REPORT OF THE DEFENSE SCIENCE BOARD
TASK FORCE
ON
IMPROVED APPLICATION OF INTELLIGENCE TO THE BATTLEFIELD
May - July 1996

OFFICE OF THE UNDER SECRETARY OF DEFENSE
FOR
ACQUISITION AND TECHNOLOGY

WASHINGTON, D.C. 20301-3140

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**DEFENSE SCIENCE
BOARD**

3 Mar 97

MEMORANDUM FOR THE UNDER SECRETARY OF DEFENSE(ACQUISITION AND
TECHNOLOGY)

SUBJECT: Report of the 1996 Defense Science Board (DSB) Task Force on Improve
Application of Intelligence to the Battlefield

I am pleased to forward the final report of the DSB Task Force on Applications of
Intelligence to the Battlefield. You asked the Task Force chaired by Mr. Charles Gandy
to review and evaluate the progress made in implementing the recommendations from
last year, to identify further actions that could be quickly implemented to improve the
safety and effectiveness of the coalition forces in Bosnia prior to and during their
redeployment, and to recommend longer term actions to prepare for future
contingencies.

The Task Force recommends renewed attention to implement seven specific
recommendations approved in 1995. The Task Force recommends a special sense of
urgency for new specific activities in three broad areas: (1) continuing the process of
getting information and tools down to the battalion level, (2) executing a paradigm shift
where the higher level Intelligence Centers become more proactive and push tailored
products to lower level users, where users develop improved techniques for smart pull,
and (3) organizing collection management teams that can integrate National, Theater,
and Organic assets to provide the warfighter with needed information. In addition,
specific activities only feasible prior to redeployment of our forces should be planned
and completed now. In the longer term, the Task Force recommends continued
development and realistic evaluation of information management tools and techniques
to exploit the high bandwidth communications channels. To spread the benefits of the
BC2A program and to continue the experimentation, the Task Force also recommends
activities for a developmental system for another theater of operations.

The Task Force finds that implementation of these recommendations will require
changes in organization and doctrine as well as additional equipment and urges that
additional realistic experimentation occur so that the benefits of the recommendations
can be carefully evaluated.

Craig I. Fields
Chairman

24 Feb 97

Dr. Craig Fields
Chairman
Defense Science Board
3140 Defense Pentagon
Washington, DC 20301-3140

Dear Dr. Fields,

Attached is the report of the DSB 1996 Task Force on "Improved Application of Intelligence to the Battlefield". This report extends and refines the prior year's study on the same subject and a copy of that study is included as an attachment to this year's report.

The 1996 Task Force was asked (1) to review and evaluate the progress made in implementing the recommendations made last year, (2) to identify further actions that could be quickly implemented to improve the safety and effectiveness of the coalition forces in Bosnia prior to and during their redeployment, and (3) to recommend longer term actions to prepare for future contingencies.

The Task Force conducted extensive meetings and field inspections giving particular attention to the needs of warfighters in lower level echelons. Information dominance remains a desirable and feasible goal. The Task Force found that the Bosnia Command and Control Augmentation Initiative already has made a real contribution to improving the safety and effectiveness of the warfighter, but more remains to be done to spread high bandwidth connectivity to additional sites. A good beginning has been made in forming and fielding systems that can support missions performed by alliances and coalitions. We can be proud of the remarkable and timely acquisition and deployment of the recommended systems, and the skill that has been developed in using them. It demonstrates the remarkable capability of our people. As the communications infrastructure improves, the need increases for improved information management tools and techniques. Experimentation under the realistic conditions of the Bosnian operations is providing a most valuable evaluation of concepts and approaches.

The Task Force report documents detailed recommendations for each one of the three parts of the assignment. Renewed attention is needed to implement seven specific recommendations approved in 1995. The 1996 Task Force now recommends a special sense of urgency for specific activities in three broad areas: (1) continuing the process of getting information and tools down to the battalion level, (2) executing a

paradigm shift where the higher level Intelligence Centers become more proactive and push tailored products to lower level users, where users develop improved techniques for smart pull, and (3) organizing collection management teams that can integrate National, Theater, and Organic assets to provide the warfighter with needed information. In addition, specific activities only feasible prior to redeployment of our forces should be planned and completed now. In the longer term, the Task Force recommends continued development and realistic evaluation of information management tools and techniques to exploit the high bandwidth communications channels. To spread the benefits of the BC2A program and to continue the experimentation, the Task Force also recommends activities for a developmental system for another theater of operations.

Last year's findings and recommendations gave particular attention to contributions that technology and equipment could make to increasing the safety and effectiveness of the warfighter. As Chairman of the Task Force last year, I was gratified by the acceptance of our recommendations and by the aggressive implementation given to many of them - implementation that already is giving significant benefits.

This year's report gives particular attention to the contribution that recommended changes in operations and doctrine will make to leverage the technology and equipment infrastructure. As Chairman of the Task Force this year, I am troubled by preliminary indications of an apparent reluctance of our military to engage the spirit of our recommendations. I remain convinced that changes in operations and doctrine are needed to exploit the capabilities of the information revolution and I urge the military to conduct additional experimentation so they might more realistically evaluate the worth of our recommendations.

The Task Force, of course, stands ready to provide any further assistance you may desire.

Sincerely,

Charles L. Gandy
Chairman, Improved Application of Intelligence to the Battlefield Task Force

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Improved Application of Intelligence to the Battlefield
A Defense Science Board Study
May - July 1996

1.0 Executive Summary

The 1996 Defense Science Board (DSB) Task Force on "Improved Application of Intelligence to the Battlefield" submits this report to document its work, findings and recommendations, which extends and refines the prior year's study on the same subject. The Task Force was asked to: (1) review and evaluate the progress made in implementing the recommendations made last year; (2) identify further actions that could be quickly implemented to improve the safety and effectiveness of the coalition forces in Bosnia prior to and during their redeployment; and (3) recommend longer term actions to prepare for future contingencies. This report documents detailed recommendations for each one of the three parts of the assignment.

While the 1995 study focused on contributions that the recommended technology and equipment additions would have on operations in Bosnia Herzegovina and other Theater sites, this year's report highlights the need for changes in operations as well as joint, Service and coalition doctrine to leverage the deployed technology and equipment infrastructure. However, the 'non-technological' changes are at least as important to make as the 'technological' changes and will require strong commitment and leadership at all levels for effective implementation.

The Task Force found numerous systemic barriers to achieving information dominance. With the potential for deployment of ground forces and the resulting increased operational stress, the shortcomings and unnecessary risks would be expected to increase unless significant changes were made.

The 1995 recommendations addressed policy, organizational, equipment, and technological changes to make a dramatic improvement in force effectiveness and protection. Many of those recommendations were approved for implementation as part of an expedited Bosnia Command and Control Augmentation (BC2A) Initiative. Less than a year later, the Task Force finds impressive achievements in the field and the capabilities for dramatically improved force effectiveness and increased protection. The Task Force recommends building on the accomplishments by continuing the BC2A program and increasing the development focus on emerging information management challenges. The Task Force continues to believe its recommendations are compatible with exploring the approaches and reconfigurations necessary to achieve a longer term architecture of interoperable and integrated information systems designed for the post Cold War era.

The Task Force conducted extensive meetings, in the continental United States (CONUS) and in the field, paying particular attention to the needs of warfighters in lower level echelons. Information dominance remains a desirable and feasible goal. The Task Force found that the BC2A Initiative already has made a real contribution to improving the flow of information and

subsequent effectiveness of the warfighter, but more remains to be done to field high bandwidth connectivity to additional sites. As the communications infrastructure improves, the need increases for improved information management tools and techniques. Experimentation under the realistic conditions of the Bosnian operations is a valuable proving ground for evaluating new warfighting concepts and approaches.

Not all recommendations approved in 1995 have been implemented, but are still valid. The new recommendations address specific needs of ground forces, not addressed in 1995. Some recommendations can and should be implemented quickly to assist our forces during the September, 1996 elections in Bosnia-Herzegovina and during the anticipated redeployment of our forces. Three broad areas require a special sense of urgency: (1) continuing the process of getting information and tools down to the battalion level; (2) executing a paradigm shift where higher level Intelligence Centers become more proactive and push tailored products to lower level users via improved techniques for smart pull; and (3) organizing collection management teams to integrate information from National, Theater, and Organic intelligence, surveillance and reconnaissance assets and provide the warfighter with needed information. Specific activities deemed necessary by the Task Force prior to redeployment of the forces should be planned and completed now.

In the longer term, the Task Force believes that information management deserves greater attention and recommends continuing the development process, using the information system deployed in Bosnia as the point of departure, to exploit the high bandwidth communications channels. Realistic evaluation of information management tools and techniques relative to warfighter needs will help to create the paradigm shift required to achieve information dominance.

There are common themes in both reports: gain information dominance for the warfighter by removing the barriers to communications content, bandwidth, and connectivity; by coordinating and targeting collection, production and dissemination activities directly at the mission requirements of the warfighter; by addressing and funding the O&M and equipment requirements down to the lowest echelon; by integrating systems and fusing data; by developing and applying information management tools and techniques; and by being a good partner in joint and coalition operations.

As before, the Task Force recommends and is prepared to support an inter-organizational working group led by operations personnel to develop an integrated implementation plan, which addresses the recommendations, and begins its execution.

We have made good progress thus far in implementing the 1995 recommendations. We can be proud of the remarkable, timely acquisition and deployment of the recommended systems and the skill that has been developed in using them to date -- it reflects upon the extraordinary capability of our people. As we continue to implement the new recommendations, we can look forward to even more effectiveness and use of information towards achieving the goal of information dominance.

Report of the Defense Science Board Task Force on Improved Application of Intelligence to the Battlefield

Chart 1. Briefing Package Front Cover

Defense Science Board Task Force
on
Improved Application of Intelligence to the
Battlefield
(May - July 1996)

Charles L. Gandy, Chairman
Gen. James P. McCarthy USAF (ret),
Vice Chairman

July 18, 1996
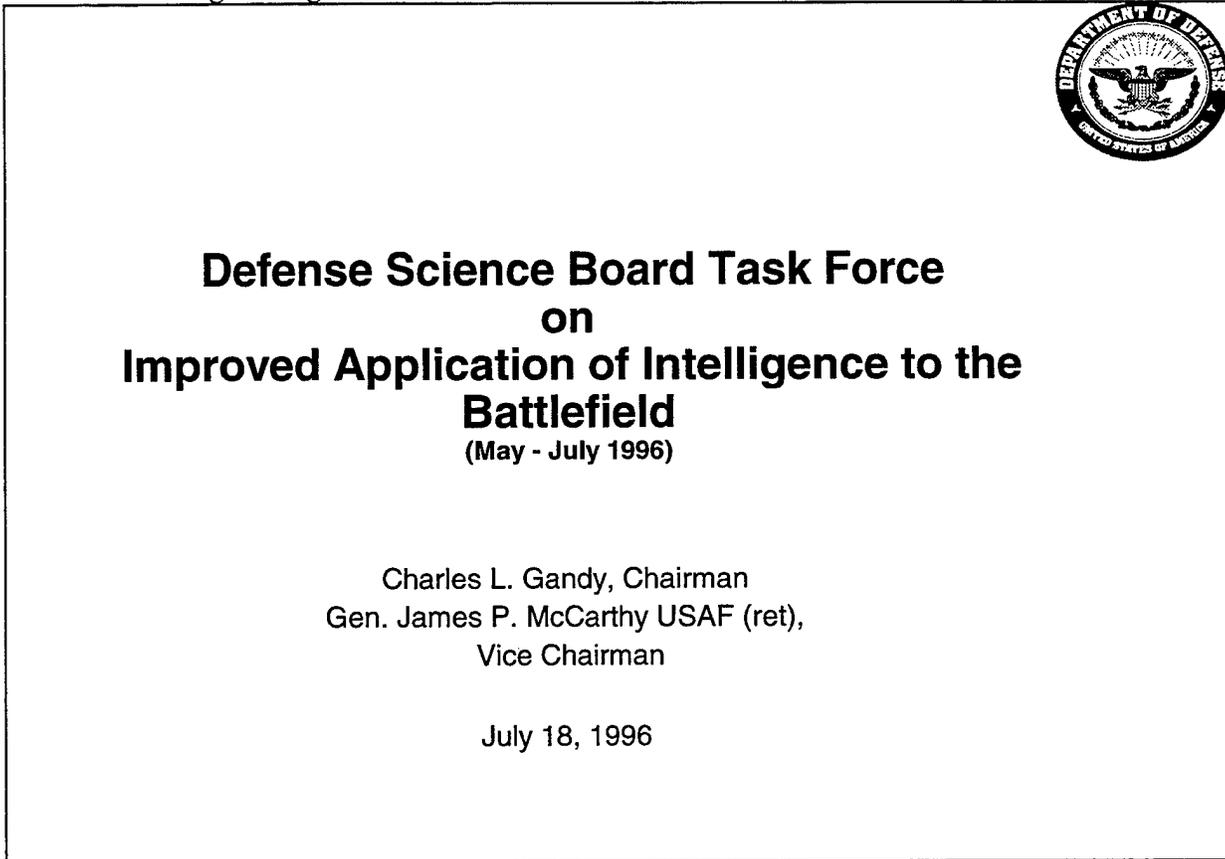
2.0 INTRODUCTION

At the request of the Under Secretary of Defense for Acquisition and Technology, a Defense Science Board (DSB) Task Force was convened to continue a study known as the "Improved Application of Intelligence to the Battlefield". The Task Force met from May through July, 1996. The study was led by Mr. Charles Gandy, Chairman, and Gen. James McCarthy, USAF (ret), Vice Chairman, and extends the work of the 1995 DSB Task Force on the same topic. (The report, **Defense Science Board Task Force on Improved Application of Intelligence to the Battlefield** dated September 1995, is classified and available under separate cover). This is the unclassified version of this report, the classified version is under separate cover.

At the time of this report being drafted, the elections in Bosnia were fast approaching. The Task Force believed that some of its recommendations made as a result of the study would need to be implemented by mid-August if they were to be effective in supporting the election process. It appeared that the immediate goal of our forces, outside of force protection, was to support a peaceful election process in the region which was, hopefully, preceded by peaceful election campaigns and, subsequently, followed by the peaceful formation of a new government within the Bosnian region. At the same time, the United States (US) would continue to protect our forces, those of our coalition partners, and any observers or others in the area. Force protection may become even more critical when the final decision is made to redeploy forces.

The Task Force recommends a special sense of urgency for implementation of recommendations in three broad areas: (1) continuing the process of getting information and tools down to the battalion level (and its equivalent for the other Services); (2) executing a paradigm shift where the higher level Intelligence Centers become more proactive and push tailored products to lower level users; and (3) organizing collection management teams that can integrate the use of National, Theater, and Organic assets to provide the warfighter with needed information in a timely fashion.

The Bosnia Command and Control Augmentation Initiative (BC2A) that resulted from the 1995 Task Force recommendations already has made a real operational difference to the warfighter and deserves continued support. The 1996 Task Force recommends continuing BC2A and its related Joint Broadcast System (JBS) by deploying additional systems; assuring sustained funding from DISA for operational systems; expanding the effort on critical information management capabilities; and retaining the successful BC2A program team. A continued program would provide greater information support to warfighters, particularly those in lower level land, sea, and air units.

In addition, the Task Force recommends creating a focused team to coordinate, integrate, and fuse all intelligence, surveillance and reconnaissance (ISR) capabilities, including national, theater, organic, and commercial elements to improve intelligence support during the Bosnian elections and prepare for the redeployment of forces. The team, organized and functioning in the model of a Bosnian C4 (Command, Control, Communications and Computers) ISR "anchor desk," must virtually integrate the resources of all our supporting units and agencies and focus them on serving the needs of lower-level deployed units. The Task Force recommends taking steps prior to redeployment that would maximize our C4ISR capabilities. This might include deploying additional aircraft and/or systems, especially those providing real-time video as well as additional surveillance capabilities.

Chart 2. DSB Task Force Members and Supporting Personnel

Task Force Members

Members:
Charles L. Gandy, Chairman
Gen James P. McCarthy, USAF (ret), Vice Chairman
Lewis R. Franklin
Maj Gen Robert A. Rosenberg, USAF (ret)
John P. Stenbit

Executive Secretary:
Col Edward C. Mahen, USAF

Government Advisors:
Hon Arthur L. Money
Lt Gen (S) John Gordon

DSB Secretariat Representative :
Maj Wynne Waldron, USAF*

Reviewers:
Dr. Robert J. Hermann*
Gen Larry D. Welch, USAF (ret)*

Executive Staff:
Carol A. Haave

*Did not travel to theater

- **Task Force Members**

Chart 2 presents the Task Force membership and supporting personnel. Mr. Charles L. Gandy, Chairman, and Gen. James P. McCarthy, USAF (ret), Vice Chairman, led the 1996 Task Force, as well as the previous one in 1995. The 1996 Task Force also includes Maj. Gen. Robert A. Rosenberg, USAF (ret) and Mr. Lewis R. Franklin, both members of the 1995 group, as well as Mr. John P. Stenbit, a new Task Force member. The team was ably assisted by an Executive Secretary, a DSB Secretariat representative, government advisors, executive staff, and DSB reviewers. The 1996 Task Force is especially pleased to recognize the assistance provided by the Hon. Arthur L. Money, currently the Assistant Secretary of the Air Force for Acquisition, and Lt. Gen. (S) John Gordon, nominated to become Associate Director of Central Intelligence (DCI) for Military Support, who served as Government Advisors.

Chart 3. 1996 DSB Task Force Terms of Reference

Terms of Reference

- Determine the optimum posture for the employment & use of intelligence & other information derived from national & theater assets, & the timely delivery & fusion of same to coalition forces

- Emphasis:
  - Evaluate ongoing implementation of previous recommendations
  - Determine other C4I improvements to be quickly applied to support coalition air, naval & ground forces
  - Future operations
    - After restructuring/redeployment in Dec 96
    - Other contingencies

- **Terms of Reference**

The Under Secretary of Defense for Acquisition and Technology directed the 1996 Task Force to review the progress towards the implementation of recommendations made the previous year and to determine any other improvements which would enhance the flow of intelligence and other information for Operation JOINT ENDEAVOR. Note that the Terms of Reference (see Chart 3) explicitly state "intelligence and other information". The Task Force conducted its review of the flow of intelligence in the context of how it is used in conjunction with other types of information to support the operational commander. Implementation of the resulting recommendations will require the active support of the operations and doctrinal communities in addition to the Intelligence Community.

One of the concerns initially expressed by the Secretary of Defense as an area of focus for this study was the introduction of ground forces into Bosnia and their use of intelligence and other information; there had been no US forces on the ground at the time of the previous study in 1995. The focus of the recommendations became more specific as the Bosnia-Herzegovina elections, scheduled for September 14, 1996, moved closer. The impetus was to evaluate the employment and use of intelligence and other information by the ground forces and whether sufficient Command, Control, Communications, Computers, and Intelligence Surveillance and

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Reconnaissance (C4ISR) capabilities existed and could be utilized to help the coalition forces assure peaceful pre-election campaigns, a peaceful election polling process, and a peaceful implementation of election decisions. The Task Force was asked to also consider C4ISR information system improvements that ought to be developed and deployed to support the redeployment of forces scheduled for December, 1996. And, finally, the Task Force was to identify lessons learned to be applied to other contingencies.

A little over a year ago, the Secretary of Defense was not satisfied with the answers he was getting from the Intelligence community about the shoot-down and rescue of our USAF Pilot Scott O'Grady: could the shoot down have been avoided and could the rescue have occurred sooner? The Secretary had asked the 1995 Task Force to focus on air defense and targeting issues and to look for opportunities to make dramatic improvements in the safety of our forces and in our chances for success should a peacekeeping or ground operation be conducted.

The 1995 Task Force gathered information from numerous units, organizations and sources in addition to observing actual combat operations. From that came numerous recommendations in 1995 to address what were considered policy, technological and organizational deficiencies. The Task Force recommended the creation of an ACTD to field, demonstrate and evaluate various advanced development systems in the realistic "laboratory" environment of Bosnia. The vision was to include a Direct Broadcast System (DBS) capability, previously demonstrated as part of the Joint Warrior Interoperability Demonstration (JWID) '95 exercise, to better disseminate imagery and other large data format information to all levels of units within the coalition. Suggestions were also made to improve use of the LOCE (Linked Operations-Intelligence Centers Europe) system, a US-developed system utilized by close to 200 NATO locations but with limited bandwidth capability.

The 1995 Task Force made its recommendations to the Secretary of Defense and to the Director of Central Intelligence (DCI); all were accepted. What resulted was the creation of a Joint Department of Defense (DoD)/Central Intelligence Agency (CIA) Implementation Planning Working Group monitored by the DSB Task Force through December, 1995. A commitment of approximately $150 million followed to begin making rapid improvements centered primarily around Air Force and Navy missions.

The 1996 Task Force now reports on what has been achieved through the first six months of the active program, what remains to complete implementation of the 1995 recommendations, and what new tasks should be initiated.

Chart 4. Background Briefings for 1996 DSB Task Force

Background Briefings

- National Agencies
  - CIA
  - CIO
  - NRO/OSO
- OSD Staff
  - ASD C3I
- OSD Organizations
  - DIA
  - DMA
  - DISA
  - DARO
  - DARPA
  - NSA

- Joint Staff
  - J2, J3, J4, J5, J7
- Services
  - Army
  - Navy
  - Air Force
  - Marines
- CINCs
  - EUCOM
    - USAEUR
    - USAFE
    - NAVEUR
    - SOCEUR
  - USSOCOM
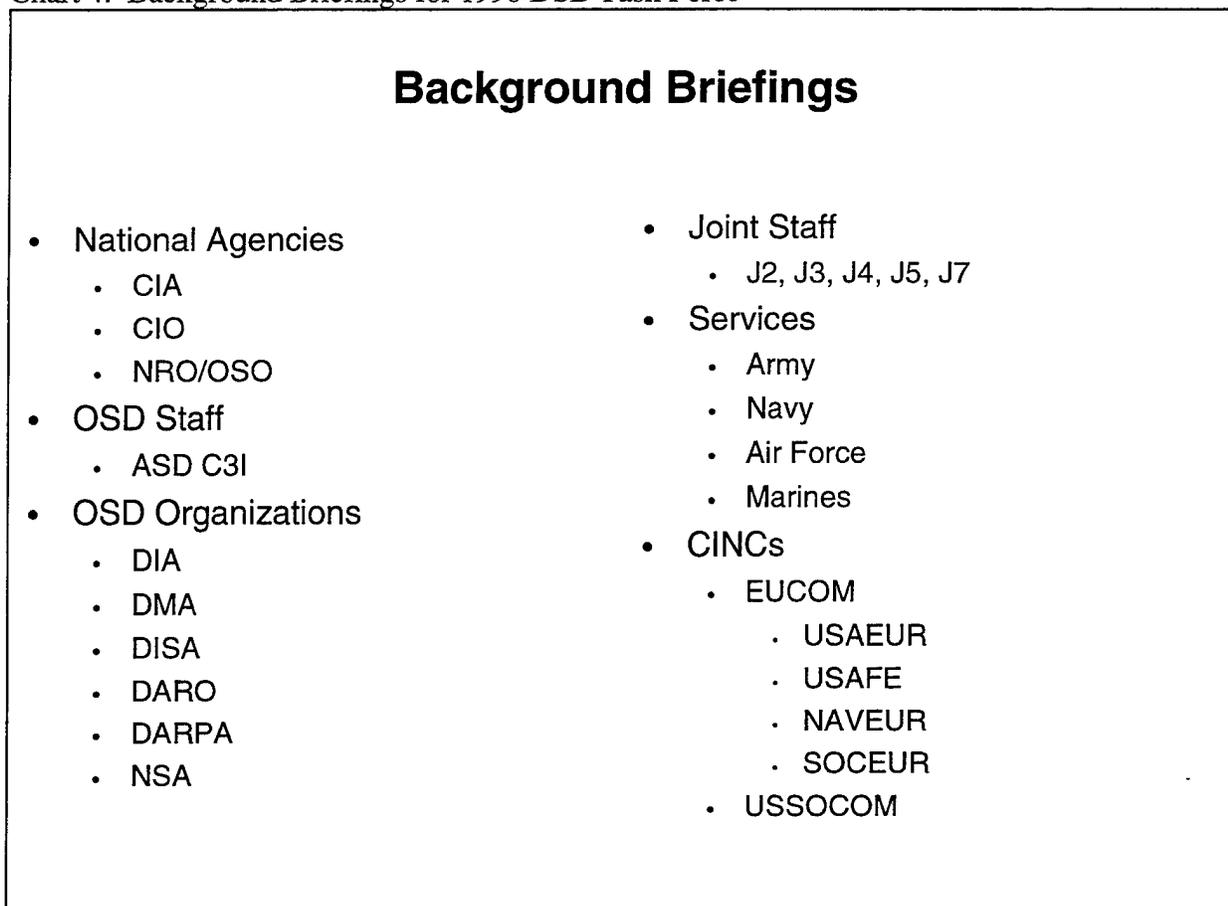
- **Background Briefings**

The Task Force spent several weeks visiting more than twenty-five different National as well as DoD Agencies and Organizations in the continental United States (CONUS) to develop background and prepare for visits to deployed units in the European theater, some of which the Task Force had seen the prior year. The Task Force thanks all of the organizations and individuals for their cooperation and support. The Task Force found improvements are being made and that continued benefits can be achieved by continuing the BC2A program and other focused efforts to enhance the timeliness and flow of information.

Chart 5. Sites Visited by DSB Task Force

Observing Deployed Units & Operations in Theater Enhanced Our Understanding
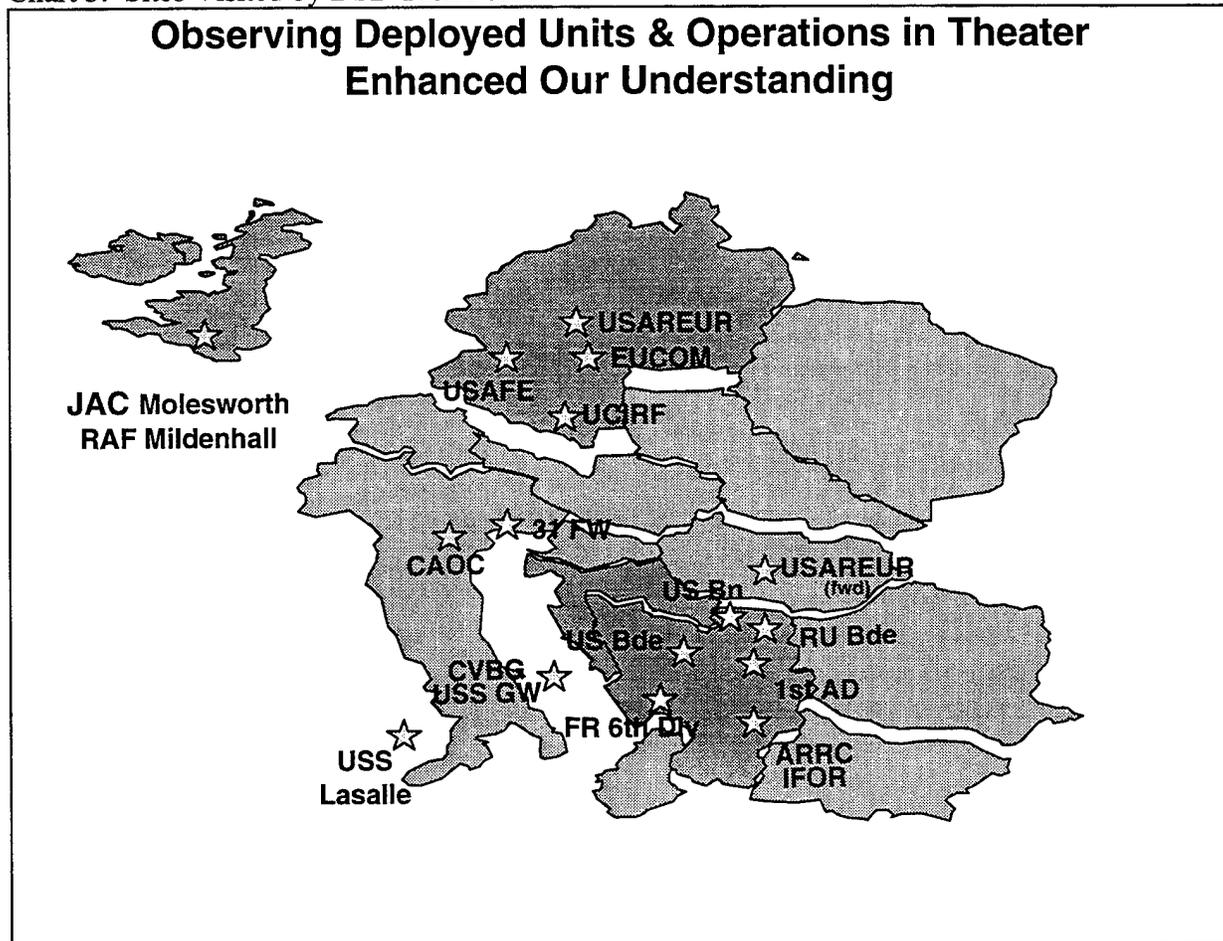
- **Observing Deployed Units and Operations in Theater Enhanced Our Understanding**

During a fourteen day trip, the 1996 Task Force visited land, naval, and air units at seventeen sites in Europe. It was at IFOR (Implementation Force) and EUCOM (European Command) headquarters. It saw French and British Divisions and a Russian Brigade. It visited with US units down to the battalion level along with a Carrier Battle Group (CVBG) centered around the USS George Washington (that has the finest C4I integrated suite and best organization for its exploitation yet seen), and with the USS LaSalle Command and Control ship. The 1996 Task Force also went back to some places visited the previous year, such as the Combined Air Operation Center (CAOC) in Vicenza, Italy and the Air Wings at Aviano. The Task Force saw a proliferation of National Intelligence Support Teams (NISTs), National Intelligence Centers (NICs) and Joint Intelligence Centers (JICs) all designed to facilitate direct communication with supporting agencies and organizations and provide information flow up-echelon. But the hub of intelligence information resides at the Joint Analysis Center that is responsible for integrating and providing intelligence information to commanders in the European theater.

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Chart 6. 1996 DSB Task Force Key Observations

Key Observations

- Most previous Task Force findings are being effectively implemented
  - Major improvements in information

- Several major impediments to improving information dominance

- Post-withdrawal intelligence planning needs to be initiated

3.0 KEY FINDINGS AND RECOMMENDATIONS

Like last year, the DSB Task Force is focused on constructive criticisms that can lead to valuable improvements. However, it should be positively noted that the Task Force is very encouraged by the progress made to date, both as a result of implementation of 1995 recommendations and as a result of independent innovation and initiative by our forces. There were many, many wonderful ideas and innovations observed during the trip, all designed to help improve the process by which commanders are supported in the field.

To sum up the 1996 Task Force's key observations:

> Most of the previous year's findings and recommendations have been effectively implemented. The 1996 Task Force saw a **dramatic** improvement, not just a major, but a **dramatic** improvement in information availability to the forces that were visited last year and that were addressed by 1995 Task Force's recommendations. The Task Force strongly urges that the appropriate intelligence planning and actions for the post-withdrawal or deployment phases be implemented immediately. Opportunities will vanish with time and must be seized now.

Emerging as a key issue is the challenge of effective information management. A DSB Task Force documented, in a report known as the "Information Architecture for the Battlefield" (October, 1994), its concerns about this subject and recommended a focused research and development initiative into various techniques and tools for information management. More concepts and supporting technology, government and commercial, are now becoming available for evaluation and should be pursued in concert with BC2A. The good news is that we have made the information flow down to the forces much more robust. The related bad news is that we need to make sure that "we don't saturate the warrior with data while starving him of useful information." For information getting down to lower echelon and mobile forces, the "last dirt mile is still that -- the last dirt mile."

Matching Information Capability With Mission Requirements

- Bosnia is dynamically changing operational environment
  - Information needs change as operational phases change
  - Information capability must change to match operational phases
- Mission success is being achieved by combat power & information power
  - Combat power played key role in entry & separation phases
  - Information power is playing key role in compliance verification phase
  - Integrating the two remains a challenge
- Coalition operation with 33 partners adds additional complexity

3.1 INFORMATION INTEGRATION MAJOR RECOMMENDATION AREA

First, a brief review of some history may be useful. Operations in Bosnia began with an enforced entry phase after Operation Deny Flight and subsequent agreements were reached as a result of the Dayton Peace Accord. Next came the separation of forces among the former warring parties followed by the establishment of zones of separation and having people disarm and place their weapons in recognized storage containment areas. Now Bosnia is in the economic reconstruction and rebuilding phase.

Each phase of the operation has been different, and the information needs change as each one of the operational phases change. Conducting an enforced entry is much different from normal "police" activities, which could range from having to deal with a drug supplier to a politician; or from watching smugglers to determining who are the less threatening Mafia to identifying potential terrorists. The Task Force believes that flexible equipment and information management approaches (with scaleable and expandable/contractible plug-and-play subsystems) are necessary to meet the various information needs to support the forces as the missions change. The Task Force found that our forces are not effectively organized to address the challenge of matching information capability to mission requirements. The 'Corporate Information Officer' function does not exist at most units, with the possible exception of the Navy at some levels. This function is necessary if we are to begin reducing incompatible hardware and software

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systems in favor of creating fused, synchronized information systems leading to information dominance for our forces.

The United States progressed from executing a military entry operation to conducting a peacekeeping and civil policing operation, focused on national and ethnic extremism, terrorism and gang warfare that threatened successful nation-building. This change in mission requires a corresponding change in policy and doctrine in many areas: training; intelligence collection and analysis; creation of tailored intelligence products along with timely dissemination and easy retrieval by warfighters; a better process for providing operational feedback, for example, when strategic assets are tasked; the ability to create a synchronized and recognized common picture of the battlespace; a better process to deconflict the frequency spectrum; and a systematic approach to understanding and resolving problems associated with legacy systems and cultures. For example, it was learned that the Bosnians strongly supported checkpoints during the entry phase; thus we instituted such checkpoints and they were respected. Those same checkpoints were less effective when the mission changed to rebuilding the new nation.

Said another way, the Task Force found signs of at least five different behavior cycles, each with individual time constants but operating simultaneously with insufficient coordination. The mission appeared to change on, approximately, a six month cycle -- from no forces involvement in Bosnia to Operation Deny Flight to forces on the ground charged with separation of the warring factions and establishment of cantonment areas to a police enforcement/peacekeeping role to whatever the next phase. However, the organizational responsibilities and resources changed on, approximately, a one year cycle – first from the United Nations (UN) being in charge, then switching to NATO Air for DENY FLIGHT, until IFOR took command with the insertion of ground troops in Bosnia to whatever comes next. Information availability may also change about yearly resulting from changes in command to policy changes such as the US downgrading policy. Adding complexity to the coordination process is the personnel rotation policy among different nations in the alliance. In addition, new systems based on commercial equipment may arrive every two months and leave after a six month trial period.

The Task Force found that mission success was being achieved by combining combat power and information power. Combat power played a primary role in the entry and separation phases, while information power is the key during the compliance and verification phase. But the most difficult challenge is integrating both combat power and information together. The truth is that linking combat power with the information power of timely unclassified video from a drone made a significant difference during the enforcement phase.

The French provided us this example of integrating combat and information power during the rebuilding phase. The Sunday after the Task Force had met with French commanders in Mostar, local elections were scheduled. The French Commander in was concerned about potential riots and fighting at the polling places, which could disrupt the election process. Not wanting to send his patrols throughout the city in small units, where they could potentially be overcome by local 'toughs,' he asked for video support to monitor the polling places in real-time. This allowed the French to mass several large units around the perimeter of the city so in the event something went wrong, the Commander could send his forces in sufficient mass so as to contain the problem without jeopardizing troop safety.

Despite these successes, there is still a critical need to better integrate combat and information power. Chart 8 (Recommendations) addresses potential solutions to this evolving issue.

Coalition warfare is surfacing issues with respect to unity of command, the role of bilateral agreements and the clarity of accountability and responsibility. If intelligence is shared with a lowest common denominator approach, the information quality will be diluted. The doctrine with respect to unit hierarchy in a coalition environment needs to be defined for the corps, division, and brigade levels.

Chart 8. Recommendations

Matching Information Capability With Mission Requirements

- RECOMMENDATION
  - Establish information management as an evolving functional support area supporting combat operations
    - Requires focus, expertise, resources
  - Create information staff function at appropriate command levels to support Bosnian & beyond operations
    - Led by operators
    - Include intelligence, communications, civil affairs, logistics personnel & other expertise as needed
  - Continue to infuse new information concepts for Bosnia & future operations

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- **Recommendations**

The three major recommendations from Chart 8 are discussed below:

The Task Force recommendation to match information capabilities with mission requirements requires establishing and filling a position now missing from our structure. A corporate information officer/chief information officer (CIO) function is needed to focus expertise for immediate application in the Bosnian theater. It is important to create this information staff function at the various command levels, led by operations, with active participation from the intelligence, communications, civil affairs, logistics, and other communities as needed. Knowledge requires integrating information contributions from the J2, J3, J4 J5, and J6 functions in a way that transcends 'ownership' of the information needed to support the warfighter. As mission requirements change, the relative contributions from the various domains of expertise also may be expected to change, but always with the operations community in the lead.

The Task Force notes that an independent action by the US Congress, the Information Technology Reform Act of 1996, requires Departments and Agencies to establish a CIO position (at the Executive IV level). In this case, the essence of what makes sense at high levels also makes sense at lower levels in the organization.

Modern technology may make it possible to distribute the participants physically as long as the CIO actively manages the process and the information. The 'anchor desk concept' is one mechanism by which to assemble the resources, achieve the integration of information, provide focus on mission needs, and promote a proactive stance. Developing the required skill and experience to quickly integrate 'plug and play' systems targeted at specific mission needs will provide major payoffs. The closest thing to resemble the information staff function was aboard the Carrier Battle Group, where the Navy had established an integrated C3I information warfare function. The command and control functions were combined with the Navy's Joint Maritime Command Information System (JMCIS) and the Global Command and Control System (GCCS) to provide focused mission information. Although it was an entry level effort, it surpasses what the Task Force saw elsewhere.

The CIO function will help to focus the efforts of NICs, JICs and the JAC on satisfying the operational needs of the warfighter and will help to address an observation made to the Task Force by a Naval Intelligence Officer and found elsewhere as well -- "that, in practice, JICs (and other intelligence activities) look up the chain of command rather than down," i.e., they respond to their rater. Intelligence providers must move from the reactive mode (waiting for Requests for Information (RFI) to trigger activity) to the proactive mode of anticipating warfighters needs for a particular situation and pushing those specific products to the field.

The Task Force did not see integrated National, theater and organic tasking in response to particular needs expressed by three different senior Commanders. The Task Force thinks the CIO function will be an important part of the solution of this problem and observes that the battlespace is not at EUCOM headquarters. Information assets should be managed at the lower levels where the warfighters are.

Techniques for planning and replanning to support a Bosnia redeployment phase and other contingencies deserve immediate attention. Modeling and simulation (M&S) should help explore real-time, distributed collaborative planning concepts to include video/audio teleconferencing and whiteboarding as well as support mission preview and rehearsal, assessment, and 'what-if' evaluations for subsequent mission phases.

Capability is needed and could be provided for a precision targeting tool kit with applications matched to the CAOC, wing, division, and brigade levels. Defense Mapping Agency (DMA) should rapidly become a data provider of mensurated points to users rather than a data producer. Very accurate Digital Elevation Models could be produced from new data sources if innovation occurs.

More Information & Better Connectivity

- Dramatic changes in security releasability policy have given NATO & IFOR valuable combat information
- Significant improvements in C3I & information processing are enhancing Bosnia operations
  - Joint Analysis Center (JAC) & Combined Air Operations Center (CAOC) are evolving new models of support for contingency operations
  - Reachback to Contingency Airborne Reconnaissance System (CARS) at Beale AFB makes U-2 ASARS a timely asset for supporting ground commanders with minimum in-theater footprint

- **More Information & Better Connectivity**

Last year, the Secretary of Defense and Director, Central Intelligence Agency agreed the time had come to break down some of the leftover Cold War security barriers and go from a 'System High' environment to a 'System Low' one. Their objective was to ensure that information was put into the hands of those who needed it in a timely fashion without revealing sources and methods, but stringently protecting highly sensitive information.

LOCE started as a US system and was adopted by our allies because it was further along in development and offered better capability than what was available to them at the time. The expansion in the number of LOCE sites in the course of one year is truly impressive. While our coalition partners now are fully using LOCE and sharing information among themselves, the Task Force noted many cases where US forces are not taking full advantage of the information in LOCE. One reason is inadequate training. Another reason is the attitude "I've got my own system; I don't need to use that one."

The JAC and the CAOC are evolving new models designed to better support contingency operations by being flexible and dynamically changing to meet mission requirements. Both organizations are experimenting with new ways of conducting operations and using systems to help them in their jobs. The Task Force found numerous examples of informal innovation in the

field to partially fuse information from legacy 'stovepipe' systems in order to solve immediate problems. Many of these informal systems should stop when supportable and better designed substitutes, conforming to the Defense Information Infrastructure (DII) requirements are available. Until then, the informal systems are helping the warfighter perform his mission.

The Task Force discovered that 'reachback' as a capability was being effectively used and accepted in the field. There had been some concern about whether Commanders would be comfortable with this approach, but it appears to be working well. Previously, support to the commanders would be collocated in the theater and, for example, have direct downlink capability from collection assets. However, this presents force protections and logistics problems in that there are local footprint vulnerabilities, supportability issues, and analyst staffing and housing requirements to be met. Utilizing facilities remote from the battlefield receive the data, prepare products and transmit them to warfighters over large bandwidth communications systems is an ideal way to overcome these obstacles. Elements of this approach long have worked for the Navy (where shipboard space is at a premium) and should be extended to all Services and for more intelligence systems. The Task Force recommends a systematic approach to spread the process, with parallel development and refinement of the Concept of Operations (CONOPS).

Chart 10. Summary Recommendations for Information Management

More Information & Better Connectivity

- RECOMMENDATION
  - Adopt JAC & CAOC's flexibility & adaptability for future contingency operations
  - Pursue "reachback" as fundamental support concept for existing & future systems
  - Recognize Bosnia remains the most realistic laboratory for developing new concepts for Operations Other Than War (OOTW)

- **Recommendations**

The Task Force makes three specific recommendations for more information and better connectivity.

Adopt the JAC and CAOC's flexibility and adaptability for the future contingency operations discussed earlier.

In addition, the Task Force believes that the concept of 'reachback' is a fundamental support concept for existing and future systems.

The Task Force also notes that Operations Other Than War (OOTW) military activities, such as those in Bosnia, are occurring with greater frequency than the Major Regional Contingencies (MRC) upon which our force structure and doctrine are primarily based. The Task Force recommends continued operational and doctrinal experimentation in the Bosnian area of operations to take advantage of the relatively benign circumstances now available to us. Many people would disagree with the concept of using a real 'battlefield' as a battle laboratory; in fact, many of the Task Force members served in active military operations and instinctively questioned the wisdom of that type of effort. The Task Force concluded, however, that it is important for the DoD leadership to understand and recognize the value this type of battlefield laboratory environment has in testing new systems, doctrine and concepts for both OOTW and MRC operations.

Chart 11. Findings for the JBS Experience to Date

Joint Broadcast System "ACTD"
Bosnia Command and Control Augmentation (BC2A)

- BC2A resulted in significant operational capability in coalition environment within a very short of time
  - Forces learning to use expanded bandwidth
  - Continued development of experience with the procedures required to exploit full potential
  - Foundation developed for Global Broadcast System
- Information processing & distribution improvements provide more robust capability at headquarters levels for division, wing, & battle group, but not below
  - Still improving
  - Common information is enhancing jointness
- As missions change, dynamic reconfigurability is required

3.2 JOINT BROADCAST SYSTEM "ACTD" MAJOR RECOMMENDATION AREA

The Bosnia Command and Control Augmentation initiative (BC2A) has resulted in significant improved operational capability in an extremely short period of time; however, it has not yet realized its full potential. Pumping 'CNN' (Cable News Network) and watching ball games through extremely large communications pipes is not the primary objective of the Joint Broadcast System (JBS). BC2A was designed to provide relevant, timely information (specifically large data format information such as imagery and video) to operators, both US and coalition, as a remedy to the problem of insufficient bandwidth and poor imagery quality found last year. BC2A provides not only a 30 Mbps one-way broadcast capability (JBS), but also includes a two-way tactical internet capability for collaboration among Commanders. Because BC2A is funded with Operations and Maintenance (O&M) dollars resulting from the supplemental budget request authorized by the Congress in support of US efforts in Bosnia, the BC2A program is being conducted like an Advanced Concept Technology Demonstration (ACTD) even though it is not one officially. Nevertheless, the Task Force believes strongly that the BC2A program should continue beyond the end of the first year in Bosnia and should be considered for deployment to other theaters such as in Korea. Critical work remains to be done

in developing new concepts and procedures for exploiting the expanded communications infrastructure, both locally and globally (in advance of the Global Broadcast System).

As noted earlier, the Task Force finds that great improvement has been made in getting information processing, distribution, and dissemination down to the division, wing and battle group level through the use of JBS. It is so much better than last August that 'improvement' is not even the right word, but the dramatic change does not yet occur below those levels. Nineteen of the original 29 requested JBS sites have been fielded in support of Operation Joint Endeavor, but 51 locations are needed according to Commanders. JBS is providing great connectivity where it is deployed, but should be further deployed immediately to lower echelons where bandwidth is greatly limited. The Task Force believes it is important to continue the process of bringing JBS up to its full potential as a foundation for the Global Broadcast System (GBS) recommended by the DSB previously and endorsed in other studies. JBS should be seen as a low cost, low risk opportunity to explore technology and operational implications prior to making major GBS commitments.

Common information to/from lower force element levels is needed to make 'jointness' even more effective. The DSB has said before that the JTF Commander needs the right collection of tanks, ships, planes and warriors to accomplish the OOTW mission objectives. In Bosnia, because the mission phases change, the requirements and capabilities mix also changes over time. In the world of C4ISR, information capability is the ability to hook together the right hardware, software, information systems, databases, communications pipes and sensors to support that *ad hoc* collection of shooters. This is what 'dynamic reconfigurability' means in the last bullet of Chart 11 -- the flexible reengineering of C4ISR systems and processes to be able to 'plug and play.'

Chart 12. JBS/BC2A Recommendations

Joint Broadcast System "ACTD"
Bosnia Command and Control Augmentation (BC2A)

- RECOMMENDATION
  - Continue BC2A system deployment under EUCOM direction
  - Expand success in Bosnia implementation
    - Keep BC2A team in place
    - Integrate into DII/GCCS architecture to facilitate full support
  - Provide DISA additional FY97 funding to operate & maintain system during redeployment or reshaping of forces

- **Recommendations**

The Task Force made four programmatic recommendations to Secretary Perry.

(1) The Task Force recommends continuing the BC2A deployment of JBS assets and supporting equipment even though it was only funded for fiscal year (FY) 1996 and the first quarter of FY97. While the program is not an ACTD, it should continue to be pursued outside the routine system. The Task Force believes that deploying additional BC2A capabilities is critical for achieving the goal of 'near zero loss of life' during US participation in IFOR and that the acquisition delays often found in more routine programs should not be acceptable. EUCOM fully supports BC2A and wants to continue the deployment under their direction. The Task Force strongly endorses this position. While the US is prevented from giving BC2A equipment to other countries, one route to further coalition activities could be other countries buying receiver suites that would allow them to get the JBS broadcasts.

(2) The experience to date in Bosnia has been successful, and the Task Force recommends keeping the BC2A team in place to continue the program while we have forces in Bosnia and then beyond. However there must be some assurance that this will not be another 'stovepipe,' noninteroperable system; we must ensure that BC2A is integrated into the Defense Information Infrastructure (DII) Architecture. The DSB has been consistent in its support for DII. With appropriate direction and review, the integration should be achievable.

(3) The Task Force strongly urges providing DISA additional next year funding to assure operations and maintenance support, especially during critical election and redeployment phases to which the Task Force has paid particular attention.

(4) To expand beyond current Bosnian applications, the Task Force recommends testing of BC2A capabilities in another theater in addition to evaluating their use in response to the next contingency with a view towards pushing the capabilities down to serving that 'last dirt mile' to the warfighter. The capabilities should not be copied from Bosnia for other theaters, but the concepts should be considered. Focused development and tailoring for each theater will be needed to maximize the utility of the system.

Greater Information Support
For Brigade & Battalion Headquarters Is Required & Possible

- Land combat forces are trained & equipped for great mobility & lethality
- Present mission phase places units in more static situation
- Mission objectives require different information support
- Commanders report information needs not being met
  - Limited communications & information systems support
  - Lack understanding of what information is available
  - Lack information tools & technical support to keep them operating
  - Lack analysis capability to use information made available
  - Tactics, training & procedures don't cover flexibility needs

The Task Force has identified a number of factors requiring attention if warfighters are to become more effective, particularly in executing non-traditional missions.

The land combat forces that the Task Force visited are very lethal with great mobility and fire power, but still have only their standard narrow bandwidth communications pipes. Even SINCGARS in the vehicles is not enough.

The second bullet on Chart 13 states that the Task Force found units in a more 'static situation;' meaning that although the units are deployed – mobile, so to speak – they operate more as if they were in a garrison/headquarters environment. The Task Force found during its visits a dynamic situation, where the daily job might entail anything from being a 'King Solomon' to being a Peacemaker to being a Warlord to identifying which roads, bridges and buildings are in need of reconstruction to negotiating funding from non-government organizations (NGO) to keep the otherwise unemployed former soldiers busy at work rebuilding their country.

Currently, the mission has shifted from combat power as key to information power as key, concepts discussed earlier; thus the mission objectives now require more information support. Fixing the broken communications pipe between the brigade and higher levels is as important to facilitate the flow of information up and down echelons as it is to direct more effectively the attention of the JICs or NICs down to the brigade level. Unfortunately, there is no easy way to

instantaneously inject that information into a real-time operational system. It would seem operationally advantageous to have the technology to utilize this type of real-time information in order to task Predator to follow the Mujahadeen car in order to locate their covert headquarters. In addition, if products are pushed to lower level organizations, more effective tools are needed for them to make use of the products without increasing the demand for more expert support staff.

The Task Force emphasizes that this finding is not a criticism of any organization in particular, because this situation did not exist before. These changes have resulted from communications and other technology/systems advances which permit more of this information to be disseminated at lower levels; thus information management is the emerging challenge. Not unexpected, the Task Force found a lack of information tools and analysis capability and, as we learned most importantly from US Army Europe (USAREUR) Forward, training procedures do not exist to help manage the information.

The Task Force believes that for all the different kinds of contingencies we must develop new plans and institutionalize the appropriate training to prove their utility. The Task Force observes that the training techniques developed and improved for traditional warfighting activities may not be well-suited to the demands of training for peacekeeping missions. Keeping warfighting skills current while performing non-warfighting missions for extended periods of time will be a challenge and deserves special attention. The Task Force believes that effort should be made to experiment with training for the Bosnian operations and to capture and apply the lessons learned.

For one planning example, USAREUR Forward shared their complete entry plan with the Task Force. They realized that their existing structure would not work in Bosnia for the anticipated enforced entry and separation of forces phases. They needed to move Corps capability down to the Division level and Division capability down to the Brigade level. They conducted much planning and replanning, ultimately changing their TOE (Table of Organization and Equipment) essentially for the entry phase by fielding a Trojan Spirit system at brigade level. Currently, the large demands of conducting operations in Bosnia have prevented the needed replanning and reconfiguration to support the current rebuilding phase as effectively as possible. And, of course, the Task Force observes that we should move ahead with planning and training for changes and reconfigure in advance to make the redeployment phase a success. Better tools would speed the planning and training process and emerging equipment complying with DII standards would ease reconfiguration of information systems.

Other factors exacerbated the information need found by the Task Force down at the battalion level. The Task Force found many examples of reduced effectiveness due to the constraints of narrow bandwidth in communications systems and equipment that didn't work. The Task Force found a 15' AT&T antenna installed right outside a Battalion Headquarters providing 3 Mbps connectivity for telephone calls home from the troops, that is providing they had an AT&T credit card. We could have bought some of that bandwidth to get SECRET REL NATO operational data to the warfighters at the battalion level. But to do so in the future requires we reevaluate the doctrine of how we conduct OOTW and other types of conflict.

It is possible to provide greater information support for the brigade and battalion headquarters. Wider deployment of JBS to combat brigades and battalions would allow pushed/pulled information to reach warfighters more quickly, especially if the tools and applications were deployed as well to ensure meaningful use of the data, again a doctrinal issue. Most importantly, however, better operations and logistics support, supplies and contract maintenance needs to be provided to keep commercial communications, computers, fax, and copiers operational.

**Greater Information Support
For Brigade & Battalion Headquarters Is Required & Possible**

- RECOMMENDATION
  - Deploy JBS to combat brigades & battalions
  - Support mobile activity with Lightweight Visual Reconnaissance System for imagery & overlays transmission
  - Provide computers, fax, copying capabilities & commercial communications where required
  - Contract for maintenance & support capability
  - Adapt concept of "smart push" from higher echelons -- "smart pull" from lower echelons

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- **Recommendations**

The Task Force made five specific recommendations based on the short comings observed at the Brigade and Battalion levels.

(1) The Task Force recommends deploying JBS down to the brigade and battalion levels and providing the requisite training. This should be done quickly and in conjunction with deploying the tools and support systems needed to exploit the JBS feeds. Obtaining the kind of flexibility seen at the CAOC should be an objective.

(2) The Task Force recommends deploying the Light Weight Visual Reconnaissance System (LWVRS), which was demonstrated to the Task Force and would be very useful in the field. The system operates using SINCGARS (Single Channel Ground to Air Radio). Achieving this near real-time performance is critical for many operational reasons. This sort of system should be acquired in reasonable quantities and used in the realist environment now available to our forces.

(3) The Task Force recommends deploying additional information support equipment infrastructure, such as computers, copiers and fax machines at the brigade and battalion levels, the end of that critical 'last dirt mile.' This year the Task Force was concerned with how well commercial equipment was operating in a combat environment since it was a recommendation from last year. What was found is that it is working well. For example, the Task Force heard that Sony displays are reliable and work well. In one instance, the Task Force found commercial

connectors, exposed to rain and unprotected, providing interconnect ADP capability between tents. While the connectors were functioning at the time, large quantities of rubberized tape should be supplied for commercial equipment and military equipment as well. The Task Force recognizes attention in required to care for items like those and believes that additional focus will allow our forces to get even more use from commercial equipment.

(4) The Task Force recommends contracting commercially for maintenance and support capability. While commercial equipment is proving to be more robust than some had expected, it still requires a maintenance strategy and items, like consumable supplies, need to be planned for and supplied in adequate quantities. Licenses need to be monitored and renewed as needed to prevent (temporary) loss of applications. Just because the equipment is commercial does not mean that the 'maintenance and supportability tail' can be neglected. It does mean that there are opportunities to experiment and find the most effective means to deliver the services.

(5) Most importantly, the Task Force proposes adapting and exploiting the concept of smart push, smart pull (see again Chart 8). Down at the battalion and the brigade levels, commanders cannot afford the extra support staff it would take to have an inherent, robust analytical capability to exploit the information now available from higher echelons. However, lower levels run the risk of becoming saturated with data and information unless the process is changed and they are provided the right tools.

We need to get away from the current concept of the NICs and other units waiting to be asked for information through the RFI process, and then responding to the request. Instead, NICs and JICs must use their knowledge of available products and ones that can be produced, i.e., custom products, as they anticipate what is needed at lower levels and do a smart push of it through the expanded communications pipes. The Task Force found examples of this type behavior at the JAC. The informal system of personal relationships, 'backchannels' and liaison staffing is inefficient, but shows that the information usually is there or can be produced if one knows how to go after it. The Task Force is confident that a formal system can be as effective and achieve higher efficiency.

Information Officers should be dedicated to serving a unit and act without waiting to be asked. The 'anchor desk' concept would seem to be an effective way to integrate information sources and support Information Officers. We should have an officer or enlisted person assigned at the higher level echelons dedicated to supporting the lower level units, thinking about the needs of the 1st Brigade, for example -- what to push down to them via JBS or suggesting to them what information to pull from where as they respond to emerging circumstances and local information. Experimentation should lead to development of an effective CONOPS to guide the process.

Chart 15. Information Management Findings for Lower Echelon Users

Managing All That Information

- Inadequate information management concepts & tools limit access to information located somewhere else in the system
    - No quick way to search for available information for specific objectives
    - Database incompatibilities aggravate search process
    - Multiple source video archiving not possible yet
    - HUMINT not available to warfighter in a timely fashion
- Intelligence from lower echelons does not flow easily up the chain of command to theater level
    - HUMINT currently reviewed/delayed at each echelon
    - Little or no automation, analysis tools
    - Limited bandwidth
- Ground Order of Battle is example
    - ARRC policy restricts release to higher echelons
- Bandwidth reallocation still not adequate to support operational needs

The Task Force identified a number of problem areas for managing all the information now becoming available. Users do not have an adequate web browser to search for available information. Archiving of the immense amounts of video being collected in-theater from many sources is not possible because the metadata with time-tagged coordinates and subject cataloging information are missing or nonstandard. As a result, data is recollected and not usable for effective change detection. There is a tremendous amount of information that never gets to users, because they don't know where to find it and don't have effective tools.

The Task Force believes that a comprehensive, current and shared Ground Order of Battle (GOB) is needed to reduce the threat of fratricide as well as improve the executions of joint operations against mission objectives.

Right now a GOB database is only being updated once every 24 hours and users don't see the peacetime operations in that database because it addresses war fighting operations. And even more importantly than that, there is no recognized GOB. What comes out of Augsburg is Red force only or Red and Gray. The communications channels no longer are the major impediment to producing and distributing a more useful GOB.

The Task Force went aboard the USS George Washington where they are generating task sorties everyday in support of US Brigades and Battalions on the ground - show of flag, show of force,

cover for operations, and related missions. They have a beautiful display system ready for the data, but no data yet. The Task Force is concerned over the potential fratricide implications of that gap.

That communications deficiency can and should be fixed. And the resources should be devoted to improving our PATROLINT collection and exploitation.

The 1995 Task Force made the recommendation last year to get Blue data into the databases so that our intelligence operations people could better support the operations by knowing where our forces were and their intentions. The Task Force members all thought that wouldn't be that hard to do and the payoff would make it worthwhile. However, this year's Task Force has found Commanders still reluctant to put the Blue data into the databases. There could be many reasons including concerns that micromanagement might occur if more visibility is available to seniors. It is possible that allies are reluctant to contribute Blue data because of concerns that the data might go back to their countries through new or uncontrolled channels. The Task Force has no easy answers to these concern, but believes that the benefits from using Blue data are so great that solutions will be found.

Finally, the Task Force found that sufficient bandwidth still is not being assigned to direct support of operational needs. Reallocation away from Intelligence systems is one remedial action that could make a difference and should be considered until more bandwidth is deployed.

Chart 16. Summary Recommendations for BC2A Information Management

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Managing All That Information

- RECOMMENDATION
  - Focus BC2A "ACTD" on information management processes & tools
  - Rapidly mature Joint Information Management Center (JIMC) & broadcast management concepts/capabilities
    - Field military analog of CNN with distributed anchor desks & assigned production responsibilities
    - Establish JIMC, JICs & theater NICs as proactive providers of anchor desk products to other echelons using common geospatial reference, time-tagged & pedigreed -- start now in Bosnian theater
  - DISA & Army resources should provide HUMINT database management system with modern analysis tools to support brigade needs ASAP
  - Annotate all significant information with geospatial, temporal & source codes required for database management to meet users' needs for rapid access
  - Improve & integrate HUMINT into more frequently updated GOB databases with easy access & distribution
  - Develop information/video databases with cataloging, storage & retrieval capabilities

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- **Recommendations**

The Task Force made a number of recommendations to address the information management group of challenges that is taking on more importance as communications bandwidth is increased for all echelons. The Task Force emphasizes that its assessments and recommendations address 'information', a broader term than traditional 'intelligence'. Managing information effectively will require changes in operational practices, organization, and doctrine. The recently deployed technology makes it possible to bypass the traditional chain of command. Capturing the benefits of near real-time information may not be possible without changes in organizational structure. Concerns and issues over control and authority can be expected to arise. Continued commitment and experimentation will be needed to determine the best solutions.

To address the potential for saturating the warrior with data when he really needs useful information, the Task Force thinks that the BC2A 'ACTD' must be continued beyond the first funded year into a sustaining phase and needs to focus on information management processes and tools. BC2A is not a formal ACTD, so the ACTD term is in quotes and is meant to convey the necessity of operating the BC2A program outside of routine program procedures and taking advantage of the Bosnian operations while they continue and of subsequent operations as they arise. The DARPA Battlefield Awareness and Data Dissemination (BADD) program will have

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much the same focus but lag the exploratory BC2A program and it should benefit from the continuing experience of the BC2A program.

The Task Force recommends rapidly maturing the Joint Information Management Center (JIMC) and broadcast management concepts and capabilities to field the military analog of CNN with anchor desks and force assigned production responsibilities. Continuing to rely on National Intelligence Support Teams (NISTs) long after theater requirements stabilize is one way to get around the broken current system, but that way relies on personal contacts and the buddy system and anchor desks are a better way to use the resources.

The report of October 1994 by the Defense Science Board Summer Study Task Force on Information for the Battlefield and the 1996 Tactics and Technology DSB Summer Study recommend that the warfighter be given dynamic control over the form and flow of information to him in support of his particular mission requirements. As a model, the warfighter would specify the types of information, the level of detail, the update frequency, the access controls, the fused products, and the display formats. His Information Officer would assist. Anchor desks would coordinate satisfying the requirements from available information sources or from new products or from arranging new collections. As needs change, the focus of the anchor desk or collection of anchor desks will change. Anchor desks need not be permanent. The anchor desk concept and the broadcast distribution mechanism should be more thoroughly explored and developed prior to making the large investments in a Global Broadcast System (GBS).

The Task Force believes that any lingering questions about the utility and value of real-time video data have been answered: video is here to stay. The Task Force is pleased that assigning Predator to the operations groups has been successful.

Visits to our NICs and our IFOR and NATO intelligence centers found widely varying daily numbers of Requests For Information (RFI) and a sense that there needed to be a change in the current approach. Instead of having intelligence center staff sitting at the Centers and waiting to be asked for information by operators who don't know what they can ask for, the Task Force believes we need to move to the anchor desk concept and learn to produce and distribute the right specific products to support focused operational needs. This is a totally different role for the resources. By using common standards for metadata descriptors and ensuring data is geospatially referenced, time-tagged, and pedigreed, all providers can work more effectively and integrated products will be possible. Rationalized databases can be specified and implemented.

The Task Force recommended looking at an anchor desk concept focused strictly on Middle East Force Protection. An anchor desk is a group of people who are charged with a particular production responsibility, so a separate anchor desk or group of related anchor desks would be needed.

The Task Force recommended that DISA and the Army agree to put off-the-shelf commercial database management systems in place as soon as possible for a HUMINT database. Making the database available at the brigade level and providing analysis tools for its use would be very positive steps and useful steps.

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The Task Force believes that not just the JIMC and the JAC but other JICs and Theater NICs should be proactive providers using common geospatial reference time tags and pedigreed information. This will address the problems that prevent us now from pulling up data because we can't find it and then, if it is found, not being able to use it fully because we can't get it overlaid on top of each other. Solving the problems that prevent us from retrieving data must be a high priority.

The GOB database needs more frequent updates, easier access, and wider distribution so that our forces can be more effective and so that coalition activities can be effective. Simple support and analysis tools are critical to the use of data.

The Task Force particularly recommends better developing and deploying video information databases on an expedited schedule. All the video collected in support of earlier local elections in Mostar is not retrievable now.

The Task Force believes that the changes in missions, supporting systems, releasability of information, and communications bandwidth combine to require an approach of dynamic resource allocation. Support systems, especially systems based on commercial products, change rapidly. Information now is being developed in a 'library' context and prepared for information pull. Even people become more or less available for experimenting as the operation changes. Resources include the critical people - analysts, cleared linguists, computer system administrators, and web page creators. Better browser tools are needed to facilitate product location and retrieval.

Chart 17.

Leave Behind Programs

[Not available in this report]
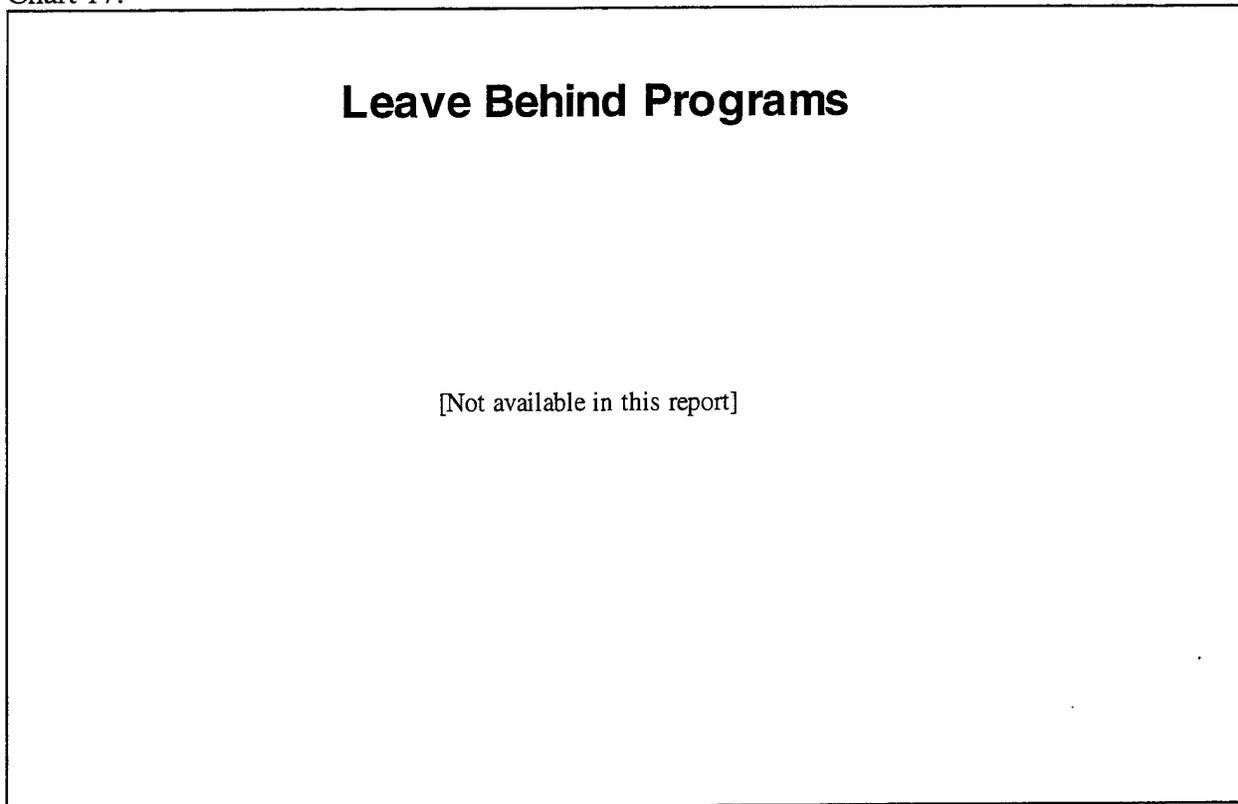
3.3 LEAVE BEHIND PROGRAMS MAJOR RECOMMENDATION AREA

(Remarks on findings and recommendations for Leave Behind Programs are classified. The DSB Task Force believes that Leave Behind Programs offer a major opportunity, but one that is time perishable and that deserves immediate attention.)

Chart 18. Recommendations for Leave Behind Programs

Leave Behind Programs

- RECOMMENDATION
  - Establish interagency Task Force to identify opportunities, develop specific items & assist in deployment before redeployment phase

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- **Recommendations**

We recommend an inter-agency task force be established as soon as possible to address the leave behind problem and to take advantage of the fact that we are on the ground there now in numbers of approximately 20,000 and are accompanied by approximately 40,000 additional forces from other coalition members. The inter-agency task force should have a broad charter to explore these and other possibilities.

Major Recommendation Areas

- Joint Broadcast System ACTD
- Information Integration
- Leave Behind Programs
- C4ISR Dynamic Tasking Capability
- HUMINT Information
- Countermine/Demining
- LOCE
- Airborne Video Surveillance

- Tactical SIGINT
- Commercial Equipment
- JSTARS
- Commercial Satellite Imagery
- Information Warfare Vulnerability
- Total Asset Visibility
- Other Previous Recommendations Still Valid

4.0 OTHER MAJOR RECOMMENDATION AREAS

The Task Force has grouped its recommendations into fifteen major areas as shown on Chart 19. This report has already covered the first three areas in some detail: The Joint Broadcast System ACTD, Information Integration, and leave behind Programs.

These three recommendation areas should not be interpreted as higher priority than the others but create a framework for motivating other recommendations. Also, while all recommendation areas are important, unless the challenge of information integration and management is addressed effectively and urgently, implementing the other recommendations will lead to marginal gains at best. The report will follow the order of the charts in the briefing, each chart will be followed by supporting text.

Other Major Recommendation Areas

- C4ISR Dynamic Tasking Capability
  - Provide tools to dynamically integrate tasking of national/theater RECCE/surveillance in C2 systems with timely feedback
- HUMINT Information Management
  - Integrate database management system to improve brigade-collected HUMINT/Patrolint dissemination & access
- Countermine/Demining
  - Accelerate efforts to substantially enhance rapid surveying, reporting, building, updating and publishing of mine field databases essential for economic reconstruction
- LOCE
  - Install electronic gateways to/from US databases & apply DII standards
- Airborne Video Surveillance
  - Deploy additional video surveillance assets and video exploitation capabilities

Chart 20 provides summary statements for five of the remaining major recommendation areas. Each one is addressed in separate remarks following the chart.

C4ISR Dynamic Tasking Capability

- Substantial benefit reaped from dynamic interaction of theater reconnaissance & surveillance assets -- further improvements can be made by integration of national assets
- CAOC integration of ISR assets tasking into ISR Cell a great idea
  - Optimizes theater assets
  - Beginning to develop integrated operations concepts
- National asset integration limited
  - Very limited understanding of asset allocation/availability
  - No timely feedback on task accomplishment
  - Unable to optimize integrated/synergistic use of national/theater assets together, e.g., cannot use theater assets for uncovered national targets
- RECOMMENDATION
  - Secret level tools to provide JTF commander capability to integrate national/theater operations including direct feedback on target coverage to permit dynamic tasking capability in C2 systems

4.1 C4ISR Dynamic Tasking Capability.

The Task Force continues to recommend tools and processes to integrate tasking of National and Theater and Organic RECCE/surveillance assets to satisfy mission requirements. The C4 functions should be integrated with ISR information to satisfy battlespace requirements. The focus should be the synergy between collection assets more than on deconfliction, with strong emphasis given to satisfying the needs of the warfighter balanced against the need for strategic intelligence.

The Task Force found a good start towards that goal at the CAOC compared to last year, when the process was fragmented, but still found a limited understanding of what assets/information was available from various sources. After several hours with the collection management teams from both the CAOC and EUCOM, the observation of the Task Force was that "dynamic integrated tasking" is conducted primarily with theater assets and theater operation plans. There were numerous examples of missed opportunities, which could be utilized to develop a process for improving current systems' performance.

The Task Force reported to the Secretary that there is little understanding at the National level of the details and capabilities inherent in organic and theater assets and vice versa. From organic to theater and theater to national, all levels complained that there was little feedback provided by

the higher echelons and often there was no knowledge as to whether they were even being supported. The understanding of assets, resources and capabilities is far too limited. up or down the chain. And there is a continuing deconfliction mentality that misses opportunities for constructive collaboration.

The deployed force is dedicated in trying to enhance the process. In one example, there was a National asset image showing a Predator UAV flying through it. The National Collection Manager in DIA commented that "we really should not have done this. We should have known enough about what they were doing with Predator to make sure that both were not operating in the same area." The Task Force's response was.... "No, you should be doing synergistic interaction between them. These decisions should not be made in Washington. Operations of all ISR systems in the Bosnian battlespace should be controlled by operators in the theater, who should be looking at the National system image and saying, 'Hey Predator, you are three clicks off to the right, move over there, that is what you want to see'." That is an example of why the Task Force believes the time has come to provide the tools to dynamically integrate the tasking of national, theater, and organic reconnaissance capabilities into a true C4ISR dynamic tasking and feedback system.

The Task Force finds that a failure to coordinate and integrate the use of superb ISR assets in direct support of the warfighter is a remaining barrier to achieving and exploiting information dominance. Solving the problem at the Theater level is insufficient. National assets must be more responsive to Theater needs when priorities permit. The best ISR capabilities will be formed by allowing teams dedicated to the Theater to plan ISR with effective tools and using all available assets. The timelines of Theater concerns mean that dynamic asset tasking will be required. The Task Force believes that exploring combinations of National and Theater assets will uncover valuable and efficient ways to get information now unavailable to either class of asset alone. The recommendation is to proceed with the experiment by providing the Joint Task Force commander with the tools and support to explore the benefits of integrated C4/ISR and dynamic tasking of ISR assets including those normally not responsive to him.

Chart 22. The HUMINT Area Requires More Attention

HUMINT Information Management

- Despite augmentation of HUMINT resources, ground forces uniformly expressed need for even more support
- Brigades augmented with HUMINT resources but feel inadequately supported in present phase of operations
  - Reporting follows chain of command
- RECOMMENDATION
  - DISA & Army resources provide database management system to support brigade needs ASAP

4.2 HUMINT Information Management.

The Task Force found a number of areas regarding HUMINT that need improvement and consider it a major weakness. In addition, restrictions in the movement of information by the chain of command hamper its fusion with other types of intelligence up echelon. The Task Force recommends that a database system with robust search engine capabilities along with the requisite communications capabilities to disseminate all forms of HUMINT to include video, still camera, etc. be provided to the forces immediately by DISA and the Army.

Chart 23. Managing Legacy Minefields Requires Several Advances

Countermine/Demining

- Minefield detection, classification, location & rapid development & maintenance of mine databases essential to:
  - Force protection
  - Economic reconstruction -- global issue as well as Bosnia
- Current programs limited in scope to critically important force protection mission
- Countermine/demining programs essential to future of Dayton accords to support economic development of region hampered by lack of priority
- Many current minefield mapping products are restricted to IFOR distribution only
- RECOMMENDATION
  - Accelerate program to substantially enhance rapid surveying, reporting, building, updating & unclassified publishing of minefield databases
    - Proposed DARPA program is good start point
    - Follow-up with development of improved sensors, removal mechanisms & inexpensive demining techniques

4.3 Countermining/Demining.

There are two missions with respect to Countermining and Demining - force protection and economic reconstruction. Day-to-day force protection is different from the other mission of economic reconstruction, which is key to the long-term strategic objectives outlined in the Dayton Peace Agreement. Countermining is a military action, rapid and forceful; demining is a civil action occurring post-conflict and conducted over a period of time. Considerable effort has been made relative to Force Protection, but there are still improvements which could enhance the surveying, reporting, updating, declassifying, and publishing of minefield databases. High technology and a mechanized approach can help to support the goal of removing 70-80% of the mines in a specified area, regardless of which mission. The research and development community, i.e., DARPA and the Army, should evaluate the status and development of improved sensors in conjunction with GPS, removal mechanisms and cheaper demining techniques. The Task Force believes we should accelerate efforts in this area. In Bosnia, one to three million mines have been deployed for both unconventional and defensive use for force protection. Much of this information is still held in classified channels despite having been provided by Bosnian Serbs, Croats and Muslims. It needs to be made unclassified and given to those responsible for economic reconstruction.

Chart 24. LOCE is Valuable Now and Can Be Made Even More Useful

LOCE

- Continued LOCE deployment & use -- at division & higher & coalition partner units -- is evident
- Dramatic changes in security releasability policy have resulted in information widely available at IFOR & NATO via LOCE
- Coalition partners are sharing more of their information
- US forces not taking full advantage of LOCE -- electronic transfer of LOCE information to US systems, e.g., Warlord, not available
- LOCE utility still limited in many locations because of severely constricted bandwidth &/or air gaps
- RECOMMENDATION
  - US to LOCE electronic gateway needs to be implemented immediately
    - DIA has several under consideration; pick best one today
  - Need to accelerate incorporation of 5D & Netscape into LOCE now to enhance exploitation utility
  - Accelerate JBS - LOCE integration/interoperability programs
  - Accelerate LOCE migration into DISN (Internet-like) architecture, e.g., Intelink

4.4 LOCE.

Tremendous progress has been made relative to LOCE since last year but a major problem remains. Previously in 1995, the Task Force made a strong recommendation that there needed to be an electronic interface between our US systems and LOCE to help accelerate the information cycle. Previously, information entered into LOCE was "fat-fingered in," meaning that an operator physically typed the relevant information into the LOCE system which created an opportunity for error in translations. The current process is to copy the US information to disk or some other media and then transfer it to LOCE, which still requires manual intervention but with less errors and risk.

It is the opinion of the Task Force that use of an electronic gateway with the appropriate "guard" technology as recommended last year would not significantly increase the risk over today's methodology and may even improve it. Worst case, it would remain the same. However, the cycle time for transfer would be faster because less effort is required on the part of the operator(s), who would simply "send" it to LOCE rather then first copying it, etc. The net benefit to the warfighter would come from being able to better operate inside the enemy's information cycle.

'We must maintain an air gap' is not the right solution to security concerns in this environment. The Task Force found that DIA has several less than perfect, multilevel security solutions available now. The Task Force recommends that DIA pick one, install it at the Joint Analysis Center (JAC) as well as other locations operating to the same constraints and not wait for the 100% solution - that the benefits of doing so appear to outweigh the risk in this circumstance.

While significant progress has been made in strengthening the LOCE system by extending the range of information that can be carried on it and encouraging allies and coalition partners to make their own contributions of information, the Task Force finds our forces are not exploiting LOCE as they should. Continuing limitations with the LOCE system that contribute to its underutilization by US forces include: LOCE bandwidth is far too low at major nodes (only 19.2 kbps and often is less than that depending on how a site is configured) and does not allow for effective information push to the brigade level; US forces cannot easily move between LOCE and US databases; the ACE is reacting rather than pushing information; and there is no electronic connectivity between the Army's Warlord system and LOCE.

The Task Force observes the obvious point that integrating LOCE with the JBS delivery system would allow LOCE users much faster access to larger product files on a routine basis and free up some of its very limited bandwidth for other important uses. At the same time, the LOCE concept should be migrated into the DISN architecture to provide a seamless flow of information into and out of LOCE and US systems consistent with the security guidelines and the previous discussion relative to electronic interfaces. In addition, LOCE utility would be increased if it were made compatible with 5D and Netscape, thereby allowing the use of standard web browsers for access to information and accelerating LOCE's compliance with the standard architecture for Intelink.

Airborne Video Surveillance

- UAVs & airborne video surveillance systems dramatically improving the battlefield understanding
- Predator, Gnat 750, Pioneer, ARL, & P3 video providing extensive support to all command levels
    - Demand for greater coverage by both intelligence & operational elements
    - Information being used as weapon to discourage violations of Peace Accord
    - Unique capability providing real-time God's eye view of unfolding operations directly to commanders
    - BC2A video distribution & new video exploitation tools expanding innovative applications of real-time video
- RECOMMENDATION
    - Continue to provide technical improvements to deployed UAVs to improve availability & overall video quality
    - Consider deploying additional airborne video collection assets from available inventory to a forward position
    - Provide capability for distribution of gun camera & other theater video

4.5 Airborne Video Surveillance.

The Task Force finds a need for more video and freeze-frame capability in the Theater based upon how Predator UAV information is being used in what is an "Operations Other Than War" (OOTW) environment. The peacekeeping attributes of airborne video surveillance have been found to be equally important to the IFOR peacekeeping mission in 1996 as they were to the NATO air war in 1995. Innovative tasking of real-time video assets by local IFOR commanders and its distribution to theater commanders at many levels (and their staffs) is providing a new type of "situational intelligence and should be evaluated for its potential utility in MRC scenarios. Video clips and single freeze-frame pictures are being used as "information weapons" to discourage activities in violation of the Peace Accord; much of this information previously was available only from ground patrols and forward observers at much greater risk to forward forces. Other uses are to document (and show to local Bosnian authorities when appropriate) suspicious activities of concern; to monitor the status of stored weapons in cantonment areas and activities around suspect burial sites; and to improve security of IFOR forces by monitoring base perimeters and other items of interest. For example, planning for the Mostar local elections included placing the polling locations under video surveillance for real-time indication of disturbances, while French patrols remained at a small number of locations away from the polling areas but with a sufficient number of forces to respond quickly and quell any disturbance.

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The proliferation of video collection systems provides the capability to cover multiple and widely separated targets concurrently over much of Bosnia, each asset retaskable in real time as the threat situation develops. Current video collection assets include Predator, Gnat 750, Pioneer, ARL, and P3. In addition there are large numbers of video cameras mounted as part of weapons systems (such as gun cameras) for Target Localization and Identification and Battle Damage Assessment; many of these have video recorders and are increasingly being used for intelligence applications. Chart 28 summarizes the findings and recommendations.

While the Task Force supports the use of these assets and recommends that more drones be deployed, it is as important to make them more useful. That is why the recommendation addresses 'video exploitation capability'. The Task Force found little capability to catalogue and retrieve video imagery. The Task Force recommends using the same approach used to archive video from gun cameras and other video sources including hand-held data: attach metadata from the beginning, preserve the video, and use indexing and retrieval systems to aid in its exploitation. Video archives which allow a user to "punch in xyz coordinates" days after its collection and retrieve the latest imagery or a temporal sequence of imagery is important to the concept of situational awareness and for operational planning. Commercial tools and techniques, specifically developed for the entertainment market, are available now to achieve this goal.

Real-time movement detection is a unique attribute of video systems and allows analysts and commanders to observe local events unfolding while under surveillance. It is being exploited by analysts both as an indicator of potential threat activity and to optimize sensor re-targeting.

Overall, the surveillance and intelligence 'take' from this new class of airborne sensor is impressive. Many of the observed difficulties are typical of the introductory phase of new military capabilities when the existing doctrine does not prescribe operational procedures well, and experimental innovation is needed at a high level to develop solutions. The Bosnian laboratory is contributing the essential experience to determining the most effective procedures and applications of video sensors. The coupling of video sensors and BC2A is permitting a much larger group of diverse military and civilian experts and customers to participate and contribute to this experiment, while providing essential intelligence to support the IFOR commanders' needs.

Other Major Recommendation Areas (cont.)

- Tactical SIGINT
- Commercial Equipment
  - Future requires new concepts for in-field spares, commercial support & hardware/software training
- JSTARS
- Commercial Satellite Imagery
  - Direct procurement & use of commercial/international imagery to fill gaps in theater surveillance needs
- Information Warfare Vulnerability
- Total Asset Visibility
  - Fix TAV in Hungary to support redeployment phase

The Task Force made recommendations in six additional major areas.

Chart 27. Tactical SIGINT Findings and Recommendations

Tactical SIGINT

- [Not available in this version of the report.]

4.6 Tactical SIGINT.

The Task Force feels strongly that it is important to build a standard background signal database and recommends ensuring an active, aggressive, and coordinated signals program supported by integrated tasking of all appropriate collection assets.

The tactical SIGINT picture has changed dramatically from that observed by the 1995 Task Force visit made during the NATO air war phase. Since that time, the major weapons using signals have been deactivated and placed in cantons. And with the cessation of Bosnian military activities, the use of tactical radio communications has also decreased dramatically. A developing problem is the increase in criminal activity, such as car-jacking or 'turf' battles between rival gangs, in which weapons are used and, as a result, represent a danger to IFOR forces in the vicinity. In this complex and potentially dangerous situation, even though the signals picture is currently 'quiet', the Task Force recommends that an appropriate organization such as NSA or JAC-Molesworth review the tasking of Bosnia SIGINT capabilities, coverage schedules and collection results to ensure that all SIGINT assets are effectively tasked, deployed and operated, independent of their reporting level.

Chart 28. Commercial Equipment is Proving Itself

Commercial Equipment

- Most theater information improvements dependent upon application of commercial equipment/software & will be in the future
  - Software surprisingly robust
- New systems arrive about every two months, some taken away after about six months
  - JSTARS, Predator, Binocular, ICARUS....
  - BC2A has potential to go same route
- Many systems unsupported -- copy & fax machines not fixed for months
- Successes are short-lived unless :
  - Training is institutionalized or integrated (embedded tutor) -- personnel rotation
  - New/upgraded releases to include a self-training capability (video or computer program before installation in theater)
  - Maximize use of training packages which normally come with commercial hardware or software
  - Configuration support is continuous -- handover of responsibility to support systems produces gaps in funding
  - Spares & maintenance are provided -- funds available to buy people/parts available to sell & acceptable transfer mechanism
  - Proprietary rights and licenses are consistent with period of use
- In-theater contractor support recognized as very effective

4.7 Commercial Equipment.

Achieving technical superiority is possible through superior integration (faster and cheaper) of commercially available items, supplemented with a few distinctly military technologies. During its trip, the Task Force found that commercial equipment is proving to be quite suitable for military use provided that adequate supplies of consumables are procured and effective maintenance is conducted.

An increase in utilization of commercial equipment (with their shorter product lifecycle times) is required if obsolescence is to be avoided. However, a couple of issues surfaced during the trip. For example, not all commercial equipment has been procured with an O&M (Operations and Maintenance) support 'tail' unlike the standard process for acquisition of military systems, which must include O&M equipment supportability in the contract. In addition, acquisition personnel must be sensitive to commercial licensing requirements to preclude the expiration of a software license while a system is operational. The result is that, regardless of where the system is employed and under what battlefield conditions, the software/system will shut down when its license expires. Installation of commercial equipment simply requires a different thought process; however, we should not expect commercial equipment to operate with less environmental protection and maintenance than standard military equipment. Its value may rest

in the fact that it is cheaper to replace when it fails. The Task Force recommends attention be given to developing and proving new concepts for integrating commercial technology into operations and its supportability with respect to spares, commercial logistics support, and embedded hardware/software training. In addition, consideration should also be given to the rotation of trained personnel as a matter of TDY policy and the process by which configuration changes are made to deployed systems.

The BC2A program has effectively integrated commercial equipment and demonstrated impressive speed in testing and deploying a communications and information infrastructure within the European theater. The Task Force believes the BC2A program has delivered meaningful benefits already, but the achievements of all programs, including BC2A, are at risk if effective support is not planned and provided.

Chart 29. JSTARS Findings and Recommendations

JSTARS

- Ground commanders universal in praise for JSTARS during entry phase
  - Gave high confidence that entry routes were clear
  - Monitored "blue" forces as well as "red"
- Lower echelons' requests not met because of limited access & prioritization
- JSTARS not required during separation & transition to peace phases
  - Helicopter detection would be valuable
- Ground commanders want JSTARS support for withdrawal phase
- RECOMMENDATION
  - Plan JSTARS deployment for force withdrawal

4.8 JSTARS.

The Task Force found that JSTARS was a valuable asset during the entry phase in Bosnia. Monitoring both the 'Blue' and the 'Red' forces was important. JSTARS has not been active during the separation of forces and rebuilding phases even though some capabilities might have contributed at the margin. Warfighters want JSTARS support during the redeployment phase and the Task Force agrees. Helicopter detection and tracking can be frustrating when adversary pilots employ optimal tactics. Relying on adversary pilots to deviate from optimal tactics and on our teams to detect these deviations in the midst of monitoring and tracking many other platforms is an inferior solution to the problem.

Commercial Satellite Imagery

- Use of unclassified video/imagery has demonstrated a whole new dimension of information power
- Demand for visualization of the battlespace far exceeds ability of limited DOD/national assets
- Required for modeling and simulation, wargaming, mission planning, surveillance/reconnaissance, operations
    - Large number of commercial/international EO, SAR & MSI sensors are operational on orbit today
    - Many more new systems will be flying in near future
- RECOMMENDATION
    - Direct procurement & use of commercial/international imagery
    - Focused CIO/DARPA initiative promptly to effectively exploit all available imagery sources to support theater surveillance

4.9 Commercial Satellite Imagery.

The greatly expanded availability of high-quality commercial imagery in the next few years poses important challenges and opportunities for US military forces.

The Task Force recommends that the Secretary direct the procurement and use of commercial satellite imagery. This was recommended last year by the Defense Science Board Task Force September 1995 report on Defense Mapping for Future Operations and also by this Task Force. It has not happened.

During the election phase in Bosnia, we are going to be focusing our RECCE and surveillance assets on polling places for the national elections. During the withdrawal phase we are going to be focusing on many other critical areas. We don't need precise weapon identification and tracking while weapons are in containment areas, we only need indications of change resulting from movement out/in of the areas. Commercial resources should be sought.

Commercial systems do have limitations: for example, a single SPOT only flies over Bosnia every 17 days. But then SPOT has three contiguous revolutions that can see Bosnia. A customer can task them on day 16.9 with cash in his hand; multiple SPOTS and other commercial systems have almost continual daylight, and some night and all weather, coverage of the area. They are very responsive to customers who pay for it and such customers get very rapid response.

For the first time ever, satellite imagery of 1-meter ground resolution will be available to countries, organizations, groups, or individuals anywhere who are prepared to purchase the material. Technologies and operating doctrine must be examined for ways to deny the advantages that potential adversaries might gain from the new commercial satellite imagery.

On the other hand, the availability of high-quality commercial products will greatly enhance the use of information derived from satellite imagery within our forces.

The key challenges in today's world are (a) to identify the unique contributions of US national imagery that will not be available from commercial sources, then (b) carefully protect that subset while easing restrictions on the official use of all the rest. We encourage the SecDef to propose such a review to the DCI so that a new policy can be in place before the first high-quality commercial imagery is available worldwide.

Information Warfare Vulnerability

- Growing dependence on information systems increases vulnerability to IW
- Insufficient theater program to respond to vulnerability
  - Training & assets needed to maintain information systems
- NSA's Information Warfare Center initiative a good idea
  - Integrates offense & defensive capabilities
  - Develops tools for operating command's use
- RECOMMEND
  - Initial stop-gap effort
    - Assemble IPT to support Bosnia theater IW defense development
    - Field secure digital cellular telephones
    - Leverage NSA's information warfare concept

4.10 Information Warfare Vulnerability.

The Task Force did not do a robust examination of Information Warfare vulnerabilities. The Task Force recommends immediate formation of an Integrated Product Team (IPT) to assess the Bosnian situation and develop preventative and corrective actions.

Computer viruses were widespread. We have coalition partners shoving data back and forth at each other. We also carried equipment over there with viruses in it. We've got to clean up the viruses and get them out of our networks. The Task Force recommends deploying a team to go computer by computer and network by network and clean out the viruses. Then we should put up guards and do training and get ourselves into a safer position in preparation for the tougher phases when vulnerabilities might lead to greater operational impacts and when vulnerabilities might be actively exploited. Close-in emissions could be a real problem because the protective zones are very short with no control outside our wire.

Information systems should can be cleaned up to remove viruses. Vulnerabilities can be reduced through training and discipline assisted by special software and equipment. We should take seriously the capabilities of other forces and discipline ourselves to make it harder for other forces to know or anticipate our intentions and plans and to attack our systems. At the very least, we should expedite the deployment of secure cell phones for our forces in the field. At the same time we need to understand more thoroughly the communications networks available to potential adversaries and determine how best to shape their use.

The IPT mechanism appears appropriate for focusing the attention of a number of areas and disciplines on information warfare vulnerabilities. The Bosnian Theater may provide a good test environment for tools and procedures emerging from NSA's Information Warfare Center.

Total Asset Visibility (TAV)

- TAV observed in Hungary
- Tags & hand-held readers at Taszar Airfield very effective
  - Personnel well-trained
  - Excellent hardware & software reliability (Savi)
- Army program being revised
- RECOMMENDATION
  - Expedite fielding of replacement TAV management system to support Bosnian redeployment

4.11 Total Asset Visibility.

The Task Force looked at the Total Asset Visibility Program supporting forces in Bosnia and the Task Force judged the overall program with respect to procedural, and hardware and software perspectives.

The Task Force is concerned about Total Asset Visibility (TAV). The logistics information system located in Taszar that should support the redeployment and withdrawal phases is not operational and needs to be fixed. The objective is to move forces and equipment so that immediate redeployment to another Theater or for another contingency is possible without a lengthy reconstitution process. TAV will allow us to do that when it is functioning. Not everything is going to come out of Bosnia, but the things that do come back out need to come back out in a coherent way that commanders can monitor. We need to fix TAV.

Chart 33. 1995 Task Force Recommendations Requiring Renewed Attention

1995 Task Force Recommendations Not Fully Implemented

- [Not available in this version of the report.]
- Controlled Imagery Base (CIB) needs to be unclassified for photomaps & simulators over B-H
- UHF airborne SATCOM support still a problem
- Need additional high quality & large format printers in addition to soft copy
- [Not available in this version of the report.]
- Communications landing rights were only addressed for B-H
    - Needs to be incorporated in all Status Of Forces Agreements

5.0 1995 Recommendations Requiring Renewed Attention

The Task Force has noted the effective implementation of many of the 1995 recommendations accepted by the Secretary of Defense and the Director of Central Intelligence and commends those responsible for the impressive progress achieved in a short period of time. Nevertheless, the 1996 Task Force found a series of recommended actions from last year that were not fully implemented or where the progress made was unacceptable to the Task Force (see Chart 33). Six in particular constitute a 1996 major recommendation area and deserve attention and renewed attempts at effective implementation.

5.1 Bosnia Theater Radar/Infrared (IR) Imagery.

One action that the 1995 Task Force recommended was to put our Bosnia theater radar, as well as electro-optical and infrared imagery, in the hands of NATO combat crews. The Task Force knows that the current policy is that there must be exceptional circumstances for radar and IR data to be released to NATO combat crews. The 1996 Task Force continues to feel that all the imagery should be routinely released to the NATO combat crews. If there are stressed operations during redeployment where effective support is needed and you do release all the imagery only then, it just won't be used because you didn't train with it; you fight the way that you train.

5.2 Controlled Imagery Base.

The 1995 Task Force recommended immediate declassification of the Controlled Imagery Base (CIB) to provide gridded photo maps to our land forces. There was great evidence of a need for that on the ground. The Task Force believes that a sufficiently rich mixture of sources (National, Theater, Organic, commercial) is achievable to hide the ultimate capabilities of our systems while providing the highly current materials needed for effective use of tools such as PowerScene and EagleVision.

5.3 UHF SATCOM.

The UHF SATCOM link margin closure problem that the Task Force reported last year has not been fixed at all. The Task Force understands the difficulties of communicating with airborne platforms in the Theater, but believes additional attention is warranted .

5.4 Hard Copy.

The 1996 Task Force still saw a need for generating high quality hard copy in Theater. In Washington, DC we have moved more to the world of soft copy, but many warriors can't use soft copy effectively and must get it printed. Some progress has been made, but more remains to be done. It is frustrating to the support officers to have high quality soft copies at their fingertips but when they need to print a hardcopy for the warfighter, it prints at a lower quality. High quality and large format printers are still in short supply and their maintenance and consumable supplies remain concerns.

5.5 Linguists.

[Not available in this version of the report.]

5.6 Communications Landing Rights.

The 1995 Task Force recommended that when commercial communications systems are used for military purposes they be treated as part of the Defense Communications System infrastructure for Landing Rights purposes. The Dayton Peace Accords handled this appropriately for Bosnia-Herzegovina. However, the 1996 Task Force found that certain of our allies (especially Italy)

persist in levying usurious fees for Landing Rights. The Task Force recommends that the DoD emphasize to the Department of State the importance of resolving this issue fairly and quickly.

Chart 34. Individual Innovations are Addressing Critical Challenges

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Great Ideas Uncovered

- DOD & military adaptation to changing environment
  - Army plan to deploy nondoctrine force structure to optimize constraints on numbers of in-country soldiers
  - NSA initiative for linguist training in Germany before deployment
  - Fighter Management Program, Army program to train and provide R&R to forces
- Important information applications
  - Binocular, integrated NSA intelligence data system integrating nine separate transmissions
    - Integrate into GCCS/DII
  - Adversary, communications relay analysis tool
  - F16 RECCE pods, for RECCE or BDA
  - French RPV, for supplemental photo coverage
- Integration of information
  - Navy's integration of C2 Warfare Officer & JMCIS Ops/Intel, interoperable with GCCS (USS Lasalle, USS George Washington)
  - Video switch for display - 5 different information sources monitored on a single display (Bubba, Wingtip, etc.)
- Innovated applications of information
  - 1st Brigade "person" & "City" books, preparing brigade commander for effective interface with local Bosnian authorities
  - Gold Strike, Sure Strike: new capabilities to provide pilot real-time target identification

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6.0 GREAT IDEAS UNCOVERED

The assignments to the 1996 Task Force were to make evaluations and assessments and to offer constructive criticism and suggestions to make things better. Some may read the lengthy list of deficiencies the Task Force found and forget the good news. The Task Force found real improvements made from last year. We saw a many more good things than deficiencies. The Task Force is pleased to highlight a few of these numerous good things that were found.

The adaptation of our forces to the changing Bosnian environment was phenomenal. After visiting French Units, British Units, and Russian Units, the Americans - young men and women in uniform and civilian clothes - all stood ten feet tall in comparison to everybody else. The Task Force notes with particular approval the innovative adjustments made to comply with in-country military force limits. Pre-deployment linguist training initiatives were a good idea. The Army program using R&R time for forces to recover combat proficiencies not exercised in the OOTW is one way to keep critical skills sharp.

The Task Force saw tremendous information applications with BINOCULAR, the integrated NSA source system, providing data. ADVERSARY is being used by the Carrier Battle Group to do network analysis with very good results. Information from the F-16 RECCE pods can also support battle damage assessments. Some steps were being taken to acquire needed

supplemental photo coverage from non-traditional sources. The Task Force felt that the Russian Brigade was getting better intelligence down at the brigade level than we were because we had one of our sharpest US Army Major S2's there with a group of twenty young people skilled in communications. The Task Force asked the Army Major, "Do the Russians let you into their intelligence center the way you let them into yours?" The Major replied, "I am their intelligence center". And the Task Force was very proud of what we heard.

The Task Force saw integration of information everywhere. Noted earlier in this report, the Navy has taken steps toward an effective Information Officer function and data systems being integrated into the carrier battle group's information database. This is an important model for others to understand and borrow from. We also saw young people who were overcoming the stove pipe systems that we still deploy by innovating. They didn't ask for some acquisition manager in the Pentagon to approve it. They were just doing it. The Task Force even saw one impressive system called "BUBBA," and there were many others. Better and interoperable systems eventually must replace these local efforts, but until then these efforts help get the job done for our warfighters.

Finally, the Task Force wants to highlight a few examples of innovative uses of information. We found brigade commanders being more effective when dealing with local authorities because the brigade commanders could review special briefing books focused on the city and personality involved. We found the Gold Strike and Sure Strike systems assisting a pilot in real-time target identification.

Chart 35. Summary Comments of 1996 DSB Task Force

Summary

- SECDEF initiative for initial DSB Task Force review produced significant improvements
  - EUCOM greatly facilitated implementation of the recommendations
  - Monitoring progress of implementation was important to project success

- SECDEF's approval of 20 DSB Task Force recommendations & continuing monitoring system will further improve intelligence support to the warfighter

- Near-term improvements can enhance Force Protection & Mission Accomplishment

- Tremendous improvement has been made in the past year, thanks to many innovative, hard-working people

7.0 SUMMARY

The four major points above summarize the DSB Task Force's assessment of good progress made to date and the many remaining opportunities for improvement and repeat a sincere recognition of the contribution made by hard-working individual innovators.

The 1996 Task Force found that the actions following the 1995 review conducted under Secretary Perry's initiative have already produced significant improvements. These improvements could not have been achieved without EUCOM wanting to help the information revolution take place. Active monitoring of the implementation probably contributed to the rapid progress. What's happened over the past ten months is really a dramatic change.

The 1996 Task Force made additional recommendations for Secretary Perry's approval that would extend the progress already achieved. These recommendations respond to the Secretary's concerns over the Bosnian election phase, the redeployment and withdrawal phases, what comes after that, and future contingencies. Information support to the warfighter can and should be improved and will allow our forces to act with greater effectiveness and with greater safety.

The Task Force notes that little time is available before the Bosnian elections to develop, test, and reduce to practice additional capabilities that will help coalition forces assure an effective and fair election.

The Task Force made a number of critical recommendations for improved information management so that users can exploit the increased availability of information without becoming overwhelmed. If realized, these actions will not only support our Bosnia warfighters but will support our 21st Century warfighters. Urgent tasks requiring continued and focused attention include proliferating the communications infrastructure and tools to get useful information down to the battalion level, forcing a paradigm shift where higher level Intelligence Centers become proactive providers of targeted information to the lower level users, and forming collection management teams able to coordinate tasking of National, Theater, and Organic assets in support of mission objectives.