares:

> The Members of the United Nations shall join in affording mutual assistance in carrying out the measures decided upon by the Security Council.

This section focuses on the conduct of Jordan, Iran, India and traditionally neutral European nations (primarily Austria and Switzerland) during the course of the hostilities, and the effect of Coalition maritime interceptions on neutral shipping.

UNSC Resolution 661, which called for an economic embargo of Iraq, pursuant to Article 41 of the UN Charter, obligated all member nations to refrain from aiding Iraq. The declarations of "neutrality" by Jordan and Iran were subordinate to their obligation as UN members to comply with UNSC resolutions. Although Jordan's attitude toward Iraq and the Coalition appeared inconsistent with its UN obligations, mere sympathy for one belligerent does not constitute a violation of traditional neutral duties, nor even a rejection of the obligations imposed by the UNSC resolutions cited. Conduct is the issue.

There were reports that Jordan supplied materials (including munitions) to Iraq during Operations Desert Shield and Desert Storm. Furnishing supplies and munitions to a belligerent traditionally has been regarded as a violation of a neutral's obligations. In this case, it would have been an even more palpable contravention of Jordan's obligations – both because of the request of UNSC Resolution 678 that all States support those seeking to uphold and implement the relevant resolutions, and because the sanctions Resolution 661 established expressly prohibited the supply of war materials to Iraq.

As the US became aware of specific allegations of Jordanian failure to comply with UNSC sanctions, they were raised with the Government of Jordan. Some were without foundation; some were substantiated. Regarding the latter, the Government of Jordan acted to stop the actions and reassured the United States those instances had been the result of individual initiative rather than as a result of government policy. Such logistical assistance as Jordan may have provided Iraq did not substantially improve Iraq's ability to conduct operations, nor did it have an appreciable effect on Coalition forces' operational capabilities.

During actual hostilities, Saudi Arabia stopped pumping oil to Jordan; Jordan obtained petroleum from Iraq, taking delivery by truck. Although not a violation of a neutral's duties under traditional principles of international law, such purchases were inconsistent with UNSC Resolutions 661 and 678.

While the Jordanian importation of oil products from Iraq did not substantially affect Coalition military operations, additional steps were required by Coalition forces to protect Iraqi and Jordanian civilians from the risks of military operations. Jordan imported Iraqi oil by truck across roads in western Iraq during the day and night. These oil trucks were commingled with military and civilian vehicles. At night, some oil trucks were mistaken for mobile Scud launchers or other military vehicles; other trucks and civilian vehicles were struck incidental to attack of legitimate military targets.

This collateral damage and injury, which occurred despite previously described Coalition efforts to minimize damage to civilian objects and injury to noncombatant civilians, is attributable to Jordan's failure to ensure adherence to UNSC sanctions and to warn its nationals of the perils of travel on main supply routes in a combat zone. It also is attributable to mixing of Iraqi military vehicles and convoys with Jordanian civilian traffic traveling in Iraq. Coalition forces continued to take reasonable precautions to minimize collateral damage to civilian vehicles and incidental injury to noncombatant civilians. As a result, the ability to target Iraqi military vehicles and convoys, including mobile Scud missile launchers and support equipment, was impeded.

Iran's conduct during Operations Desert Shield and Desert Storm essentially was consistent with that expected of a neutral under traditional principles of international law, including Hague V. Immediately after the Operation Desert Storm air campaign began, many Iraqi civil and military aircraft began fleeing to Iran, presumably to avoid damage or destruction by Coalition air forces. Under Article 11 of Hague V and traditional law of war principles regarding neutral rights and obligations, when belligerent military aircraft land in a nation not party to a conflict, the neutral must intern the aircraft, aircrew, and accompanying military personnel for the duration of the war. Both Switzerland and Sweden took such actions in the course of World War II, for example, with respect to Allied and German aircraft and aircrews. Some civil (and possibly some military) transport aircraft may have returned to Iraq. With respect to tactical aircraft, however, it appears Iran complied with the traditional obligations of a neutral. US forces nonetheless remained alert to the possibility of a flanking attack by Iraqi aircraft operating from Iran.

Although the situation never arose, the United States advised Iran that, in light of UNSC Resolution 678, Iran would be obligated to return downed Coalition aircraft and aircrew, rather than intern them. This illustrates the modified nature of neutrality in these circumstances. It also was the US position that entry into Iranian (or Jordanian) airspace to rescue downed aviators would be consistent with its international obligations as a belligerent, particularly in light of Resolution 678.

On several occasions, Iran protested alleged entry of its airspace by Coalition aircraft or missiles. The United States expressed regret for any damage that may have occurred within Iranian territory by virtue of inadvertent entry into Iranian airspace. The US replies did not, however, address whether Iranian expectations of airspace inviolability were affected by UNSC Resolution 678.

Although military aircraft must gain permission to enter another State's airspace (except in distress), both Switzerland and Austria routinely granted such clearance for US military transport aircraft prior to the Iraqi invasion of Kuwait. Early in the Persian Gulf crisis, the United States approached the Governments of Austria and Switzerland, seeking permission for overflight of US military transport aircraft carrying equipment and personnel to SWA. Despite initial misgivings, based upon their traditional neutrality, each nation assented. That there was a reluctance to grant permission early in the crisis – that is, when the United States was not involved in the hostilities, and thus not legally a belligerent – demonstrates that the

view by these two States of neutrality may be more expansive than the traditional understanding of the role of neutrality in the law of war. At the same time, while Switzerland is not a UN member, its support for the US effort (through airspace clearances for US military aircraft) preceded UNSC Resolution 678.

Given their reluctance to permit pre-hostilities overflights, it was natural to expect that Switzerland and Austria would weigh very carefully any requests for overflights once offensive actions began, which each did. In light of the UNSC request that all States support the efforts of those acting to uphold and implement UNSC resolutions, each government decided that overflights by US military transport aircraft would not be inconsistent with its neutral obligations. Accordingly, permission for overflights was granted, easing logistical support for combat operations.

In contrast, overflight denial by the Government of India required Marine combat aviation assets in the Western Pacific to fly across the Pacific, the continental US, the Atlantic, and through Europe to reach SWA, substantially increasing the transit route. Air Force transport aircraft delivering ammunition to the theater of operations also were denied overflight permission.

UNSC Resolution 661 directed member states to prevent the import or transshipment of materials originating in Iraq or Kuwait, and further obligated member states to prevent imports to or exports from Iraq and Kuwait. In support of Resolution 661, on 16 August, the United States ordered its warships to intercept all ships believed to be proceeding to or from Iraq or Kuwait, and all vessels bound to or from ports of other nations carrying materials destined for or originating from Iraq or Kuwait. On 25 August, the Security Council adopted Resolution 665, which called upon UN members to enforce sanctions by means of a maritime interception operation. This contemplated intercepting so-called "neutral" shipping as well as that of non-neutral nations. These resolutions modified the obligation of neutral powers to remain impartial with regard to Coalition UN members.

The law of war regarding neutrality traditionally permits neutral nations to engage in non-war related commerce with belligerent nations. During the Persian Gulf crisis, however, the Coalition Maritime Interception Force (MIF) was directed to prevent all goods (except medical supplies and humanitarian foodstuffs expressly authorized for Iraqi import by the UNSC Sanctions Committee) from leaving or entering Iraqi-controlled ports or Iraq, consistent with the relevant UNSC resolutions. The claim of neutral status by Iran and Jordan, or any of the traditional neutral nations, did not adversely affect the conduct of the Coalition's ability to carry out military operations against Iraq.

THE CONCEPT OF "SURRENDER" IN THE CONDUCT OF COMBAT OPERATIONS

The law of war obligates a party to a conflict to accept the surrender of enemy personnel and thereafter treat them in accordance with the provisions of the 1949 Geneva Conventions for the Protection of War Victims. Article 23(d) of Hague IV prohibits the denial of quarter, that is the refusal to accept an enemy's surrender, while other provisions in that treaty address the use of flags of truce and capitulation.

However, there is a gap in the law of war in defining precisely when surrender takes effect or how it may be accomplished in practical terms. Surrender involves an offer by the surrendering party (a unit or an individual soldier) and an ability to accept on the part of his opponent. The latter may not refuse an offer of surrender when communicated, but that communication must be made at a time when it can be received and properly acted upon – an attempt at surrender in the midst of a hard-fought battle is neither easily communicated nor received. The issue is one of reasonableness.

A combatant force involved in an armed conflict is not obligated to offer its opponent an opportunity to surrender before carrying out an attack. To minimize Iraqi and Coalition casualties, however, the Coalition engaged in a major psychological operations campaign to encourage Iraqi soldiers to surrender before the Coalition ground offensive. Once that offensive began, the Coalition effort was to defeat Iraqi forces as quickly as possible to minimize the loss of Coalition lives. In the process, Coalition forces continued to accept legitimate Iraqi offers of surrender in a manner consistent with the law of war. The large number of Iraqi prisoners of war is evidence of Coalition compliance with its law of war obligations with regard to surrendering forces.

Situations arose in the course of Operation Desert Storm that have been questioned by some in the post-conflict environment. Two specific cases involve the Coalition's breach of the Iraqi defensive line and attack of Iraqi military forces leaving Kuwait City. Neither situation involved an offer of surrender by Iraqi forces, but it is necessary to discuss each in the context of the law of war concept of surrender.

As explained in Chapter VIII, rapid breach of the Iraqi defense in depth was crucial to the success of the Coalition ground campaign. When the ground campaign began, Iraq had not yet used its air force or extensive helicopter fleet in combat operations, the Iraqi Scud capability had not been eliminated, and most importantly, chemical warfare by Iraq remained a distinct possibility. It was uncertain whether the Coalition deception plan had worked or whether the Coalition effort had lost the element of surprise and there was also no definitive information about the strength and morale of the defending Iraqi soldiers. Because of these uncertainties, and the need to minimize loss of US and other Coalition lives, military necessity required that the assault through the forward Iraqi defensive line be conducted with maximum speed and violence.

The VII Corps main effort was the initial breaching operation through Iraqi defensive fortifications. This crucial mission was assigned to the 1st Infantry Division (Mechanized). The Division's mission was to conduct a deliberate breach of the Iraqi defensive positions as quickly as possible to expand and secure the breach site, and to pass the 1st UK Armored Division through the lines to continue the attack against the Iraqi forces.

To accomplish the deliberate breaching operation, the 1st Infantry Division (Mechanized) moved forward and plowed through the berms and mine fields erected by the Iraqis. Many Iraqis surrendered during this phase of the attack and were taken prisoner. The division then assaulted the trenches containing other Iraqi soldiers. Once astride the trench lines, the division turned the plow blades of its tanks and combat earthmovers along the Iraqi defense line and, covered by fire from its M-2/-3 armored infantry fighting vehicles, began to fill in the trench line and its heavily bunkered, mutually supporting fighting positions.

In the process, many more Iraqi soldiers surrendered to division personnel; others died in the course of the attack and destruction or bulldozing of their defensive positions.

By nightfall, the division had breached the Iraqi defenses, consolidated its position, and prepared to pass the 1st UK Armoured Division through the lines. Hundreds of Iraqi soldiers had been taken prisoner; US casualties were extremely light.

The tactic used by the 1st Infantry Division (Mechanized) resulted in a number of Iraqi soldiers' dying in their defensive positions as those positions were bulldozed. Marine Corps breaching operations along its axis of attack into Kuwait used different, but also legally acceptable, techniques of assault by fire, bayonet, and the blasting of enemy defensive positions. Both tactics were entirely consistent with the law of war.

Tactics involving the use of armored vehicles against dug-in infantry forces have been common since the first use of armored vehicles in combat. The tactic of using armored vehicles to crush or bury enemy soldiers was briefly discussed in the course of the UN Conference on Certain Conventional Weapons, conducted in Geneva from 1978 to 1980 and attended by the United States and more than 100 other nations. It was left unregulated, however, as it was recognized by the participants to be a common long-standing tactic entirely consistent with the law of war.

In the case in point, military necessity required violent, rapid attack. Had the breaching operation stalled, the VII Corps main effort would have been delayed or, at worst, blunted. This would have had an adverse effect on the entire ground campaign, lengthening the time required to liberate Kuwait, and increasing overall Coalition casualties.

As first stated in US Army General Orders No. 100 (1863), otherwise known as the Lieber Code, military necessity "consists in the necessity of those measures which are indispensable for securing the ends of war, and which are lawful according to the modern law and usages of war...[It] admits of all direct destruction of life or limb of armed enemies." As developed by the practice of nations since that time, the law of war has placed restrictions on the application of force against enemy combatants in very few circumstances (e.g., the first use of chemical or biological weapons). None of these restrictions were at issue during the breaching operations during Operation Desert Storm.

The law of war principle complementary to military necessity is that of unnecessary suffering (or superfluous injury). That principle does not preclude combat actions that otherwise are lawful, such as that used by the 1st Infantry Division (Mechanized).

In the course of the breaching operations, the Iraqi defenders were given the opportunity to surrender, as indicated by the large number of EPWs taken by the division. However, soldiers must make their intent to surrender clear and unequivocal, and do so rapidly. Fighting from fortified emplacements is not a manifestation of an intent to surrender, and a soldier who fights until the very last possible moment assumes certain risks. His opponent either may not see his surrender, may not recognize his actions as an attempt to surrender in the heat and confusion of battle, or may find it difficult (if not impossible) to halt an onrushing assault to accept a soldier's last-minute effort at surrender.

It was in this context that the breach of the Iraqi defense line occurred. The scenario Coalition forces faced and described herein illustrates the difficulty of defining or effecting "surrender." Nonetheless, the breaching tactics used by US Army and Marine Corps forces assigned this assault mission were entirely consistent with US law of war obligations.

In the early hours of 27 February, CENTCOM received a report that a concentration of vehicles was forming in Kuwait City. It was surmised that Iraqi forces were preparing to depart under the cover of darkness. CINCCENT was concerned about the redeployment of Iraqi forces in Kuwait City, fearing they could join with and provide reinforcements for Republican Guard units west of Kuwait City in an effort to stop the Coalition advance or otherwise endanger Coalition forces.

The concentration of Iraqi military personnel and vehicles, including tanks, invited attack. CINCCENT decided against attack of the Iraqi forces in Kuwait City, since it could lead to substantial collateral damage to Kuwaiti civilian property and could cause surviving Iraqi units to decide to mount a defense from Kuwait City rather than depart. Iraqi units remaining in Kuwait City would cause the Coalition to engage in military operations in urban terrain, a form of fighting that is costly to attacker, defender, innocent civilians, and civilian objects.

The decision was made to permit Iraqi forces to leave Kuwait City and engage them in the unpopulated area to the north. Once departed, the Iraqi force was stopped by barricades of mines deployed across the highway in front of and behind the column. Air attacks on the trapped vehicles began about 0200. The following morning, CENTCOM leadership viewed the resulting damage. More than two hundred Iraqi tanks had been trapped and destroyed in the ambush, along with hundreds of other military vehicles and various forms of civilian transportation confiscated or seized by Iraqi forces for the redeployment. The vehicles in turn were full of property pillaged from Kuwaiti civilians: appliances, clothing, jewelry, compact disc players, tape recorders, and money, the last step in the Iraqi looting of Kuwait.

Throughout the ground campaign Coalition leaflets had warned Iraqi soldiers that their tanks and other vehicles were subject to attack, but that Iraqi soldiers would not be attacked if they abandoned their vehicles – yet another way in which the Coalition endeavored to minimize Iraqi casualties while encouraging their defection and/or surrender. When the convoy was stopped by the mining operations that blocked the Iraqi axis of advance, most Iraqi soldiers in the vehicles immediately abandoned their vehicles and fled into the desert to avoid attack.

In the aftermath of Operation Desert Storm, some questions were raised regarding this attack, apparently on the supposition that the Iraqi force was retreating. The attack was entirely consistent with military doctrine and the law of war. The law of war permits the attack of enemy combatants and enemy equipment at any time, wherever located, whether advancing, retreating, or standing still. Retreat does not prevent further attack. At the small-unit level, for example, once an objective has been seized and the position consolidated, an attacking force is trained to fire upon the retreating enemy to discourage or prevent a counterattack.

Attacks on retreating enemy forces have been common throughout history. Napoleon suffered some of his worst losses in his retreat from Russia, as did the German Wermacht more than a century later. It is recognized by military professionals that a retreating force remains dangerous. The 1st Marine Division and its 4,000 attached US Army forces and British Royal Marines, in the famous 1950 march out of the Chosin Reservoir in North Korea, fighting outnumbered by a 4:1 margin, turned its "retreat" into a battle in which it defeated the 20th and 26th Chinese Armies trying to annihilate it, much as Xenophon and his "immortal 10,000" did as they fought their way through hostile Persian forces to the Black Sea in 401 BC.

In the case at hand, neither the composition, degree of unit cohesiveness, nor intent of the Iraqi military forces engaged was known at the time of the attack. At no time did any element within the formation offer to surrender. CENTCOM was under no law of war obligation to offer the Iraqi forces an opportunity to surrender before the attack.

OBSERVATIONS

Accomplishments

- DOD-mandated instruction and training in the law of war were reflected in US operations, which were in keeping with historic US adherence to the precepts of the law of war. Adherence to the law of war impeded neither Coalition planning nor execution; Iraqi violations of the law provided Iraq no advantage.

- CINCCENT conducted a theater campaign directed solely at military targets. As frequently noted during the conduct of the conflict, exceptional care was devoted to minimize collateral damage to civilian population and property.

- The special trust and confidence reposed in the professional capabilities of military commanders by the National Command Authorities permitted commanders at all levels to accomplish their respective missions in an unconstrained manner that simultaneously was consistent with the law of war.

- The willingness of commanders to seek legal advice at every stage of operational planning ensured US respect for the law of war throughout Operations Desert Shield and Desert Storm.

Issue

- A strategy should be developed to respond to Iraqi violations of the law of war, to make clear that a price will be paid for such violations, and to deter future violators.

APPENDIX P

RESPONSIBILITY SHARING

"[The contributions of our allies] would rank, by a considerable margin, as the world's third largest defense budget.... Few would have imagined this level of foreign participation. There will no doubt be those who will focus attention on whether a particular country paid as much as it might have or as promptly, but these concerns – valid as they are – should not overshadow all that has been accomplished."

Hon. Paul Wolfowitz
Under Secretary of Defense (Policy)

INTRODUCTION

After the decision to send US forces to Southwest Asia, allied and friendly nations from around the world became involved in confronting Iraqi aggression. Recognizing that confronting aggression is an international responsibility, wealthy and poor nations alike deployed thousands of land, sea and air forces. Particularly in Europe, but also in the Pacific and Indian Ocean areas, countries supported the deployment of US forces by granting transit and overflight rights and access to bases and facilities. Saudi Arabia and the other Gulf states opened their borders to receive these multinational deployments.

These traditional aspects of international cooperation – the contributions of forces, support of the deployment, and basing foreign forces– were among the invaluable and historic contributions of Coalition members around the world. (They are addressed separately in Appendix I.) Without them, it would have been extraordinarily difficult to halt and reverse Iraqi aggression. However, even with these multinational efforts, it was clear from the beginning that large and costly US deployments were essential. Recognizing this requirement and the additional fiscal and economic strains it could place on the nation, the Department of Defense (DOD) developed and shepherded through the interagency process a plan for a new form of international cooperation that became known as "responsibility sharing."

RESPONSIBILITY SHARING TO OFFSET US INCREMENTAL DEFENSE COSTS

The commitment of more than 500,000 US troops and associated equipment in Operations Desert Shield and Desert Storm involved large US financial obligations. The United States made its force commitments without regard to whether Coalition and other countries would offset any of these costs. Nevertheless, in recognition of the shared responsibility of confronting Iraqi aggression, Coalition members made financial and other contributions of historic proportions to offset incremental defense costs.

Total US defense costs associated with Operations Desert Shield and Desert Storm consist of three elements:

- Costs associated with the investment in force structure used in Operations Desert Shield and Desert Storm;

- Baseline operating costs for that force structure; and,

- Incremental costs (costs that would not otherwise have been incurred) associated with deploying, operating, and supporting forces used in Operations Desert Shield and Desert Storm.

Through DOD's annual planning, programming, and budget process, the United States already had determined that national security required undertaking the first two categories of costs. These expenses would have been borne even in the absence of Iraq's invasion of Kuwait. However, Coalition partners in Operations Desert Shield and Desert Storm recognized that one important area of shared responsibility in defeating Iraqi aggression was to help finance US incremental defense costs.

Total US incremental costs for Operations Desert Shield and Desert Storm are estimated at $61 billion. Without responsibility sharing, the US would have had to pay these costs either through a tax increase or through deficit spending, adding to the nations' fiscal difficulties. Instead, in 1990 and 1991, Coalition countries committed almost $54 billion to offset these costs. Roughly two-thirds of these commitments were from the Gulf States directly confronted by Iraq, with the other one-third coming largely from Japan and Germany. As shown in Figure P-1, the United States had received, by 11 March 1992, almost $53 billion toward these commitments (more than $47 billion in cash). This amount would rank, by a considerable margin, as the third largest defense budget in the world.

While these historic contributions clearly served a very important role in offsetting the significant financial costs of Operations Desert Shield and Desert Storm, they also served valuable political purposes. First, they enabled Japan and Germany to make major contributions to the Coalition within their domestic political and legal constraints. This has served as an important step in helping these two countries overcome obstacles they face in undertaking international political

Foreign Contributions Pledged in 1990 and 1991 to Offset US Desert Shield/Storm Costs

($ Millions)

Countries	Commitments	Receipts[1]		
		Cash	In-Kind	Total
Saudi Arabia	16,839	12,002	4,001	16,003
Kuwait[2]	16,057	16,015	43	16,058
UAE	4,088	3,870	218	4,088
Japan	10,012	9,437	571	10,008
Germany[3]	6,572	5,772	683	6,455
Korea	355	150	101	251
Other	29	7	22	29
Total	53,952	47,254	5,639	52,893

Figure P-1
Foreign Contributions

and security responsibilities commensurate with their economic stature. Second, allied contributions served as additional proof that Iraq was confronting not just the United States, but a worldwide, politically united Coalition, willing to pay the costs of confronting aggression. Finally, financial responsibility sharing gave the contributing countries a vested interest in working to achieve lasting peace among Middle East nations. The discussion below outlines some details involved in responsibility-sharing contributions to the United States in Operations Desert Shield and Desert Storm.

RESPONSIBILITY SHARING FOR CALENDAR YEAR 1990 - DESERT SHIELD COSTS

To encourage other nations to assume their fair share of responsibility for opposing the Iraqi aggression, the President sent two simultaneous missions abroad

in early September. The first was headed by the Secretary of the Treasury and included the Deputy Secretary of State and the Under Secretary of Defense for Policy. This mission visited the United Kingdom, France, South Korea, and Japan to discuss Coalition contributions. The second mission was headed by the Secretary of State and included the Deputy Secretary of the Treasury and the Deputy Secretary of Defense. This mission visited Saudi Arabia, the Kuwaiti Government in Exile, the United Arab Emirates (UAE), Egypt, Brussels (North Atlantic Treaty Organization and the European Community), Italy, and Germany to discuss contributions to the Coalition effort.

During and shortly after these Presidential missions, various commitments were made to help multinational forces in general and, in particular, to offset US incremental costs for Operation Desert Shield. As a result of these missions and other consultations with foreign nations through diplomatic channels, commitments to the United States came in three principal forms: cash, in-kind airlift and sealift, and in-kind material and equipment. In late September, as part of the Supplemental Appropriations for Operation Desert Shield in the Fiscal Year 1991 Continuing Resolution, Congress expanded the Secretary of Defense's authority to accept contributions of money and property from individuals, foreign governments and international organizations, and established the Defense Cooperation Account (DCA) to receive deposits of monetary contributions (Section 2608, Chapter 155, Title 10 USC). Use of DCA funds was made subject to Congressional authorization and appropriation. Funds deposited in the DCA were authorized to be invested in US securities with interest deposited in the DCA.

Specific commitments by the principal foreign government contributors toward Calendar Year (CY) 1990 US incremental Operation Desert Shield costs, outlined below in Figure P-2, were as follows:

- Saudi Arabia agreed to provide, at no cost to the United States, all fuel, food, water, local transportation, and facilities for all US forces in the Kingdom and surrounding waters. This host nation support (HNS) commitment was implemented through an arrangement between the US Central Command (CENTCOM) J-4 and the Saudi Military and was titled "Implementation Plan for Logistics Support of the United States Forces in Defense of the Kingdom of Saudi Arabia." Later in CY 1990, Saudi Arabia also committed to reimburse the US for en route transportation costs associated with the second deployment of US forces to the region.

- Japan committed to provide $2 billion to the multinational forces, including about $1.7 billion for US incremental costs. This $1.7 billion was allocated among various forms: cash to cover US transportation expenses, in-kind material and equipment support, and in-kind airlift and sealift.

- Germany agreed to provide about $1 billion worth of support, including some cash for US transportation expenses, lift support, and equipment and other material from its defense stocks (the bulk of the commitment).

Foreign Contributions Pledged in 1990 to Offset US Desert Shield/Storm Costs

($ Millions)

Countries	Commitments	Receipts[1]		
		Cash	In-Kind	Total
Saudi Arabia	3,339	1,621	882	2,503
Kuwait	2,506	2,500	6	2,506
UAE	1,000	870	130	1,000
Japan	1,680	1,105	571	1,676
Germany[2]	1,072	272	683	955
Korea	80	50	30	80
Other	3	0	3	3
Total	9,680	6,418	2,306	8,724

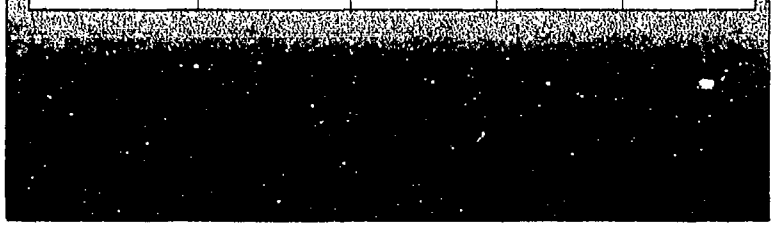

Figure P- 2
Commitments and Receipts CY 1990

- Kuwait agreed to provide $2.5 billion in cash and some limited in-kind lift.

- The UAE committed to provide $1 billion of support composed of cash and in-kind HNS for US forces in the UAE (e.g., fuel, water, facilities, food, local transportation).

- Korea agreed to provide $80 million for US incremental costs composed of $50 million in cash and $30 million worth of in-kind lift.

- Several other nations provided smaller, but nevertheless important contributions to offset US incremental costs from Operation Desert Shield. This included no-cost HNS by Oman, Bahrain, and Qatar, and in-kind sealift contributions from Denmark.

RESPONSIBILITY SHARING FOR CALENDAR YEAR- 1991 DESERT SHIELD AND DESERT STORM INCREMENTAL COSTS

When it became apparent that Operation Desert Shield would extend into 1991, and with the growing likelihood of military conflict, consultations about additional 1991 commitments were conducted with the major foreign contributors to US incremental costs. Subsequently, the following commitments, outlined below in Figure P-3, were made for Operation Desert Shield and what followed as Operation Desert Storm:

Foreign Contributions Pledged in 1991 to Offset US Desert Shield/Storm Costs

($ Millions)

Countries	Commitments	Receipts[1]		
		Cash	In-Kind	Total
Saudi Arabia	13,500	10,381	3,119	13,500
Kuwait[2]	13,551	13,515	37	13,552
UAE	3,088	3,000	88	3,088
Japan	8,332	8,332	0	8,332
Germany	5,500	5,500	0	5,500
Korea	275	100	71	171
Other	26	7	19	26
Total	44,272	40,836	3,334	44,169

Figure P-3
Foreign Contributions Pledged

- Saudi Arabia agreed to continue providing in-kind HNS and to pay $13.5 billion in cash (less the value of the in-kind HNS).

- The UAE committed to pay $3 billion in addition to in-kind HNS.

- Kuwait agreed to pay $13.5 billion in cash and to provide some in-kind lift.

- Japan committed to provide $9 billion to the multinational forces, of which $8.332 billion in cash was pledged to the United States.

- Germany provided $5.5 billion in cash.

- Korea committed $275 million to the United States, made up of cash, in-kind material, and in-kind airlift and sealift.

Contributions from other countries also increased during Operation Desert Storm. These included no-cost HNS by Oman, Bahrain, and Qatar, and cash and in-kind lift contributions from Italy, Denmark, Luxembourg, Belgium, and Norway.

IN-KIND CONTRIBUTIONS OTHER THAN HOST NATION SUPPORT

Aside from cash and HNS, several countries contributed airlift , sealift, and material and supplies on an in-kind basis. Transportation Command worked with foreign governments in conjunction with elements of the relevant unified commands (e.g., European Command in Europe and Pacific Command in Asia) and US embassies to match US requirements with the contributed lift capabilities. In the case of in-kind equipment, material, and supplies, CENTCOM worked through unified commands and US embassies to match requirements with foreign government offers. Each country's donation had different features in terms of coverage and scope of the in-kind assistance provided.

EQUIPMENT, MATERIAL, AND SUPPLIES

Contributions of in-kind equipment, material, and supplies varied by country. As noted above, these contributions were only accepted against established CENTCOM requirements . The following examples of Germany and Japan demonstrate the differing approaches to in-kind contributions:

- Germany provided almost $550 million worth of equipment and material from existing Defense Ministry stocks. CENTCOM worked with European Command and the US Embassy in Bonn to match these stocks with established requirements. Germany also provided 60 new "Fuchs" nuclear, biological, and chemical (NBC) detection vehicles worth $130 million. This contribution strengthened US abilities to operate in an NBC environment. Germany also provided heavy equipment transporters which helped fill a serious shortfall in US mobility capabilities. Other in-

kind contributions included ammunition, chemical protective gear, many types of transport and materials handling equipment (MHE), bulldozers, and miscellaneous supplies (e.g., water cans, tents, medical equipment).

- Japan provided almost $500 million worth of in-kind equipment, material, and supplies. Unlike the German case, however, the Japanese contracted directly with suppliers for delivery of items. Japan worked closely with US forces Japan and CENTCOM to identify requirements. More than 80 percent of the contracted equipment and supplies were made in the United States or provided by US suppliers. Examples of the types of in-kind support provided included vehicles, construction equipment and materials, and computer and communication equipment.

IN-KIND AIRLIFT AND SEALIFT

Figure P-4, below, shows the total number of missions/sailings and the total value of in-kind lift donated by each of the several countries which provided in-kind

In-kind Donations of Airlift and Sealift

(as of 29 February 1992)

Countries	Donated Airlift		Donated Sealift	
	Missions	Value ($000)	Missions	Value ($000)
Korea	89	45,350	1,376	35,700
Japan	119	46,893	420	34,900
Kuwait	1	261	1,334	36,591
Denmark	0	0	*	11,557
Luxembourg	18	6,317	0	0
Italy	23	1,602	0	0
Total	250	100,423	3,130	118,748

Figure P-4
In-Kind Donations of Airlift and Sealift

airlift and sealift support. These lift contributions gave the US important additional assets to help accomplish the tremendous operation of rapidly transporting US forces and equipment half-way around the world.

OBSERVATIONS

Accomplishment

- The sharing of US incremental costs associated with Operations Desert Shield and Desert Storm represents an historic undertaking of unprecedented magnitude in modern times. It not only served to offset almost 90 percent of US incremental costs, but also was an important indicator of the scope and resolve of the multinational Coalition to defeat Iraqi aggression.

Shortcoming

- HNS agreements with Persian Gulf states were not in place initially to provide much needed support items. A concentrated effort was required to produce a November implementation plan for logistics support of the United States in defense of the Kingdom of Saudi Arabia.

APPENDIX Q

CHEMICAL AND BIOLOGICAL WARFARE DEFENSE

"One of these days it's going to happen, we're going to have to fight a chemical war. When that happens, we need to be as ready as we can possibly be and we need to be as well trained."

General H. Norman Schwarzkopf
Commander-in-Chief, Central Command

INTRODUCTION

The United States and many other nations have worked actively to eliminate chemical and biological weapons (CW/BW). An array of treaties and other international agreements has been erected to stem the proliferation of such capabilities and to ban their use. Despite these obstacles, Iraq entered the crisis with demonstrated CW and suspected BW capabilities. The inflamed rhetoric of Saddam Hussein implied a possible willingness to use such weapons to inflict mass casualties – perhaps to defeat the Coalition on the battlefield or perhaps to disrupt the will and cohesion of the Coalition. This appendix briefly surveys US defensive measures taken to counter a dangerous threat sustained by Iraq throughout the campaign, albeit one whose specific nature remained largely uncertain to the tactical forces engaged in the theater.

It is not known why Iraq did not use chemical or biological weapons. It is not known what logistic preparations were made to enable such use should it have been ordered by Saddam. Nor is it known what specific actions by the US and other members of the Coalition may have contributed to the Iraqi leader's decision not to use such capabilities. However, we assume US and other Coalition actions had a strong, restraining effect. Saddam already had demonstrated a willingness to inflict mass casualties with CW against enemy troops in the war with Iran, and against his own Kurdish population during and after that war. As evidenced by the Iraqi Scud attacks against civilian populations in Israel, Saudi Arabia, and other Gulf states, Saddam was willing to exceed the bounds of conventional warfare.

To provide the maximum possible deterrence against such contingencies, the US adopted a range of measures, all resting on the powerful military capabilities arrayed against Iraq. The initial phases of the air campaign opened with a sustained series of attacks on all known CW/BW sites. Stringent measures were taken to minimize the risks to surrounding populations from these strikes, which were intended to disrupt Iraq's capability to use its CW/BW arsenal. These strikes and

other measures also were intended to signal Iraqi military leaders in the field that their own interests would not be served obeying orders from Saddam to use CW/BW. Authorization to use CW/BW was assessed to rest solely with the Iraqi leader. The emphasis on speed in planning for the ground offensive was in part driven by the doctrinal view that rapid, sustained maneuver could substantially counter the Iraqi tactic of canalizing attacks into obstacles to create static concentrations of enemy forces vulnerable to CW attack by massed artillery fires.

> ***". . . were Saddam Hussein foolish enough to use weapons of mass destruction, the US response would be absolutely overwhelming and it would be devastating."***
>
> **Dick Cheney, Secretary of Defense**
> **23 December 1990**

Repeated statements by senior US officials signaled unmistakably that the US viewed CW/BW use with utmost seriousness. As underscored in the new Regional Defense Strategy, such arsenals of ballistic missiles fitted with nuclear and biological weapons pose a genuinely "strategic" threat to the US and other nations. Countering that threat promises to be an increasingly demanding task in the future and will continue to require the full range of US deterrence and defense capabilities.

While the defensive capabilities of US and other Coalition forces improved rapidly, CW/BW defensive readiness at the outset of the crisis was quite low. Coalition forces embarked on extraordinary measures to correct these weaknesses, largely by building up the preparedness of individuals to protect themselves in the event of CW/BW attack. On balance, these gains did lead to a significant potential for US forces to operate on a contaminated battlefield. While the outcome would have been unaffected, the tempo of the Operation Desert Storm campaign could have been hindered had US troops been forced to remain fully protected by masks and suits. Temperatures during Operation Desert Storm were comparatively cool; data indicate that risks of heat exhaustion would have been sharply higher in the summer, making protracted use of personal protective gear impractical. Studies have also shown that protective equipment dramatically impedes crew performance. The masks hinder communications, and the suits impair the ability to operate equipment. High-speed combat requiring close coordination between crews manning complex systems becomes quite difficult.

THE IRAQI THREAT

Iraq had developed a substantial CW capability including research and development facilities; stockpiles of CW munitions; a variety of delivery systems;

and the doctrine and training to employ integrated CW and conventional fires effectively on the battlefield. Iraq was the first nation to use nerve agents on the battlefield – attacking unprepared Iranian troops in 1984. By 1990, Iraq had the largest CW agent production capability in the Third World, annually producing thousands of tons of blister and nerve agents. By the invasion, Iraq had developed BW agents, most likely botulinum toxin and anthrax bacteria. In addition to surface-to-surface ballistic missile warheads, Iraqi delivery means for CW/BW included aerial bombs, artillery shells, rockets, and aircraft-mounted spray tanks.

In contrast to the reasonably comprehensive appreciation of Iraqi CW capabilities and doctrine, intelligence assessments of the BW threat were much more tenuous. (A more detailed discussion of Iraqi military capabilities is in Chapter I.)

COALITION CW/BW DEFENSE MEASURES

CW/BW Defense Force Structure

Deployment of CW/BW defense forces to the theater helped develop a defensive posture. The first units deployed included two Army chemical battalion headquarters; seven heavy decontamination companies; seven dual-purpose (decontamination and smoke generation) companies; four nuclear, biological, and chemical (NBC) reconnaissance platoons; and several CW defense staff augmentation teams. To support units with these limited assets, decontamination areas of responsibility were established. Units deploying in November, following the President's decision to augment Central Command (CENTCOM) forces, included two Army chemical battalion headquarters, five heavy decontamination companies, three smoke generation companies, five dual-purpose companies, and additional staff augmentation teams. The total CW/BW defense force structure included 45 units with 6,028 soldiers, and more than 450 vehicles for reconnaissance, detection, decontamination and smoke generation.

CW/BW Defense Training

During Operation Desert Shield, CW/BW defense training was conducted aggressively at every echelon, from individual survival skills to large scale unit sustainment operations. Individual training began with intensive common task and mask confidence exercises. With the immediacy of the Iraqi threat, proficiency in common individual tasks improved, and the focus shifted to collective unit CW/BW defense survival tasks. The Army Component, Central Command (ARCENT) conducted large scale unit decontamination exercises, mass chemical agent casualty exercises, and command post exercises, which included the warning and reporting

system. The Navy Component, Central Command (NAVCENT) conducted chemical casualty handling and equipment decontamination training during shipboard operations and at port facilities. The Air Force Component, Central Command (CENTAF) tested disaster preparedness plans for airfield and equipment decontamination. The Marine Corps Component, Central Command (MARCENT) conducted division-wide decontamination exercises to assess the effects of a large scale CW/BW attack and the ability to defend against it. Special Operations Forces (SOF) conducted intensive training and were the backbone for the conduct of CW/BW defense training for non-US Coalition forces. SOF training teams, CENTCOM mobile training teams, and component staffs improved the Coalition forces' CW/BW defense and support capabilities.

The CW/BW threat prompted immediate and comprehensive medical assistance, technology development, and training. More than 1,500 physicians, nurses, and physician assistants were trained in specialized casualty care by the Army Medical Research Institute of Chemical Defense. The Defense Nuclear Agency's (DNA) Armed Forces Radiobiology Research Institute provided crucial information on biological organisms in desert soil, analyzed the Saudi Arabian water supply for possible contamination, and provided treatment protocols (using new biotechnology agents, for CW/BW agent exposure. The Navy Medical Unit Cairo's laboratory provided analysis and samples of regional organisms and infections.

These CW/BW defense training experiences validated the need for realistic, mission-oriented training, including operating with actual CW/BW defense equipment. Training facilities, such as the Army's Chemical Decontamination Training Facility at Fort McClellan,AL, were vital in giving training personnel confidence in their protective equipment. In turn, these trainers were able to train their own unit personnel better in the use of CW/BW defense protective equipment during preparations for Operation Desert Storm.

CW/BW DEFENSE EQUIPMENT

The systems supporting CW/BW defense are designed to protect against the effects of chemical or biological agents, so forces can survive and continue the mission. These systems perform detection, identification and warning, individual and collective protection, and decontamination of personnel and equipment.

Detection, Identification and Warning Systems

Detectors and alarms are used at the unit level to provide near-real-time detection and warning of the presence of chemical and/or biological agents. Near-real-time detection and warning is important:

- to warn forces adjacent to and downwind of attacks;
- to allow protective measures to be taken to limit dose;
- to initiate therapy early;
- to alert the casualty handling system; and
- to allow units to communicate the "all clear" signal.

Most units deployed to Southwest Asia (SWA) with standard CW detection equipment. Such equipment included the M256 chemical detector kits, and the M8A1 automatic chemical agent alarms. A few newly developed detection systems were fielded for Operations Desert Shield and Desert Storm without benefit of previous field experience. In many cases, this equipment provided unique capabilities never before available in the field, but also presented difficulties since the systems were unfamiliar, were not in final military configurations, or were serviced by special civilian support personnel.

More than 1,300 chemical agent monitors (CAM) were deployed to the theater. Army and Marine Corps after action reports cited good results with CAMs when the system was used properly to check personnel and equipment for contamination. (The system often was used improperly as a continuous monitor and alarm.) However, it could not detect both nerve and blister agents simultaneously. False alarms reportedly were caused from exposure to certain petroleum products and red fuming nitric acid (a Scud missile fuel oxidizer). Supplies in theater were not adequate to support unit requirements down to the company level.

Ten developmental XM-21 remote sensing chemical agent alarms were fielded by the end of December. The early fielding of five XM-21s with MARCENT, and five with ARCENT, represented the first land-based, stand-off remote chemical detection capability for US forces. Operator surveys indicated the system was easy to operate, and gave few false alarms. Stand-off detection capability provided earlier warning than point detectors.

To improve CW/BW warning and reporting, DNA rapidly developed the Automated NBC Information System which linked computer support in the United States to forces in the field. This system provided greater identification of potential hazard areas by drawing map overlay contours of different dosage intensity according to specific attack data from the field in order to feed back to the combat commander a more definitive prediction of the probable extent of serious contamination. US forces used this system in more than 600 tests and exercises.

The most effective contamination detection system fielded during Operations Desert Shield and Desert Storm was the German-donated Fuchs (Fox) NBC reconnaissance vehicle. Fielding of the vehicle and training of the crews began in August. Units had just three weeks of training at the German NBC School at Sonthofen or the Army Chemical School at Fort McClellan. Fully trained NBC reconnaissance platoons using Fox vehicles were assigned to ARCENT and MARCENT before the ground offensive started. (British units were also provided with Fuchs systems.) Although repair part shortages existed initially, contractor maintenance

kept the vehicles operational. However, more vehicles were needed to meet operational requirements.

THE FOX NBC RECONNAISSANCE VEHICLE

The Fox is a six-wheeled, amphibious, armored vehicle equipped with sensors that detect and identify all known chemical warfare agents. The Fox's four man crew can detect, sample, and analyze surface and air contamination on the move from the safety of the vehicle. The system can conduct NBC reconnaissance missions rapidly across wide expanses of terrain, with high automotive reliability.

Individual Protective Clothing and Equipment

All CW/BW individual defense equipment and clothing was used extensively both in training exercises during the buildup phase and during the offensive part of

the conflict. Personnel frequently had to maintain a high level of mission-oriented protective posture (MOPP) as a precaution against Iraqi CW/BW attacks. (MOPP is a doctrinal process where increasing amounts of protective clothing are worn to provide increasing levels of protection, which a commander can change to match the climate, work rate, or threat.)

Individual protective clothing and equipment consists of protective masks, boots, gloves, battle dress overgarments, agent antidote injectors, pyridostigmine bromide tablets (for nerve agent pretreatment), convulsant antidote for nerve agent (CANA), and personal decontamination kits. The CANA provided a capability for preventing or reducing convulsions and resultant brain damage caused by nerve agents. This system was fielded to complement atropine and 2-pam chloride autoinjectors in the nerve agent antidote kits, and pyridostigmine bromide tablets. Protective clothing is worn in various combinations according to the MOPP level. During Operation Desert Shield, extensive training was conducted to acclimatize personnel to the stress the protective gear imposes, so the protective equipment's burden would not unduly slow the pace of offensive operations. Many units donned chemical protective clothing at the start of Operation Desert Storm and continued to wear some items throughout the ground offensive.

Interviews generally indicate soldiers were confident their protective clothing and equipment provided adequate protection. Adding to this confidence was pre-deployment testing of protective masks. The Marine Corps tasked its only US test site to test 450 masks a day, which resulted in a requirement to establish new test sites at Camp Lejeune, NC; Camp Pendleton, CA; and Camp Butler, Okinawa. Similarly, the Army trained deploying chemical specialists in a realistic environment at the Chemical Decontamination Training Facility. The Army also deployed specialized teams equipped with mask leakage detection devices to ensure adequate fits. Individuals with hard-to-fit faces received new M40 protective masks to ensure adequate protection.

Protective mask shortcomings were reported in availability, durability, and suitability. The Marines reported high failure rates during M17 protective mask testing; reasons included poor crimps around the voicemitter, bent drinking tube levers, and outlet valve deterioration. The Marines also reported the shelf lives of many M132A2 replacement filters drawn from Maritime Prepositioning Squadron (MPS) ships had expired and the procedure used to extend the shelf lives was too time consuming. Army surveys cited the mask as uncomfortable for prolonged wear and reported the mask carriers deteriorated because of the abrasive effects of sand. In general, all masks received some criticism for limiting or distorting vision, and the inability to change filters and or eat while in a potentially contaminated environment. Atropine autoinjectors reportedly did not hold up well, breaking or discharging while stored in the mask carrier.

The battle dress overgarment suits, designed primarily for use in a European environment, provide protection against liquid agents, and are more durable than other types of suits. However, this durability and protection is achieved at the expense of greater heat stress imposed on the individual. During Operations Desert

Shield and Storm, personnel criticized boots and gloves because of difficulty in performing detailed tasks, and of excessive perspiration. The Marines also reported some overgarments drawn from MPS supplies were damaged by heat or petroleum while in storage.

The Air Force and Marine Corps procured lightweight aircrew and ground personnel CW/BW protective overgarments made of a German-designed material, but these were not fielded before the cessation of hostilities. The Marines also used the British Mark IV protective suit. Initially, operating forces preferred this lightweight suit, but it reportedly lost favor with troops because of its poor durability and protection. The Army is assessing options to field lighter protective clothing for certain missions. The Air Force fielded a multi-man intermittent cooling system for use by ground crews on flight lines. This system included standard flight line air conditioners with an air distribution system hooked up to air cooled vests, to help keep body temperatures down.

Collective Protective Systems (Vehicles and Shelters)

CW/BW collective protection systems were insufficient. Armored vehicles with no collective protection, overpressure, and cooling systems are particularly susceptible in a CW/BW environment in hot climates. The Army took a major step to improve its CW/BW defense readiness posture with its M1A1 swap out program. The newer M1A1s, which have overpressure and cooling systems, can operate in a CW/BW environment with less crew stress. However, during the conflict, significant numbers of combat vehicles had only air-blown mask CW/BW protection with no cooling or overpressure. Troop comments were favorable for systems that provided environmental control for the crew.

Decontamination Equipment

Decontamination equipment is issued at both the personal and unit level, and includes M258A1 individual decontamination kits for removing contamination from clothing and skin; small sprayers, such as the M11 or M13 decontamination apparatus, for decontamination of vehicles and weapons; and the M12A1 power driven decontamination apparatus mounted on a 5-ton truck (available at the chemical defense unit level). The lighter and more transportable M17 lightweight decontamination system also supported ARCENT, MARCENT, and CENTAF. Decontamination equipment was not used during combat operations, but received extensive training use. Adequate supply of water for decontamination operations was a major problem in the desert and there also was a shortage of potable water trailers. Operating forces cited the poor reliability of the older M12A1 system and the newer M17 system. The M12A1 and M17 systems also were criticized for

insufficient water pressure and inadequate availability of spare parts. During extended use of the M17 system, high mission failure rates were reported. These water-based decontamination systems, designed for the European theater, were inadequate for desert operations.

LOGISTICS ASPECTS OF CW/BW DEFENSE

Overgarments initially were in short supply, especially in the desert camouflage pattern. Consumption of chemical protective clothing exceeded expectations, causing a drawdown of worldwide theater war reserves stocks. The Army transferred more than 1.1 million overgarments from worldwide theater reserve stocks to augment SWA stock levels. Production of new overgarments was accelerated and almost 300,000 were issued from Defense Logistics Agency stocks by mid-February. In theater, distribution of bulky, high demand items like chemical protective clothing required extensive supply management to satisfy requirements.

High temperatures during the first months of Operation Desert Shield shortened detector battery life considerably. A training battery pack using inexpensive flashlight batteries was fielded on short notice to conserve CAM batteries for combat operations. The harsh desert environment made it necessary to change filters frequently on air intakes of chemical alarms and monitors, as well as on collective protection systems of combat vehicles, vans, and shelters. The industrial base for consumable chemical defense items was pressed to keep pace with the drawdown of war reserve stocks. As a result of experience in SWA, stock levels and resupply procedures are being reconsidered for high demand CW defense items.

The Joint Services Coordination Committee (JSCC) for chemical defense equipment (CDE), a unique joint logistics management initiative, was established, which substantially improved CW/BW defense readiness. The organization effectively managed parts of the industrial base as well as orchestrated the exchange of CDE among the Services and foreign military sales. For example, the Army exchanged protective masks and other CW/BW defense equipment for 1,004 Marine Corps chemical agent alarms to support Army units in SWA. The JSCC was instrumental in ensuring that even non-DOD US civilians living in the region were provided with adequate individual protective equipment. The United States also requested foreign assistance when required. For example, under an American, British, Canadian, Australian Armies Reciprocal Use of Materials Loan, the Canadian government provided 500 CAMs to the United States. More than $250 million of worldwide theater reserve CDE assets were drawn upon.

SUMMARY

An effective CW/BW defense builds confidence in planning and executing operations and is vital to survival in CW and BW environments. US personnel, after intensive preparation in theater, were well trained to conduct sustained combat operations in a CW/BW threat environment, although some defensive equipment deficiencies persisted. Overall, commanders and troops had confidence in the ability to survive CW/BW attacks and continue operations. Iraq had the capability and the experience to use CW, and the capability to use BW, but did not during the Persian Gulf conflict. Although the Coalition's CW/BW defense was not truly tested in combat, many elements of an effective CW/BW defense, including a particularly energetic personal protection readiness program, clearly contributed to the overall deterrent and, importantly, to the ability of the Coalition to press ahead with a bold, offensive strategy.

OBSERVATIONS

Accomplishments

- Coalition forces rapidly raised the state of individual CW/BW defensive readiness.
- Realistic training received emphasis and improved the CW/BW defense readiness posture.
- CW/BW defense equipment fielding initiatives, involving developmental and new items, improved the overall CW/BW defense posture.
- German-donated NBC reconnaissance vehicles were integrated rapidly into Coalition units before the ground offensive started. Users judged this system to be outstanding.
- Establishment of the JSCC for CDE improved CW/BW defense equipment readiness.

Shortcomings

- Chemical protective suits were not optimal for wear in the desert during the summer. Shortcomings were reported in availability, durability, and suitability.
- CW/BW collective protection systems were inadequate. Installation of CW/BW collective protection and cooling systems into combat vehicles was inadequate.

Issues

- Lightweight CW/BW protective clothing and defensive equipment is required, especially for desert climates.
- Integration of CW/BW protection and cooling systems into combat vehicles, and procurement of stand-alone transportable collective protective shelters are required for effective operations in a CW/BW environment.
- BW defense should be emphasized more fully in DOD programs. Inadequacies exist in detectors, vaccines, and protective equipment.

- To ensure effective contamination avoidance on future battlefields, additional NBC reconnaissance vehicles are needed and stand-off chemical and biological detection is required.
- Efforts to replace the water-based decontamination systems should continue.
- Continued force modernization in individual and collective protection, medical support, detection, identification and warning, and decontamination systems are required to ensure force survivability and mission accomplishment under CW/BW battlefield conditions.

APPENDIX R

ROLE OF WOMEN IN THE THEATER OF OPERATIONS

"They endured the same living conditions, duties, and responsibilities . . . . They performed professionally and without friction or special consideration."

US Marine Officer

INTRODUCTION

Department of Defense (DOD) women played a vital role in the theater of operations. By late February, more than 37,000 military women were in the Persian Gulf, making up approximately 6.8 percent of US forces. By Service, there were approximately 26,000 Army, 3,700 Navy, 2,200 Marine, and 5,300 Air Force (USAF) women deployed. Women served in almost all of the hundreds of occupations open to them; as a matter of law and policy, women were excluded from certain specific combat military occupational specialties.

JOB FUNCTIONS OF WOMEN DURING DESERT SHIELD/STORM

Women were administrators, air traffic controllers, logisticians, engineer equipment mechanics, ammunition technicians, ordnance specialists, communicators, radio operators, drivers, law enforcement specialists and guards. Many women truck drivers hauled supplies and equipment into Kuwait. Some brought enemy prisoners of war back to holding facilities. Many flew helicopters and reconnaissance aircraft. Still others served on hospital, supply, oiler and ammunition ships. Others served as public affairs officers and chaplains. Several women commanded brigade, battalion, company, and platoon size units in the combat support and combat service support areas. They endured the same hardships under the same harsh conditions as their male counterparts. The deployment of women was highly successful. Women performed admirably and without substantial friction or special considerations.

DEPLOYMENT OF WOMEN TO COMBAT ZONES

Although women did not serve in units whose mission involved direct combat with the enemy, some women were subjected to combat. Five Army women were killed in action and 21 wounded in action. Two women were taken as Prisoners of War (POW). All casualties were the result of indirect causes, i.e., Scud attack, helicopter crash, or mines. One woman Marine driving a truck struck a mine in Kuwait, receiving no injuries. Four Marine women qualified for, and received, the Combat Action Ribbon, having been engaged by, and returned fire against, bypassed Iraqi troops.

Because media attention was afforded to the relatively few cases in which women faced combat conditions, the public perception of the role of women in the Gulf War has tended to be skewed. Army and Marine women served in combat support and service support units ashore. Navy women served on hospital, supply, oiler, and ammunition ships afloat. Ashore, they served in construction battalions, fleet hospitals, and air reconnaissance squadrons, as well as in many support billets. No Navy women saw combat, either directly or indirectly. USAF women served in support billets as well as in tanker, transport, and medical evacuation aircraft. All USAF C-130 squadrons in theater had women maintenance officers. No USAF women saw direct combat.

The National Defense Authorization Act for FY 1992 and 1993 repealed the statutory limitations on the assignment of women to aircraft flying combat missions. The Act also established a Presidential Commission on Assignment of Women in the Armed Forces. The Commission is intended to assess laws and policies restricting the assignment of women service members. The law requires the President to transmit the Commission's report to Congress by 15 December 1992. DOD fully supports the commission. Several other related DOD study efforts also are examining the experience of women service members in the Persian Gulf.

The Army is conducting studies in two categories: "soldier human factors research" during Operations Desert Shield and Desert Storm, and "family factors research" focusing on post Operation Desert Storm family issues. The Navy is studying the issue of women serving in a combat environment. Researchers have surveyed units in the Persian Gulf and are analyzing their data.

DOD is working with the General Accounting Office on a more extensive study to analyze the role of military women in the Persian Gulf. This study will examine issues such as the impact of women on deployment and field operations; women's role in the deployed units; unit operations issues, such as unit cohesion/bonding; and ground deployment issues, such as hygiene. Service historians also have been asked to document contributions made by women in the Persian Gulf.

Data will document the overall number of women who deployed, the skills of those women, the number of single parents and married military couples, and data comparisons with males on the numbers and types of separations from the military.

These analyses and assessments will serve as the basis for further evaluation of current policies concerning women in the military. Emerging results of analyses conducted on non-deployable personnel suggest the non-deployability percentages for female personnel were somewhat higher than the percentage for male personnel. Pregnancy accounted for the largest difference in non-deployable percentages. Other differences are not as easily identified and require additional analysis. While non-deployability did not affect the overall conduct of the operation, it is nevertheless an issue that will require further study for future deployment criteria for women.

Several observations have emerged. There were instances of misunderstanding concerning the application of combat restrictions. DOD policies are not designed to shield women from all hostilities, but are designed to limit their exposure to a level which is less than that in direct combat. Direct combat means closing with the enemy by fire, maneuver, or shock effect to destroy or capture, or while repelling assault by fire, close combat, or counterattack. The Risk Rule is used to determine if a non-direct combat position should be closed to women. Noncombat units can be closed to women on grounds of risk of exposure to direct combat, hostile fire, or capture, if the type, degree, and duration of risk is equal to or greater than that experienced by associated combat units (of similar land, sea, or air type) in the same theater of operation.

Finally, the substantial social and cultural differences involving the role of women in Saudi Arabia have received some attention. While there are marked differences, they did not affect the military's role in Operations Desert Shield and Desert Storm. The mission was not one of changing cultural values and beliefs. In fact, the Saudi government ensured US military members, both female and male, were not restricted in the performance of their military duties, even if such duties might counter normal Saudi culture. This was best demonstrated by Saudi acceptance of American women driving military vehicles. However, outside of military duties, Service members were obliged to respect the host country's cultural distinctions of the host country. This courtesy was extended within Saudi Arabia, just as it is within all other countries where US military members serve.

Although US forces had a military, not a civilian mission, this does not mean their presence did not have an effect on Saudi culture. US military men and women deployed to Saudi Arabia were selected based on mission need, with no distinction made for gender, other than application of restrictions contained in US combat exclusion laws and policies. As previously mentioned, this meant US women performed a wide range of critical missions. This fact alone clearly sets a visible example of US principles.

OBSERVATIONS

Accomplishments

- Women were fully integrated into their assigned units.
- Women performed vital roles, under stress, and performed well.
- Current laws and policies were followed.

Issues

- The media and public interest was centered on female casualties and POW.
- In some respects, deployment criteria for women differ among Services. In a few cases, these differences and different interpretations by local commands caused concerns.

APPENDIX S

MEDIA POLICY

"The first essential in military operations is that no information of value shall be given to the enemy. The first essential in newspaper work and broadcasting is wide-open publicity. It is your job and mine to try to reconcile those sometimes diverse considerations."

General Dwight D. Eisenhower, 1944

INTRODUCTION

As in all previous American conflicts, the rules for news coverage of Operations Desert Shield and Desert Storm were driven by the need to balance the requirements of operational security against the public's right to know about ongoing military operations. Department of Defense (DOD) policy calls for making available "timely and accurate information so the public, Congress, and the news media may assess and understand the facts about national security and defense strategy," withholding information "only when disclosure would adversely affect national security or threaten the safety or privacy of the men and women of the Armed Forces." The news media feel compelled to report as much information about current newsworthy events as possible.

The challenge to provide full news coverage of Operations Desert Shield and Desert Storm was complicated by several factors:

- The host nation, closed to western media before the operation began, was reluctant to permit reporters to enter the country and was concerned about reporting of cultural sensitivities.

- More than 1,600 news media representatives eventually massed in Saudi Arabia to report about the war.

- The combat actions of Operation Desert Storm used high technology, involved long-range weapons, and occurred on and over a distant, vast, open desert and from ships operating in adjacent bodies of water.

- The combined armor and airmobile attacks and drives through Kuwait and Iraq were rapid.

• This was the first major American war to be covered by news media able to broadcast reports instantaneously to the world, including the enemy.

From the beginning of the crisis, DOD worked closely with Central Command (CENTCOM), the Joint Staff (JS), the Services, and news media organizations to balance the media's needs with the military's ability to support them and its responsibility to preserve US combat forces' operational security. The goal was to provide as much information as possible to the American people without endangering the lives or missions of US military personnel.

When the *USS Independence* (CV 62) battle group arrived in the Gulf of Oman on 7 August and the first Air Force (USAF) F-15s landed on sovereign Saudi territory on 8 August, approximately one week after Iraq invaded Kuwait, there were no western reporters in the Kingdom. The US government urged the Saudi government to begin granting visas to US news organizations, so reporters could cover the US military's arrival. On 10 August, the Secretary of Defense called the Saudi ambassador to inquire about the progress for issuing visas. The ambassador said the Saudis were studying the question but agreed in the meantime to accept a pool of US reporters if the US military would arrange their transportation.

PUBLIC AFFAIRS OPERATIONS

National Media Pool

The DOD National Media Pool, formed in 1985, was alerted the same day. The pool enables reporters to cover the earliest possible US military action in a remote area where there is no other presence of the American news media, while still protecting the element of surprise – an essential part of operational security.

Starting with those initial 17 press pool members – representing Associated Press, United Press International, Reuters, Cable News Network, National Public Radio, Time, Scripps-Howard, the Los Angeles Times, and the Milwaukee Journal – the number of reporters, editors, photographers, producers, and technicians grew to nearly 800 by December. Except during the first two weeks of the pool, those reporters all filed their stories independently, directly to their own news organizations.

Joint Information Bureau

To facilitate media coverage of US forces in Saudi Arabia, CENTCOM established a Joint Information Bureau (JIB) in Dhahran and, later, another in

Riyadh. Saudi Ministry of Information representatives also were located with the JIB in Dhahran, which let visiting media register with the Saudi government and the JIB at one location. The JIB coordinated with reporters and worked to arrange visits to units the reporters desired to cover. The Saudi government required that a US official escort reporters visiting Saudi bases. The CENTCOM Public Affairs Office (PAO) assumed this responsibility and provided escorts to facilitate coverage on Saudi bases and to US units on the ground and at sea and throughout the theater.

Media Concerns

One of the concerns of news organizations in the Pentagon press corps was that they did not have enough staff in the Persian Gulf to cover hostilities. Since they did not know how the Saudi government would respond to their requests for more visas, and since they couldn't predict what restrictions might be imposed on commercial air traffic in the event of a war, they asked the Pentagon to provide a military plane to take in a group of reporters to act as journalistic reinforcements. A USAF C-141 cargo plane left Andrews Air Force Base, MD, on 17 January, the morning after the bombing began, with 126 news media personnel on board. That plane left as offensive operations began, during the most intensive airlift since the Berlin blockade. The fact that senior military commanders dedicated one cargo airplane to the job of transporting another 126 journalists to Saudi Arabia demonstrated the military's commitment to take reporters to the scene of the action so they could get the story out to the American people.

The Pentagon worked closely with the CENTCOM PAO to determine how best to facilitate coverage of potential hostilities in the Persian Gulf. After several meetings at the Pentagon with military and civilian public affairs officials experienced in previous conflicts, and Pentagon press corps bureau chiefs, the Department published on 14 January a one-page list of ground rules and a one-page list of guidelines for the news media covering operations in the Gulf.

Media On The Battlefield

As early as October, it appeared hostilities in the region could result in a large, fast-moving, and deadly battle. The Pentagon sent a joint public affairs team to Saudi Arabia on 6 October to evaluate the public affairs aspects of hostile action and help CENTCOM prepare for media coverage of any such eventuality. The team was convinced that, given the size and distances involved, the probable speed of advance of US forces, the potential for the enemy to use chemical weapons, and the sheer violence of a large scale armor battle would make open coverage of a ground combat operation impractical, at least during its initial phase.

The team, therefore, recommended that pools of reporters be assigned to units to cover activity within those units. These reporters would stay with units to ensure they would be present with military forces at the beginning of any combat operations. Although the plan was initially rejected, the command ultimately implemented a similar plan calling for ground combat news media pools, all of which would be in place before the ground campaign began.

The second contentious issue was the requirement that in the event of hostilities, all pooled media products undergo a security review. Although most reporting from the theater had been unrestricted, the military was concerned that reporters might not realize the sensitivity of certain information and might inadvertently divulge details of military plans, capabilities, operations, or vulnerabilities that would jeopardize the outcome of an operation or the safety of US or other Coalition forces. The plan called for all pooled media material to be examined by the public affairs escort officer on scene solely for its conformance to the ground rules, not for its potential to express criticism or cause embarrassment. The public affairs escort officer would discuss ground rule problems he found with the reporter, and, if no agreement could be reached about the disputed material, it would be sent immediately to the JIB Dhahran for review by the JIB Director and the appropriate news media representative. If they could not agree, the issue would be elevated to the Assistant Secretary of Defense (Public Affairs) for review with the appropriate bureau chief. The ultimate decision on publication rested with the originating reporter's news organization, not the government or the military.

While the pools were in existence, only five of more than 1,300 print pool stories were appealed through the stages of the review process to Washington for resolution. Four of those were cleared in Washington within a few hours. The fifth story dealt in considerable detail with the methods of intelligence operations in the field. The reporter's editor-in-chief chose to change the story to protect sensitive intelligence procedures.

In addition to 27 reporters on ships and at air bases, when the ground offensive began, CENTCOM had 132 reporters in place with the US ground forces to cover their activity. This let reporters accompany every combat division into battle.

Although plans called for expeditious handling of pool reports, much of it moved far too slowly. The JIB Dhahran reviewed 343 pool reports filed during or immediately after the ground war and found approximately 21 percent arrived at the JIB in less than 12 hours, 69 percent arrived in less than two days, and 10 percent arrived in more than three days. Five reports, hampered either by weather or by poor transportation, arrived at the JIB more than six days after they were filed.

The press arrangements in Southwest Asia were a good faith effort on the part of the military to be as fair as possible to the large number of reporters on the scene, to get as many reporters as possible out with troops during a highly mobile, modern ground war, and to allow as much freedom in reporting as possible, while still preventing the enemy from knowing precisely the nature of Coalition plans.

An unanticipated problem, however, grew out of the security review issue. Reporters were upset with the presence of public affairs escort officers. Although it is a common practice for a public affairs officer to be present during interviews with military personnel, the fact the escort officer had the additional role of reviewing stories for conformance to ground rules led to the public affairs officer being perceived as an impediment. Normally the facilitators of interviews and the media's advocate, public affairs officers now were considered to be inhibiting the flow of information between the troops and the media.

Media Briefings

DOD and CENTCOM conducted extensive briefings on Operation Desert Storm. When the air campaign began, the Secretary of Defense and the Chairman of the Joint Chiefs briefed the news media. Several hours later, during the morning of 17 January, the Commander-in-Chief, CENTCOM, and the CENTCOM Air Forces Commander conducted an extensive briefing in Riyadh. At the Pentagon, during the next 47 days, the JS Directors of Operations and Intelligence – two of the most knowledgeable officials about the operation – along with the Assistant Secretary of Defense for Public Affairs conducted 35 televised news briefings. Likewise, in Saudi Arabia, the command provided the Deputy Director of Operations for daily, televised briefings, and also provided background briefings at the news media's request. The command provided 98 briefings (53 on-the-record and 45 on background). Along with the news reports coming from reporters accompanying our forces in the field, these daily news briefings – conducted by the people responsible for planning and carrying out the operation – provided an unprecedented amount of information about the war to the American people.

OBSERVATIONS

Accomplishments

- DOD acted quickly to move reporters into place to cover the early stages of the American military buildup in Saudi Arabia, providing access for the first western reporters to the early stages of the operation. CENTCOM, in conjunction with DOD, established a pool system, enabling the news media to cover Operation Desert Storm through 159 reporters and photographers who were with combat units. In contrast, 27 reporters were with the D-Day invasion force in 1944 when the first wave of troops went ashore.

- The media pool system placed pool members in positions to witness actual combat or interview troops immediately after combat, as evidenced by the fact approximately 300 reports filed during the ground war were filed from forward deployed units on or near the front lines. Of that number, approximately 60 percent appeared to contain eyewitness accounts of the fighting.

- Pool members were permitted to interview front-line troops. Some 362 stories filed from the front included interviews with front-line troops.

- Frequent public briefings were conducted on details of the operation.

Shortcomings

- Command support for the public affairs effort was uneven. Some component commands were highly cooperative while others did not appear to place a priority on getting the story out. In some cases, this meant lack of communication and transportation assets or priorities to get stories back to the Dhahran JIB in a timely manner.

- Because of the scope and sensitive nature of much of the operational planning, a significant number of PAOs were not able to stay fully abreast of daily developments, nor were they trained to conduct security reviews of pool products. Many were therefore unable to judge operational security violations properly.

- The public affairs escort officers displayed a wide range of expertise in performing their duties. While many received praise from the media and unit commanders for having done excellent jobs, others, overzealously performing their duties, made mistakes which sometimes became news items. Occasional, isolated incidents, such as public affairs officers stepping in front of cameras to stop interviews, telling reporters they could not ask questions about certain subjects, and attempting to have some news media reports altered to eliminate

unfavorable information, were reported. Although these incidents were the exception, not the rule, they nonetheless frequently were highlighted in media reports.

Issue

- Media sources have voiced dissatisfaction with some press arrangements, especially with the media pools, the need for military escorts for the news media, and security review of media pool products. DOD is working with news media representatives on ways to improve news coverage of future US military combat operations.

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GLOSSARY

A

A-box - fire support box; subdivision of a kill box [USMC]

AAA - antiaircraft artillery

AADC - Area Air Defense Commander

AAR - after-action review

AAV - assault amphibian vehicle; fully tracked vehicle able to carry Marines and equipment from assault ship to inland objectives and during subsequent operations ashore [USMC]

AAW - antiair warfare; action to destroy or reduce to an acceptable level the enemy air and missile threat [Navy; USMC]

ABCCC - Airborne Battlefield Command and Control Center; aircraft equipped with communications, data link, and display equipment; airborne command post or communications and intelligence relay facility

ABDR - Aircraft Battle Damage Repair [USAF]

ABFDS - Aerial Bulk Fuel Delivery System [USAF]

AC - Active Component

ACA - Airspace Control Authority

ACAA - automatic chemical agent alarm

ACC - 1) Arab Cooperation Council; 2) Airspace Coordination Center [CENTCOM]

ACINT - acoustic intelligence

ACE - 1) Airborne Command Element [USAF]; 2) armored combat excavator [Army]; 3) Air Combat Element [NATO]; 4) Aviation Combat Element; the task-organized Marine Air-Ground Task Force element that contains aviation and aviation support forces. It includes aviation command (including air control), combat, combat support, and combat service support units needed to accomplish a mission [USMC]

ACR - Armored Cavalry Regiment [Army]

ACV - 1) armored combat vehicle; 2) air cushion vehicle

ADA - air defense artillery

A/DACG - Arrival/Departure Airfield Control Group

ADOC - Air Defense Operations Center; an area and airspace above it within which established procedures minimize interference between air defense and other operations

ADR - Aircraft Damage Repair [Navy]

ADSS - ANVIS Display Symbology System

ADVCAP - advanced capability

AE - assault echelon; the element of a force scheduled for initial assault on the objective area

AEW - airborne early warning; detection of enemy air or surface units by radar or other equipment in an airborne vehicle and transmission of a warning to friendly units

AFB - Air Force Base

AF/SA - Headquarters USAF Studies and Analysis Agency

AF/XO - Headquarters USAF Plans and Operations

AFCS - Automatic Flight Control System; a system that includes all equipment to control automatically the flight of an aircraft or missile to a path or attitude described by internal or external references

AFID - anti-fratricide identification device

AFLC - Air Force Logistics Command

AFMSS - Air Force Mission Support System

AFOE - assault follow-on echelon; the additional forces, supplies and equipment needed for a landing force to continue operations ashore after an amphibious landing. Normally embarked aboard amphibious shipping or Military Sealift Command ships able to unload without port facilities [Navy; USMC]

AFR - Air Force Reserve

AFRC - Armed Forces Recreation Center

AFRRI - Armed Forces Radiobiology Research Institute

AFRTS - Armed Forces Radio and Television Service

AFSAC - Air Force Special Activities Center

AFSOC - Air Force Special Operations Command

AFSOCCENT - Air Force Special Operations Command, CENTCOM

AFSOUTH - Allied Forces, South [NATO]

AG - Adjutant General [Army]

AGMC - Aerospace Guidance and Meteorology Center [USAF]

AI - air interdiction; air operations to destroy, neutralize or delay the enemy's military potential before it can be brought to bear effectively against friendly forces, at such distance from friendly forces that detailed integration of each air mission with the fire and movement of friendly forces is not required

AIMD - Aircraft Intermediate Maintenance Detachment [Navy, USMC]

air superiority - that degree of dominance in the air battle of one force over another which permits operations by the former and its related land, sea, and air forces at a given time and place without prohibitive interference by the opposing force

air supremacy - that degree of air superiority wherein the opposing air force is incapable of effective interference

AIRBOC - air rapid-bloom off-board chaff countermeasures cartridge

AJCM - anti-jam control modem

ALC - Air Logistics Center [USAF]

ALCE - Airlift Control Element [USAF]

ALCM - air-launched cruise missile

ALFS - airborne low-frequency sonar

ALO - air liaison officer; an officer (aviator/pilot), attached to a ground unit, who functions as the primary advisor to the ground commander on air operations

AMC - Army Materiel Command

AMCM - aviation mine countermeasures [Navy]

AMRAAM - advanced medium-range air-to-air missile

AMTI - airborne moving-target indicator

ANG - Air National Guard

ANGLICO - Air-Naval Gunfire Liaison Company; a company with liaison and communications teams designed to coordinate naval gunfire and air support for ground forces [USMC]

ANZUS - Australia-New Zealand-United States Treaty

AO - area of operations

AOA - amphibious objective area; a geographic area, delineated in the initial directive, for command and control, within which is located the objective(s) to be secured by an amphibious task force

AOR - area of responsibility; a defined land area in which responsibility is specifically assigned to the the area commander for development and maintenance of installations, movement control and tactical operations involving troops under his control, along with parallel authority to exercise these functions

APC - armored personnel carrier; a lightly armored, highly mobile, full-tracked vehicle, amphibious and air-droppable, used primarily for transporting personnel and their individual equipment during tactical operations

APF - Afloat Prepositioning Force

APOD - aerial port of debarkation

APOE - aerial port of embarkation

APS - afloat pre-positioned ship

APU - auxiliary power unit

ARC - 1) Air Reserve Components; 2) American Red Cross

ARCENT - Army Component, Central Command

ARG - Amphibious Ready Group

ARNG - Army National Guard

ARSOC - Army Special Operations Command

ARSOFTF - Army Special Operations Forces Task Force

ASARS - Advanced Synthetic Aperture Radar System [USAF]

ASBPO - Armed Services Blood Program Office

ASE - aircraft survivability equipment

ASL - 1) allowable supply list; 2) authorized stockage list [Army]

ASM - armed scout mission

ASMD - antiship missile defense

ASR - armed surface reconnaissance [Navy]

assault shipping - shipping assigned to an amphibious task force used to transport the assault echelon to the objective area [Navy]

ASUW - antisurface warfare

ASW - antisubmarine warfare

ATACMS - Army Tactical Missile System

ATAF - Allied Tactical Air Force [NATO]

ATAS - air-to-air Stinger

ATBM - antitactical ballistic missile

ATC - 1) Air Transportable Clinic [USAF]; 2) air traffic control

ATCC - Antiterrorism Coordinating Committee

ATF - Amphibious Task Force ; naval force and landing force, with supporting forces, organized and equipped for amphibious operations[Navy; USMC]

ATGM - anti-tank guided munition

ATH - Air Transportable Hospital [USAF]

ATHS - Airborne Target Handover System

ATO - air tasking order

AUTODIN - Automatic Digital Network

AUTOVON - Automatic Voice Network; formerly the principal long-haul, unsecure voice communications network within the Defense Communications System; replaced by Defense Switched Network

AVGAS - aviation gasoline

AVIM - Aviation Intermediate-level Maintenance

AVLB - armored vehicle-launched bridge

AVSCOM - Aviation Systems Command [Army]

AVUM - Aviation Unit-level Maintenance [Army]

AWACS - Airborne Warning and Control System; air surveillance and control provided by airborne early warning vehicles equipped with search and height-finding radar and communications equipment for controlling weapons

B

BAAF - Bahrain Amiri Air Force

BAI - battlefield air interdiction

BASE-LITE - base imagery transmission equipment

BCTP - Battalion Command Training Program

BDA - battle damage assessment

BEEF - Base Emergency Engineering Force [USAF]

BFV - Bradley fighting vehicle

BGTT - Battle Group Tactical Training Continuum [Navy]

Black Hole - CENTCOM air campaign planning staff offices

BLSSS - Base-Level Self-sufficiency Spares [USAF]

BLT - Battalion Landing Team; in an amphibious operation, an infantry battalion normally reinforced by necessary combat and service elements [USMC]

BMW - Bombardment Wing [USAF]

BUU - basic user unit [USMC]

BVR - beyond visual range

BW - biological warfare; use of biological agents to produce casualties in man or animal and damage to plants or materiel; or defense against such use; also biological weapon

C

C-Day - the unnamed day on which a deployment operation begins or is to begin (in the case of Operation Desert Shield, 7 August 1990)

CA - Civil Affairs; those phases of the activities of a commander which embrace the relationship between the military forces and civil authorities and people in a friendly or occupied country or area when military forces are present

CAB - Combat Aviation Brigade

CAF - Canadian Air Force

CAFMS - Computer-assisted Force Management System

CAG - Civil Affairs Group

CALS - Committee on Ammunition Logistics Support

CAM - chemical agent monitor

CANA - convalescent antidote for nerve agent

CAP - combat air patrol; an aircraft patrol provided over an objective area, over the force protected, over the crucial area of a combat zone, or over an air defense area, to intercept and destroy hostile aircraft before they reach their target

Capstone - Army program that aligns units, regardless of component, into a wartime command structure

CAS - close air support; air action against hostile targets near friendly forces, which require detailed integration of each air mission with the fire and movement of those forces

CATF - Commander, Amphibious Task Force [Navy]

CATM - captive airborne training missile

CAX - combined arms exercise [USMC]

CBPS - chemical biological protective shelter

CBS - Columbia Broadcasting System

CCJ5-SPG - Central Command J5-Special Planning Group

CDC - Combat Development Command [USMC]

CDE - chemical defense equipment

CDTF - Chemical Decontamination Training Facility

CEM - combined effects munition

CENTAF - Air Force Component, Central Command

CENTCOM - US Central Command

CEP - circular error probable; an indicator of the accuracy of a weapon system, used as a factor in determining probable damage to a target; the radius of a circle in which half of a missile's projectiles are expected to fall

CFV - cavalry fighting vehicle

CHAMPUS - Civilian Health and Medical Program for the Uniformed Services

Checkmate - Headquarters USAF Air Staff planning group

CI - 1) counterintelligence; activities concerned with identifying and counteracting the security threat posed by hostile intelligence services or organizations, or by individuals engaged in espionage, sabotage, subversion or terrorism; 2) civilian internee; a civilian interned during armed conflict or occupation for security reasons or for protection or because he has committed an offense against the detaining power

CIA - Central Intelligence Agency

CIC - 1) Combat Information Center [Navy]; 2) Combined Intelligence Center [CENTCOM]

CILMC - Contingency Intermediate-level Maintenance Center

CINC - Commander-in-Chief

CINCCENT - Commander-in-Chief, Central Command

CINCEUR - Commander-in-Chief, European Command

CINCFOR - Commander-in-Chief, Forces Command

CINCLANT - Commander-in-Chief, Atlantic Command

CINCPAC - Commander-in-Chief, Pacific Command

CINCSPACE - Commander-in-Chief, Space Command

CINCSAC - Commander-in-Chief, Strategic Air Command

CINCSO - Commander-in-Chief, Southern Command

CINCSOC - Commander-in-Chief, Special Operations Command

CINCTRANS - Commander-in-Chief, Transportation Command

CITV - commanders' independent thermal viewer

CJCS - Chairman, Joint Chiefs of Staff

CLF - 1) Combat Logistics Force; 2) Commander, Landing Force [Navy, USMC]

CLSF - Combined Logistics Stores Facility

CLSS - Combat Logistics Support System

CLSU - Communications Security Logistics Support Unit

CMEF - Commander, Middle East Force

CMTC - Combat Maneuver Training Center

CNN - Cable News Network

CNO - Chief of Naval Operations; the Navy's senior uniformed leader

COCOM - combatant command (command authority)

COE - Corps of Engineers [Army]

COMCARGRU - Commander, Carrier Group

COMCRUDESGRU - Commander, Cruiser Destroyer Group

COMDESRON - Commander, Destroyer Squadron

COMINT - communications intelligence; technical and intelligence information derived from foreign communications by other than the intended recipients

COMSAT - communications satellite

COMSEC - communications security; protection against unauthorized receipt of telecommunications

COMTAC - Commander, Tactical Air Command

CONOPS - 1) concept of operations; 2) contingency operations

CONUS - Continental United States

COP - Concept Outline Plan

COSCOM - Corps Support Command

CP - command post; a unit or subunit headquarters where the commander and staff perform their activities

CPX - command post exercise

CRAF - Civil Reserve Air Fleet

CRC - CONUS Replacement Center

cross level - shifting of people and/or equipment from one unit to another to make the receiving unit ready for deployment

CS - combat support

CSAR - combat search and rescue

CSG - Cryptologic Support Group [NSA]

CSH - Combat Support Hospital

CSOA - combined special operations area

CSS - combat service support; assistance provided operating forces primarily in administrative services, chaplain services, civil affairs, finance, legal services, health services, military police, supply, maintenance, transportation, construction, troop construction, acquisition and disposal of real property, facilities engineering, topographic and geodetic engineering functions, food service, graves registration, laundry, dry cleaning, bath, property disposal and other logistics services

CSSA - 1) CENTAF Supply Support Activity [USAF]; 2) combat service support area; area from which logistics support is provided to forward units and where logistics operations are conducted. [USMC]

CSSD - Combat Service Support Detachment; task-organized service support unit assigned to support directly specific forward units, sites, or airfields [USMC]

CSSE - Combat Service Support Element; those elements whose primary missions are to provide service support to combat forces and which are a part, or prepared to become a part of a theater, command or task force formed for combat operations

CT - counterterrorism; offensive measures to prevent, deter and respond to terrorism

CTC - Combat Training Center [Army]

CTT - Coordination and Training Team [SOF]

CUCV - commercial utility cargo vehicle

CVBG - Aircraft Carrier Battle Group

CW - chemical warfare; all aspects of military operations involving the use of lethal and incapacitating munitions/agents and the warning and protective measures associated with such offensive operations; also chemical weapon

CWC - Composite Warfare Commander [Navy]

CY - calendar year

C2 - command and control

C3 - command, control, and communications

C3I - command, control, communications, and intelligence

C3IC - Coalition, Coordination, Communication, and Integration Center

C4 - command, control, communications, and computers

D

D-Day - the unnamed day on which a particular operation begins or will begin; (in the case of Operation Desert Storm, 17 January 1991)

DA - direct action [SOF]

DAMA - demand assigned multiple access; multiplexing system which permits one satellite channel to be shared by multiple users simultaneously

DARPA - Defense Advanced Research Projects Agency

DARS - daily aerial reconnaissance and surveillance [CENTCOM]

DAS - direct air support

DASC - Direct Air Support Center; a subordinate operational component of a tactical air control system designed for control and direction of close air support and other tactical air support operations, normally collocated with fire support coordination elements

DASC-A - Direct Air Support Center - Airborne; an airborne aircraft equipped with the necessary staff, communications and operations facilities to function as a direct air support center

DCA - 1) Defense Communications Agency; 2) Defense Cooperation Account; 3) defensive counter-air

DCI - Director of Central Intelligence

DCP - director of air campaign plans [CENTCOM]

DCS - 1) Defense Communications System; 2) Digital Computer System

DDI - Deputy Director for Intelligence [CIA]

DDN - Defense Data Network

DDO - Directorate of Operations [CIA]

DDS - 1) Defense Dissemination System; 2) dry deck shelter [Navy]

DEFSMAC - Defense Special Missile and Astronautics Center

DESCOM - Depot System Command [Army]

DEPMEDS - Deployable Medical Systems

DF - direction finding; a procedure for obtaining bearings of radio frequency emitters by using a highly directional antenna and a display unit on an intercept receiver or ancillary equipment

DFR/E - Defense Fuel Region/Europe

DFR/ME - Defense Fuel Region/Middle East

DFSC - Defense Fuel Supply Center

DFSP - Defense Fuel Support Point

DIA - Defense Intelligence Agency

DIAC - Defense Intelligence Analysis Center

DIPEC - Defense Industrial Plant Equipment Center

DISA - Defense Information Systems Agency

DISCOM - Division Support Command

DLA - Defense Logistics Agency

DLR - depot-level repairable

DMA - Defense Mapping Agency

DMI - Directorate of Military Intelligence [Iraq; Israel; Egypt]

DMPI - designated mean point of impact

DMRIS - Defense Medical Regulating Information System

DMSP - Defense Meteorological Satellite Program

DNA - Defense Nuclear Agency

DNBI - disease, non-battle injury

DOD - Department of Defense

DOD-JIC - DOD Joint Intelligence Center

DODEX - DOD Intelligence Information System Extension

DOS - day of supply; a unit or quantity of supplies adopted as a standard of measurement, used in estimating the average daily expenditure under stated conditions

DPG - Defense Planning Guidance

DPSC - Defense Personnel Support Center

DSA - defense special assessment [DIA]

DSCS - Defense Satellite Communications System

DSCSOC - Defense Satellite Communications System Operations Center

DSMAC - digital scene-matching area correlation

DSN - Defense Switched Network

DSNET - Defense Secure Network

DSP - Defense Support Program

DTED - digital terrain elevation data

DVITS - Digital Video Imagery Transmission System

E

E&E - evasion and escape; procedures to emerge from a hostile area

EAC - 1) echelons above corps; 2) Eastern Area Command

EBC - echelons below corps

EC - European Community

ECCM - electronic counter-countermeasures; that division of electronic warfare involving actions to ensure friendly use of the electromagnetic spectrum despite the enemy's use of electronic warfare

ECM - electronic countermeasures; that division of electronic warfare involving actions to prevent or reduce an enemy's effective use of the electromagnetic spectrum

EFVS - Electronic Fighting Vehicle System

EHF - extremely high frequency

ELANT - East Atlantic Satellite

ELINT - electronics intelligence; information derived from foreign non-communications electromagnetic radiations emanating from other than nuclear detonations or radioactive sources

ELT - English language training

ELV - expendable launch vehicle

EMIS - electromagnetic isotope separation

EMP - electromagnetic pulse; the electromagnetic radiation from a nuclear explosion caused by Compton-recoil electrons and photoelectrons from photons scattered in the materials of the nuclear device or in a surrounding medium

ENWGS - Enhanced Naval Warfare Gaming System

EOB - electronic order of battle

EOD - explosive ordnance disposal; the detection, identification, field evaluation, rendering-safe, recovery and final disposal of unexploded ordnance

EOSAT - Earth Observable Satellite Corp.

EPDS - Electronic Processing and Dissemination System

EPW - enemy prisoner of war

ESM - 1) electronic surveillance methods; 2) electronic warfare support measures

EUCOM - US European Command

EUCOMM-Z - US European Command Communications Zone

EVAC - evacuation hospital

EW - electronic warfare; military action involving the use of electromagnetic energy to determine, exploit, reduce or prevent hostile use of the electromagnetic spectrum through damage, destruction, and disruption while retaining friendly use of the electromagnetic spectrum

F

FA - field artillery

FAC - forward air controller; an officer (aviator/pilot) member of the tactical air control party who, from a forward ground or airborne position, controls aircraft in close air support of ground troops

FAE - fuel air explosive

FAF - French Air Force

FAISS-E - FORSCOM Automated Intelligence Support System - Enhanced [Army]

FAMMO - full ammo [Navy]

FARP - forward arming and refueling point; a temporary facility, organized, equipped, and deployed by an aviation commander, and normally located in the main battle area closer to the area of operation than to the aviation unit's combat service area, to provide fuel and ammunition necessary for use by the aviation maneuver units in combat

FAST - 1) forward area ID and TRAP broadcast; 2) Fleet Antiterrorist Security Team [USMC]

FASTCAL - Field Assistance Support Team for Calibration

FBI - Federal Bureau of Investigation

FCTC - Fleet Combat Training Center [Navy]

FDA - Food and Drug Administration

FDL - Fast Deployment Logistics

FDR/FA - flight data recorder/fault analyzer

FEBA - forward edge of the battle area; the foremost limits of a series of areas in which ground combat units are deployed, excluding the areas where the covering or screening forces are operating, designated to coordinate fire support, and the positioning or maneuver of units

FEWS - Follow-on Early Warning System

FFC-A - Forward Forces Command - 'Ar'ar

FHE - Forward Headquarters Element

FID - Foreign Internal Defense; participation by civilian and military agencies of a government in any action taken by another government to free and protect its society from subversion, lawlessness, and insurgency

FIE - fly-in echelon; Marines, supplies and equipment deployed by strategic airlift during an operation [USMC]

FIST - Fleet imagery support terminal

FLIR - forward-looking infrared

FLOT - forward line of own troops; indicates the most forward positions of friendly forces in any kind of military operation at a specific time

FLTCORGRU - Fleet Coordinating Group

FLTSAT - Fleet Satellite

FLTSATCOM - Fleet Satellite Communications

FMF - Fleet Marine Force

FMO - Frequency Management Office

FMS - Foreign Military Sales; that part of US security assistance authorized by the Foreign Assistance Act of 1961, as amended, and the Arms Export Control Act of 1976, as amended; the recipient reimburses for defense articles and services transferred

FMTV - family of medium tactical vehicles

FOB - forward operating base

FOL - forward operating location

FORSCOM - Forces Command

FROG - free rocket over ground

FSA - fire support area; a maneuver area assigned to fire support ships from which to deliver gunfire support of an amphibious operation

FSCL - Fire support coordination line; a line established by the ground commander to ensure coordination of fire not under his control, but which may affect current tactical operations

FSS - fast sealift ship

FSSG - Force Service Support Group; combat service support element of a Marine Expeditionary Force [USMC]

FTD - Foreign Technology Division [USAF]

FY - fiscal year

G

G-Day - the first day of the ground campaign (in the case of Operation Desert Storm, 24 February 1991)

GA - Tabun, a nerve agent

GB - Sarin, a nerve agent

GC - Geneva Convention Relative to the Protection of Civilian Persons in Time of War

GCC - Gulf Cooperation Council

GCE - ground combat element; ground maneuver element of a Marine Air-Ground Task Force; task organized around an infantry or armor unit with combat, combat support, and combat service support attachments [USMC].

GCI - ground controlled interception; a technique that permits control of friendly aircraft or guided missiles to effect interception

GD - Soman, a nerve agent

GF - a nerve agent

GHQ - General Headquarters

GMF - Ground Mobile Force

GNA - Goldwater-Nichols Department of Defense Reorganization Act of 1986

GPS - Global Positioning System

GPW - Geneva Convention Relative to the Treatment of Prisoners of War

GRCA - ground reference coverage area

GSM - ground station module

GWS - Geneva Convention Relative to the Treatment of Wounded or Sick Prisoners of War

H

H-Hour - the specific time at which an operation or exercise begins or is scheduled to begin; (in the case of Operation Desert Storm, 0300 local time, 17 January 1991); initial time of arrival of first aircraft over target

HARM - high-speed anti-radiation missile

HEMTT - heavy expanded mobility tactical truck

HET - heavy equipment transporter

HF - high frequency

HFDF - high frequency direction finding

HIDACZ - High Density Airspace Control Zone; doctrinal innovation used during Gulf crisis to delineate airspace under the control of I Marine Expeditionary Force; it enabled I MEF to control airspace over and forward of its units in response to the changing tactical situation

HIRSS - Hover Infrared Suppressor Subsystem

HLPS - heavy-lift preposition ship

HMMWV - high-mobility multi-purpose wheeled vehicle

HNS - host nation support; civil and military assistance given in peace and war by a host nation to allied forces on or in transit through the host nation's territory

HQDA - Headquarters, Department of the Army

HSB - high speed boat

HSC - Health Services Command

HSEP - Hospital Surgical Expansion Package [USAF]

HSS - health service support

HU - Hospital Unit; a team split from a Field Hospital

HUD - heads-up display; a display of flight, navigation, attack or other information superimposed on a pilot's forward field of view

HUMINT - human resources intelligence; intelligence derived from human beings as both sources and collectors, where the human being is the primary collection instrument

HVAA - high-value airborne assets

I

I&W - indications and warning; those intelligence activities intended to detect and report time-sensitive intelligence information on foreign developments that could involve a threat to the United States or allied military, political, or economic interests or to US citizens abroad

IADS - Integrated Air Defense System [Iraq]

IAF - Italian Air Force

IATACS - Improved Army Tactical Communications System

IBAHRS - Inflatable Body and Head Restraint System

ICBM - intercontinental ballistic missile; a ballistic missile with a range from about 3,000 to 8,000 nautical miles

ICMMP - Integrated CONUS Medical Mobilization Plan

ICON - imagery communications and operations Node

ICRC - International Committee of the Red Cross/Crescent

IDF - Israel Defense Force

IES - Imagery Exploitation System

IFF - identification, friend or foe; a system using electromagnetic transmissions to which equipment carried by friendly forces automatically responds, for example, by emitting pulses, thereby distinguishing themselves from enemy forces

IGSM - interim ground station module [JSTARS]

IHADSS - Integrated Helmet and Display Sight System [Army]

IIR - 1) imaging infrared; 2) Intelligence Information Report

IIS - Iraqi Intelligence Service

IMA - individual mobilization augmentee; a Reservist not assigned to a troop program unit, but with a specific mobilization mission and assignment, normally at a major headquarters

IMET - international military education and training; formal or informal instruction provided to foreign military students, units, and forces on a non-reimbursable basis by offices or employees of the United States, contract technicians and contractors

IMINT - imagery intelligence; intelligence derived from visual photography, infrared sensors, lasers, electro-optics and radar sensors such as synthetic aperture radar

INMARSAT - International Maritime Satellite

INS - Inertial Navigation System; a self-contained navigation system using inertial detectors, which automatically provides vehicle position, heading and velocity

IO - Indian Ocean satellite

IOC - 1) Intercept Operations Center [Iraq]; 2) initial operational capability; the first capability to use effectively a weapon, item of equipment, or system by a military unit

IPDS - Imagery Processing and Dissemination System

IPSA - Iraqi Pipeline Saudi Arabia

IR - infrared

IRDS - infrared detection set

IRR - Individual Ready Reserve; members of the Ready Reserve not assigned to the Selected Reserve and not on active duty

ISA - Intermediate Supply Activity [USMC]

ISAR - inverse synthetic aperture radar [Navy]

ISE - Intelligence Support Element

ITAC - Intelligence and Threat Analysis Center [Army]

ITALD - improved tactical air-launched decoy

ITF - Intelligence Task Force [DIA]

J

J-1 - director of personnel

J-2 - director of Intelligence

J-3 - director of operations

J-4/7 - director of logistics and security assistance

J-5 - director of plans and policy

J-6 - director of command and control, communications and computer systems

JAAT - Joint Air Attack Team

JAG - Judge Advocate General

JAIC - Joint Air Intelligence Center

JBPO - Joint Blood Program Office

JCEOI - joint communications electronics operations instructions

JCS - Joint Chiefs of Staff

JCSE - Joint Communications Support Element

JFACC - Joint Force Air Component Commander; assigned by joint force commander; duties normally include planning, coordination, allocation and tasking based on the joint force commander's apportionment decision; recommends apportionment of air sorties to various missions or geographic areas

JFC - Joint Forces Command

JFC-E - Joint Forces Command-East

JFC-N - Joint Forces Command-North

JFLC - Joint Forces Land Component

JFLCC - Joint Forces Land Component Commander

JIC - Joint Intelligence Center

JIF - Joint Interrogation Facility

JILE - Joint Intelligence Liaison Element; provided by the Central Intelligence Agency to support a unified command or joint task force

JIPC - Joint Imagery Production Complex

JITC - Joint Interoperability Test Center

JMRO - Joint Medical Regulating Office

JOC - Joint Operations Center; a jointly manned facility of a joint force commander's headquarters established for planning, monitoring, and guiding execution of the commander's decisions

JOPES - Joint Operation Planning and Execution System

JOTS - Joint Operational Tactical System [Navy]

JPO - Joint Petroleum Office

JPTS - jet petroleum, thermally stable

JRC - Joint Reconnaissance Center

JRCC - Joint Rescue Coordination Center; an installation staffed by supervisory personnel from all participating services, with facilities to direct and coordinate all available search and rescue facilities within a specified area

JROC - Joint Requirements Oversight Council

JRTC - Joint Readiness Training Center

JS - Joint Staff

JSCAT - Joint Staff Crisis Action Team

JSCC - Joint Services Coordination Committee

JSCP - Joint Strategic Capabilities Plan

JSOTF - Joint Special Operations Task Force

JSPS - Joint Strategic Planning System

JSTARS - Joint Surveillance Target Attack Radar System

JTC3A - Joint Tactical Command, Control and Communications Agency

JTF - Joint Task Force; a force composed of assigned or attached elements of the Army, Navy, Marine Corps, and the Air Force, or two or more services, which is constituted and so designated by the Secretary of Defense or by the commander of a unified command, a specified command, or an existing joint task force

JTFME - Joint Task Force Middle East

JTIDS - Joint Tactical Information Distribution System

K

KAF - Kuwaiti Air Force

kill box - geographic area designated for air strikes

KKMC - King Khalid Military City

KTF - Kuwait Civil Affairs Task Force

KTO - Kuwait Theater of Operations

L

LABCOM - Laboratory Command [Army]

LAI - light armored infantry; a mechanized infantry unit mounted in light armored vehicles with the mission of reconnaissance, screening, and conducting raids [USMC]

LAMPS - Light Airborne Multipurpose System [Navy]

LAN - local area network

landing force - a task organization of troop units, aviation and ground, assigned to an amphibious assault; highest troop echelon in the amphibious operation

LANTCOM - Atlantic Command

LANTIRN - low-altitude navigation and targeting infrared for night

LAR - logistics assistance representative

LAV - light armored vehicle ; eight-wheeled lightly armored family of vehicles used by Marine Light Armored Infantry battalions.[USMC]

LCAC - landing craft, air cushion; capable of carrying 60 tons from ship to shore at overwater speeds of more than 40 knots and ranges exceeding 50 miles

LCC - Land Component Commander

LCU - landing craft, utility

LEDET - Law Enforcement Detachment [Coast Guard]

LET - light equipment transporter

LGB - laser-guided bomb (see LGW)

LGW - laser guided weapon; a weapon which uses a seeker to detect laser energy reflected from a target and through signal processing guides itself to the point from which the laser energy is being reflected

LHA - amphibious assault ship, general purpose

LHT - line-haul tractor

littoral - the shore area between low and high tides

LNO - liaison officer

LOC - line of communication; land, water or air route which connects an operating military force with a base of operations and along which supplies and military forces move

LOROP - long range oblique photography

LOTS - logistics over the shore; the loading or unloading of ships without the benefit of fixed port facilities, in friendly or non-defended territory and, in time of war, during phases of theater development in which there is no enemy opposition

LPV - laser-protective visor

LRC - Logistics Readiness Center [USAF]

LRI - long-range international

LRU - line-replaceable unit [USAF]

LVS - Logistics Vehicle System; heavy transporter truck system capable of cross country movement [USMC]

M

M-box - maneuver box; subdivision of a kill box [USMC]

MAC - Military Airlift Command

MACCS - Marine Air Command and Control System; tactical air command and control system which gives the tactical air commander with the means to command, control, and coordinate all air operations within an assigned sector and to coordinate air operations with other services; it includes command and control agencies with communications-electronic equipment that incorporates a capability from manual through semiautomatic control. [USMC]

MACG - Marine Air Control Group; command within the Marine Aircraft Wing that contains the units and systems necessary to provide task-organized air command and control detachments to a Marine Air-Ground Task Force [USMC]

MACSAT - multiple access commercial satellite

MAG - Marine Aircraft Group; task organized aviation unit roughly equivalent in size to an Air Force wing. A composite MAG normally is the Aviation Combat Element for a Marine Expeditionary Brigade [USMC]

MAGTF - Marine Air-Ground Task Force; task organization of Marine air, ground, and combat service support forces under a single command and structured to accomplish a specific mission [USMC]

MAP - master attack plan

MARCENT - Marine Forces, Central Command; Marine component command ; it coordinated all administrative, logistical, and interservice issues for Marine forces ashore in Southwest Asia.

MARDIV - Marine Division

MARS - Military Affiliate Radio Station

MASH - Mobile Army Surgical Hospital

MASS - MICAP (mission critical parts) Asset Sourcing System

Maverick - air-to-surface missile with launch and leave capability; stand-off, outside point defense weapon able to strike point targets

MAW - Marine Aircraft Wing

MC - mission capable

MCAGCC - Marine Corps Air-Ground Combat Center, 29 Palms, CA

MCIC - Marine Corps Intelligence Center

MCLB - Marine Corps Logistics Base

MCM - mine countermeasures; all methods for preventing or reducing damage or danger from mines

MCSF - Mobile Cryptologic Support Facility

MCSSD - Mobile Combat Service Support Detachment [USMC]

MEA - munitions effectiveness assessment

MEB - Marine Expeditionary Brigade; Marine Air-Ground Task Force normally built around a command element, a regimental landing team, a composite aircraft group, and a service support group [USMC]

MEDEVAC - medical evacuation

MEDSOM - Medical Supply Optical and Maintenance [Army]

MEF - 1) Middle East Force; 2) Marine Expeditionary Force; Marine Air-Ground Task Force normally consisting of a command element, one or more Marine divisions, one or more aircraft wings, and a force service support group [USMC]

MEL - mobile erector launcher [Iraq]

MEPES - Medical Planning and Execution System

MET - medium equipment transporter

METL - mission-essential task list

METSAT - meterological satellite

METT-T - mission, enemy, terrain, troops and time available

MEU - Marine Expeditionary Unit

MEU (SOC) - Marine Expeditionary Unit (Special Operations Capable); forward deployed amphibious Marine Air-Ground Task Force composed of a command element, a battalion landing team, a composite helicopter/AV-8B squadron, and service support element; capable of limited combat operations, especially rapidly planned amphibious raids and maritime special operations [USMC]

MEWSS - Mobile Electronic Warfare Support System; light armored vehicle specially equipped with electronic warfare equipment used to conduct tactical electronic warfare and signals intelligence operations [USMC]

MEZ - Missile Engagement Zone; in air defense, airspace of defined dimensions within which the responsibility for engagement normally rests with a particular weapon system

MHE - materiel-handling equipment

MI - Military Intelligence; intelligence on any foreign military or military-related situation or activity which is significant to military policy making or the planning and conduct of military operations and activities

MIB - Military Intelligence Board

MICAP - mission critical parts [USAF]

MIF - Maritime Interception Force

MILSATCOM - military satellite communications

MIMI - Ministry of Industry and Military Industrialization [Iraq]

MIPE - Mobile Intelligence Processing Element

MIO - Maritime Interception Operations

MITT - mobile integrated tactical terminal

MLRS - Multiple Launch Rocket System

MMS - mast-mounted sight [Army]

MNS - 1) Mine Neutralization System [Navy]; 2) mission need statement

MOC - Mobile Operations Center [USAF]

MOD - Minister (Ministry) of Defense

MODA - Minister (Ministry) of Defense and Aviation [Saudi Arabia]

MOPP - mission-oriented protective posture

MORE-CT - meals, ordered ready-to-eat, contingency test

MP - Military Police

MPA - maritime patrol aircraft

MPES - Medical Planning and Execution System

MPF - Maritime Prepositioning Force; combination of a Maritime Prepositioning Squadron and its associated Marine Expeditionary Brigade [USMC]

MPLH - multipurpose light helicopter

MPM - medical planning module

MPS - Maritime Prepositioning Squadron - squadron of four or five specially configured and loaded Military Sealift Command ships on which are carried the equipment and 30 days of supplies for a Marine Expeditionary Brigade [Navy, USMC]

MRE - meal, ready-to-eat

MRS - Mobility Requirements Study

MRSA - Materiel Readiness Support Agency

MSC - Military Sealift Command

MSE - mobile subscriber equipment

MSI - multi-spectral imagery

MSR - main supply route; the route or routes designated within an area of operations upon which the bulk of traffic flows in support of military operations

MTBF - mean time between failures

MTF - medical treatment facility

MTI - moving-target indicator; a radar presentation which shows only targets in motion

MTMC - Military Traffic Management Command

MTO - mission type order; order issued to a lower unit that includes the accomplishment of the total mission assigned to the higher headquarters, or to a unit to perform a mission without specifying how it is to be accomplished

MTT - Mobile Training Team; one or more US personnel drawn from Service resources and sent on temporary duty to a foreign nation to give instruction

MULE - modular universal laser equipment

MUST - Medical Unit, Self-contained, Transportable

MWR - Morale, Welfare and Recreation

N

NAC - Northern Area Command

NADEP - Naval Aircraft Depot

NAEW - NATO airborne early warning

NAF - Naval Air Facility

NAS - Naval Air Station

NATO - North Atlantic Treaty Organization

NAVCENT - Naval Component, Central Command

NAVEUR - Naval Forces, Europe

NAVOCFORMED - Naval On-call Force, Mediterranean

NAVSPACECOM - Naval Space Command

NAVSPECWARGRU - Navy Special Warfare Group

NBC - Nuclear/biological/chemical

NCA - National Command Authorities; the President and Secretary of Defense or their duly deputized alternates or successors

NCP - Non-US Coalition Partner

NCS - National Communications System

NCTR - Non-cooperative target resolution

NDI - non-developmental item

NDMS - National Disaster Medical System

NEO - Non-combatant evacuation operations

NETT - New Equipment Training Team [USA]

NGFS - Naval gunfire support

NIC - National Intelligence Council

NITF - national imagery transmission format

NLSF - Navy Logistics Support Force

NMIC - National Military Intelligence Center [DIA]

NMIST - National Military Intelligence Support Team [DIA]

NOAA - National Oceanographic and Atmospheric Administration

NOIC - Naval Operational Intelligence Center

NORAD - North American Aerospace Defense Command

NPIC - National Photographic Interpretation Center

NPWIC - National Prisoner of War Information Center

NRT - near-real time; delay caused by automated processing and display between the occurrence of an event and reception of the data at some other locations

NSA - National Security Agency

NSC - National Security Council

NSOC - 1) National Signals Intelligence Operations Center [NSA]; 2) Navy Satellite Operations Center

NSW - Naval Special Warfare

NSWC - Navy Surface Warfare Center

NSWTG - Naval Special Warfare Task Group

NSWTG-CENT - Naval Special Warfare Task Group, Central Command

NTC - National Training Center, Fort Irwin, CA

NTIC - Navy Tactical Intelligence Center

NTPF - Near-term Prepositioning Force

NTPS - Near-term Prepositioned Ships

NTU - new threat upgrade [Navy]

NVG - night-vision goggles

O

O&M - operations and maintenance

OASD, SO/LIC - Office of the Assistant Secretary of Defense for Special Operations and Low Intensity Conflict

OCA - offensive counterair; actions to destroy, disrupt or limit enemy air power as close to its source as possible

OCAC - Operations, Control and Analysis Center

OFP - Operational Flight Program

OICC - Operational Intelligence Crisis Center [DIA]

OIP - Optical Improvement Program

OMB - Office of Management and Budget

OPCOM - operational command; authority granted to a commander to assign missions or tasks to subordinate commander, to deploy units, reassign forces and to

retain or delegate operational and/or tactical control as deemed necessary; does not necessarily include administration or logistics [NATO]

OPCON - operational control; authority delegated to a commander to direct forces assigned so the commander can accomplish specific missions or tasks, usually limited by function, time or location; to deploy units concerned, and to retain or assign tactical control of those units; does not necessarily include administration or logistics

OPLAN - Operation Plan; a plan for a single or series of connected operations to be carried out simultaneously or in succession

OPORD - Operation Order; a directive, usually formal, issued by a commander to subordinate commanders to effect the coordinated execution of an operation

OPSEC - operations security; the process of denying adversaries information about friendly capabilities and intentions by identifying, controlling and protecting indicators associated with military operations

OPTEMPO - operating tempo; the pace of operations, such as the number of sorties flown, miles steamed, etc., in a given period

OP3 - Overt Peacetime Psychological Operations Program

OR - operational readiness

OSD - Office of the Secretary of Defense

OTH - over the horizon

OUTS - Operational Unit Transportable System

Over-the-horizon assault - amphibious assault conducted from ships located beyond visual and coastal surveillance radar ranges of shore defenders, normally 30 to 60 miles [USMC]

P

PACOM - Pacific Command

PASSEX - passing exercises

PBW - Bombardment Wing (Provisional)

PC-LITE - processor, laptop-imagery transmission equipment

PD - Probability of detection; the probability that the search object will be detected under given conditions if it is in the area searched

PGM - Precision-guided munition

PLGR - precise lightweight Global Positioning System receiver

PLO - Palestine Liberation Organization

PLRS - Position Location Reporting System

PLS - Palletized Load System

PNVS - Pilot Night-vision System

POG - Psychological Operations Group

POL - petroleum, oil and lubricants; a broad term which includes all petroleum and associated products used by the armed forces

POMCUS - prepositioned overseas materiel configured to unit sets

PORTS - Portable Remote Telecommunications System

POW - prisoner of war; a detained person as defined in Articles 4 and 5 of the Geneva Convention Relative to the Treatment of Prisoners of War of August 12, 1949; in particular, one who, while engaged in combat under orders of his government, is captured by the armed forces of the enemy

PREPO - Prepositioned force, equipment, or supplies

PRM - Presidential Review Memorandum

PSHD - Port Security Harbor Defense

PSV - pseudo-synthetic video

PSYOP - psychological operations; planned operations to convey selected information and indicators to foreign audiences to influence their emotions motives, objective reasoning, and ultimately, the behavior of foreign governments organizations, groups and individuals

PWIC - Prisoner of War Information Center

PWIS2 - Prisoner of War Information System

Q

QEAF - Qatari Emiri Air Force

R

R&D - research and development

R&M - reliability and maintainability [USAF]

R&R - rest and recuperation; withdrawal of individuals from combat or duty in a combat area for short periods

RAF - Royal Air Force [UK]

RC - Reserve Component

RCCM - regional contingency construction management

RCHB - Reserve Cargo-handling Battalion [Navy]

RDF - Rapid Deployment Force

RDF - radio direction finding; radio locations in which only the direction of a station is determined by means of its emissions

RDJTF - Rapid Deployment Joint Task Force

RECCE - reconnaissance; action undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or potential enemy; or to secure data concerning the meteorological, hydrographic or geographic characteristics of a particular area

RED HORSE - Rapid Engineer Deployable, Heavy Operational Repair Squadron, Engineer [USAF]

REDCOM - Readiness Command (1971)

REFORGER - Return of Forces to Germany

Regiment - Marine infantry unit equivalent in size to an Army brigade. A regiment fights as a task-organized force with other combat arms units attached; reinforced regiment normally numbers more than 4,000 Marines [USMC]

RFI - request for information

RGFC - Republican Guard Forces Command [Iraq]

RHIB - rigid-hull inflatable boat

RIB - rubberized inflatable boat

RIBS - Readiness in Base Services [USAF]

RIT - remote imagery transceiver

R/L - receive location

RLG - ring laser gyro

RLT - Regimental Landing Team; task organization for landing, composed of an infantry regiment reinforced by those elements required for beginning its combat mission ashore [USMC]

ROE - rules of engagement; directives issued by competent military authority which delineate the circumstances and limitations under which US forces will initiate and/or continue combat engagement with other forces encountered

ROEX - rules of engagement exercise

RO/RO - roll-on/roll-off ship ; a Military Sealift Command ship built so vehicles and equipment can be loaded by driving them up stern or bow ramps into the holds; a RO/RO greatly simplifies rapid deployment of ground forces and enables ships to be unloaded without extensive port facilities [Navy].

ROWPU - reverse osmosis water purification unit

RPV - remotely piloted vehicle; an unmanned vehicle able to be controlled from a distant location through a communications link; normally designed to be recoverable

RRF - Ready Reserve Fleet

RRFWG - Ready Reserve Force Working Group

RSADF - Royal Saudi Air Defense Force

RSAF - Royal Saudi Air Force

RSCG - Royal Saudi Coast Guard

RSLF - Royal Saudi Land Force

RSNF - Royal Saudi Naval Force

RSSC - Regional Signals Intelligence Support Center [NSA]

RSTA - reconnaissance, surveillance and target acquisition

RTSV - real-time synthetic video

RWR - radar warning receiver

S

SA - selective availability [GPS]

SAAF - Saudi Arabian Armed Forces

SAAM - special assignment airlift mission

sabkas - marshy salt flats, fed by underground water table

SAC - Strategic Air Command

SAFE - safe areas for evasion

SAM - surface-to-air missile; a surface-launched missile designed to operate against a target above the surface

SAMS - School of Advanced Military Studies [Army]

SANG - Saudi Arabian National Guard

SAS - Special Air Service [UK]

SATCOM - satellite communications

SBU - Small Boat Unit

SBSS - Standard Base Supply System

SCDL - surveillance control data link

SCI - sensitive compartmented information; all information and materials bearing special community controls indicating restricted handling within present and future community intelligence collection programs and their end products for which community systems of compartmentation have been or will be formally established

SDC - shaft-driven compressor

SDV - swimmer delivery vehicle [Navy]

SEA - sea echelon area [Navy]

Seabee - construction engineer [Navy]

SEAD - supression of enemy air defenses; activity which neutralizes, destroys or temporarily degrades enemy air defenses in a specific area by physical attack and/or electronic warfare

SEAL - sea, air and land; Navy officers and enlisted members specially trained and equipped for unconventional and paramilitary operations including surveillance and reconnaissance in and from restricted waters, rivers and coastal areas. Seals also are able to train allies in special operations [Navy]

SEP - spherical error probable

SERE - survival, evasion, resistance and escape

SEVENTHFLT - 7th Fleet, the Navy command whose area of operations includes the Western Pacific and Indian Oceans

SF - Special Forces

SFG - Special Forces Group

SFOD - Special Forces Operational Detachment

SH - Station Hospital

shamal - sand/wind storm; literally means "north"

SHAPE - Supreme Headquarters, Allied Powers, Europe

SHF - super-high frequency

short ton - 2,000 pounds or 0.907 metric tons

SI - special intelligence

SIA - station of initial assignment [USMC]

SIDS - Secondary Imagery Dissemination System

SIGINT - signals intelligence; a category of intelligence including all communications intelligence, electronic intelligence and telemetry intelligence

SINCGARS - Single-channel Ground and Airborne Radio System

SITREP - situation report; a report giving the situation in the area of a reporting unit or formation

SLAM - standoff land-attack missile

SLAR - side-looking airborne radar; an airborne radar, viewing at right angles to the axis of the vehicle, which produces a presentation of terrain or moving targets

SLAT - strike leader attack training [Navy]

SLEP - Service Life Extension Program

SLGR - small, lightweight ground receiver [GPS]

SMCM - surface mine countermeasures [Navy]

SME - Squadron Medical Element [USAF]

SMESA - Special Middle East Sealift Arrangement [MSC]

SNEP - Saudi Naval Expansion Program

SOAF - Sultanate of Oman Air Force

SOAR - Special Operations Aviation Regiment

SOC - Sector Operations Center [Iraq]

SOCCENT - Special Operations Command, CENTCOM

SOCCT - Special Operations Combat Control Team

SOCEUR - Special Operations Command, Europe

SOCOM - Special Operations Command

SOCRATES - Special Operations Command Research Analysis and Threat Evaluation System; a program for assessing the level of foreign technology

SOF - Special Operations Forces

SOFA - Status of Forces Agreement

SOG - Special Operations Group [USAF]

SOP - Standard (Standing) Operating Procedure; set of instructions covering those features of operations which lend themselves to a definite or standardized procedure without loss of effectiveness; applicable unless ordered otherwise

SOS - Special Operations Squadron [USAF]

SOSB - 1) Special Operations Signal Battalion; 2) Special Operations Support Battalion

SOTA - Signals intelligence operational tasking authority

SOW - Special Operations Wing [USAF]

SPACC - Space Control Center

SPACECOM - Space Command

SPEAR - Special Project Evaluation and Antiwarfare Research [Navy]

SPG - Special Planning Group [SOF]

SPINS - special instructions

SPOD - sea port of debarkation

SPOE - sea port of embarkation

SR - special reconnaissance [SOF]

SRA - Specialized Repair Activity

SRAM - short-range air-to-surface attack missile

SRBM - short-range ballistic missile; ballistic missile with a range of about 600 nautical miles

SRIG - Surveillance, Reconnaissance and Intelligence Group; intelligence command of roughly regimental size that contains reconnaissance, interrogator, counterintelligence, unmanned aerial vehicles, intelligence analysis, signals intelligence, and special communications units.; detachments task organized for assignment to Marine Air-Ground Task Force command elements [USMC]

SRP - Sealift Readiness Program

SSA - Special Support Activity [NSA]

SSCRA - Soldiers and Sailors Civil Relief Act

SSM - surface-to-surface missile; a surface-launched missile designed to operate against a target on the surface

SSN - nuclear-powered attack submarine

SSO - Special Security Office

STANAVFORCHAN - Standing Naval Force, Channel

STAR - scheduled theater airlift route

Stop loss - program designed to retain on active duty service members with skills crucial to an operation

STOVL - short takeoff and vertical landing

STRICOM - Strike Command (1960s)

STU - secure telephone unit

SUCAP - surface combat air patrol

SUPCOM - Support Command

SWA - Southwest Asia

SWAPDOP - Southwest Asia Petroleum Distribution Operational Project

SWIP - Systems Weapon Improvement Program

SYERS - Senior Year Electro-optical Reconnaissance System [USAF]

T

T&E - Test and evaluation

TAA - tactical assembly area

TAC - Tactical Air Command; Air Force organization designed to conduct offensive and defensive air operations in conjunction with land or sea forces

TACAIR - tactical air

TACC - Tactical Air Command Center; principal Marine Corps air operation installation from which aircraft and air warning functions of tactical air operations are directed; it is the senior agency of the Marine Corps Air Command and Control System [USMC]

TACINTEL - tactical intelligence; intelligence required for planning and conduct of tactical operations

TACON - tactical control; detailed and usually local direction and control of movements or maneuvers needed to accomplish missions or tasks assigned

TACP - tactical air control party; subordinate operational component of a tactical air control system designed to provide air liaison to land forces and for the control of aircraft operating in close proximity to ground forces

TACSAT - tactical satellite

TACTRAGRU - Tactical Training Group [Navy]

TADMs - TR-1 ASARS Data Manipulation System [UK]

TADS - target acquisition and designation Sight [Army]

TADSIXS-B - Tactical Data Information Exchange System-B

TAF - Tactical Air Force

TAH - hospital ship

TAI - target of interest

takedown - forcible boarding of a ship by helicopter-borne forces, to compel the ship to stop and comply with maritime interception operations

TALD - tactical air-launched decoy

TAMMIS - Theater Army Medical Management and Information System

TAMP - Theater Aviation Maintenance Program

TAOC - Tactical Air Operations Center; subordinate operational component of the Marine Air Command and Control System designed for direction and control of all en route air traffic and air defense operations, to include manned interceptors and surface-to-air weapons, in an assigned sector; under the operational control of the Tactical Air Command Center [USMC]

TAR - training and administration into the Reserve [Navy]

TARPS - Tactical Aerial Reconnaissance Pod System [Navy]

TAACOM - Theater Area Army Command

TASM - Tomahawk antiship missile

TASOSC - Theater Army Special Operations Support Command

TAVB - aviation logistics ship; a Military Sealift Command ship, normally roll-on/roll-off, on which aviation intermediate maintenance facilities and supplies are embarked during Marine amphibious or Maritime Prepositioning Force operations. [Navy, USMC]

TAW - Tactical Airlift Wing [Air Force]

TBM - tactical ballistic missile

TBTC - Transportable Blood Transshipment Center

TCAE - Technical Control and Analysis Element

TDF - tactical digital facsimile

TDRSS - Tracking and Data Relay Satellite System

TDY - temporary duty

TEAM - Tactical EA-6B Mission Support Element

TEL - transporter erector launcher

TENCAP - tactical exploitation of national capabilities

TERCOM - terrain contour matching

TERPES - Tactical Electronic Reconnaissance Processing and Evaluation System

TERS - Tactical Event Reporting System

TF - Task Force; a temporary grouping of units, under one commander, formed to carry out a specific mission or operation

TFS - Tactical Fighter Squadron [USAF]

TFU - Tactical Forecast Unit [USAF]

TFW - Tactical Fighter Wing [USAF]

throughput capacity - rate at which personnel and equipment are received and processed

THMT - tactical high-mobility terminal

TI - total inventory

TIBS - Tactical Information Broadcast System [USAF]

TIS - Thermal Imaging System

TLAM - Tomahawk land-attack missile

TMIS - Theater Medical Information System

TNMCS - total not-mission capable, supply [USAF]

TO&E - Table of Organization and Equipment

TOSS - Tactical Operations Support System

TOT - time on target; time at which aircraft are scheduled to attack/photograph the target

TPFDD - time-phased force and deployment data

TPFDL - time-phased force and deployment list

TPU - Troop Program Unit

TPW - target planning worksheet

TRAC - tactical radar correlator [Army]

TRADOC - Training and Doctrine Command [Army]

TRAM - tractor, rubber-tired, articulated, multipurpose

TRANSCOM - Transportation Command

TRAP - tactical receive equipment and related applications

TRI-TAC - Joint Tactical Communications Program

TSS - Tactical Shelter System

TTAD - temporary tour of active duty

TTU - Transportation Terminal Unit; designed to conduct port operations [Army]

TWV - tactical wheeled vehicle

U

UAE - United Arab Emirates

UAEAF - United Arab Emirates Air Force

UAV - unmanned aerial vehicle

UHF - ultra-high frequency

UIC - unit indentification code; a six-character, alphanumeric code that uniquely identifies each Active, Reserve and National Guard unit of the Armed Forces

UK - United Kingdom

ULCS - unit-level circuit switch

UMMIPS - Uniform Material Movement and Issue Priority System

UN - United Nations

UNAAF - Unified Action Armed Forces; publication setting forth the principle, doctrines, and functions governing the activities and performance of the Armed Forces of the United States when two or more Services or elements thereof are acting together

UNSC - United Nations Security Council

USAF - United States Air Force

USAFE - US Air Forces, Europe

USAMMCE - US Army Medical Materiel Center - Europe

USAMMCSA - US Army Medical Materiel Center - Saudi Arabia

USAR - US Army Reserve

USAREUR - US Army, Europe

USASG - US Army Support Group

USCG -United States Coast Guard

USDAO - US Defense Attache Office

USIA - US Information Agency

USMC - United States Marine Corps

USMCMG - US Mine Counter Measures Group

USMCR - United States Marine Corps Reserve

USMTM - United States Military Training Mission

USNR - United States Naval Reserve

USO - United Service Organizations

USSR - Union of Soviet Socialist Republics

UW - unconventional warfare; broad spectrum of military and paramilitary operations conducted in enemy-held, enemy-controlled or politically sensitive territory

V

VA - Department of Veterans Affairs

VCJCS - Vice Chairman, Joint Chiefs of Staff

VHF - very-high frequency

VLS - Vertical Launch System

VS-17 - fluorescent orange panel

W

WATCHCON - watch condition

WEU - West European Union

WMP - War and Mobilization Plan [USAF]

WRM - war reserve materiel

WRSK - War Readiness Spares Kit [USAF]

WSEP - Weapons System Evaluation Program

WSIP II - Weapons System Improvement Program

WWIMS - Worldwide Indicators and Monitoring System

WWMCCS - Worldwide Military Command and Control System

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