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USAWC STRATEGIC RESEARCH PROJECT

THE JOINT STAFF: COMPLETING THE METAMORPHOSIS

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The Joint Staff:
Completing the Metamorphosis

Introduction

A blaring alarm on a console in a surveillance aircraft forces the operator to investigate the reason for the unexpected alert. The information flows to a ground command post and ships in an off-shore U.S. Carrier Battle group. Initial analysis indicates a flight of hostile aircraft speeding towards the Carrier Battle Group in attack profile. Urgent radio transmissions from a ground commmand post express concern over a massive, simultaneous combined infantry and armor assault across a friendly nation's border.

The Deputy Director for Operations in the National Military Command Center (NMCC) is informed of the attack and calls the Chairman of the Joint Chiefs of Staff (CJCS). The theater commander requests permission to launch cruise missile and air strikes according to the approved contingency plans for this region. The Deputy Director activates a Crisis Action Team (CAT). The CJCS advises the Deputy Director that he will consult with the Secretary of Defense (SECDEF) and the President about the requested counter strikes, but approves the CAT's activation. He orders the Joint Staff Operations Director to present a situation briefing for himself and the Secretary of Defense immediately.

The theater commmander orders the Carrier Battle Group to initiate all actions necessary to launch air and cruise missile strikes against the assaulting forces and pre-selected targets.

He also requests deployment of air assault forces, and the alert composite air wing. The CAT Action Officers in the NMCC begin electronic queries of the supporting operational commanders and the Armed Services staffs. Electronic responses quickly validate the readiness status of the units ordered to react to the crisis. These queries also confirm the availability of war stocks in the theater for resupplying the Carrier Battle Group subsequent to strike operations. The Carrier Battle Group commander establishes a teleconference with the theater (combatant) commander and the NMCC. Action Officers in the NMCC conduct simulations of the crisis using established computer modelling programs to predict potential force inadequacies and logistics shortfalls. Supporting commanders order forces to make preparations to deploy while prepositioned equipment beings to flow to the conflict . . . .

One does not require the futuristic vision of a Jules Verne to comprehend this possible scenario. The United States Armed Forces, specifically the command, control, communication, computer, and intelligence (C4I) elements, are unique. These are the only forces potentially able to respond to any crisis, worldwide. Yet, because of downsizing, interoperability, and emerging Service parochialism, they are becoming less capable of doing so effectively.

Given time, the Armed Forces may achieve the connectivity and interoperability necessary to facilitate the postulated scenario, yet the means are available today to exploit the

current explosion in information technology and enhance combat effectiveness. To do this the Joint Staff must assume a greater leadership role in preparing the United States Armed Forces for the technological leap into the next century. The Joint Staff must exert greater control over the Services, and demand a higher degree of connectivity and consolidation, National Security requires nothing less.

Building a Joint Force

The key to achieving an efficient, combat capable joint force lies within the staff organization that has the vision to build that force. The Joint Staff today is more effective than ever, but what more could be done?

Two excellent examples are readily available. The Great German General Staff, prior to 1870, embodies principles for staff organization and effectiveness that deserve consideration. It is a superb model of an organization which succeeded in capitalizing on burgeoning technology. Additionally, the General Staff was an organization which considered logistics, war gaming, and planning for the Prussian Army. The officers serving on the General Staff were the best and brightest in the Prussian Army. After rigorous education, these officers served in the General Staff, then returned to operational units to enhance each unit's effectiveness.[1] The General Staff, under the leadership of Helmuth von Moltke, forged the Prussian Army into the world's premier fighting force by employing superior technology, training, and strategic planning.[2]

The Israeli Defense Force (IDF) is an admirable contemporary example of a General Staff system which is also Joint system.[3] The IDF is primarily ground force, with a substantial reserve component, whose principal mission is Israel's defense. None the less, it is also a Joint Force which integrates the naval and air components into its stucture. The IDF has repeatedly fought and won Israel's wars by mobilizing and immediately incorporating the reserve component into the force structure. Additionally, the intelligence, logistics, operations, planning, and theater command functions are subordinate to the Chief of the General Staff.

Many of the components described above exist in the U.S. Armed Forces either within the Joint Staff, the Service staffs, or the theater commander responsibilities. The mission statement for the U. S. Joint Staff permits it to undertake a number of significant tasks which embody many of the principles espoused by the German General Staff system framers and utilized by the IDF.[4] Accomplishment of the tasks specified in the mission statement can achieve the force integration exemplified by the IDF including efficient structure, planning, and equipping of the Armed Forces for the next century.[5] Additionally, some organizational changes to the Joint Staff structure are necessary to enhance effectiveness. Critical areas requiring attention will serve as the focal points for this study.

C4I for the Warrior

The information technolgy explosion sweeping the world

presents opportunities for modernization unequaled since the nineteenth century Industrial Revolution. The nation that can visualize and then pursue the full potential of information systems and communications will ultimately dominate the economic and military environments. The battlefield use of rail as a new transportation mode and advanced types of arms deployed by the German Army of the late 19th century pale in comparison to the immense military capabilities represented by today's integrated data systems and instant worldwide communications.[6] Yet, these proposed technology changes were no less astounding when attempted in the 19th century.

The IDF's ability to utilize its extremely effective intelligence capabilities in a wide spectrum of operations is a model of integration. The IDF is nonpariel in its ability to modernize, modify, or build weaponry that suits its needs. One example is the modernization of older weapons systems such as the F-4 Phantom aircraft to support ground and naval forces. A very fiscally prudent approach to acquiring or maintaining weapons systems has permitted all the branches of the IDF to improve combat capability within a constrained budget.[7]

United States Armed Forces doctrine exists to define and apply new technologies and to integrate these technologies into combat, logisitics, and intelligence capabilities. CJCS Memorandums of Policy, such as MOP 58, and design documents, such as the Command Center Design Handbook, set forth guidelines concerning interoperability, Automatic Data Processing

architecture, and command center design.[8]

Although doctrine and policy exist to guide technological improvement, there are significant obstacles to Joint operations on a global scale. One obstacle is the inability for the Joint and Service operations centers within the Pentagon, and remote theater command centers to communicate in an integrated multi-media mode. The Worldwide Military Command and Control System (WWMCS) has been the primary worldwide communications system available to date. This system, though better than none, is cumbersome, and cannot exchange any data that is not rigidly formatted. Yet, with the exception of secure telephones, and radio communications, WWMCS was the only common data exhange capability throughout OPERATION DESERT STORM.

The rapidly expanding number of communications satellites, fiber optic technology, and high data rate transmission capability are harbringers of real-time communications for voice, video, and data exchange. The Joint Worldwide Information Communication System (JWICS) is an example of such an improvement as it permits teleconferencing between theater command centers and the Pentagon. Action Officers in the various command centers worldwide rely on video, graphic, and digital data to manage crises. This data aids in determining the force, logistics, and lift requirements necessary for accurate, rapid decisions. Presentations using state of the art displays enable senior leaders to review, select, or reject options.

It is time to eliminate the requirement for Action Officers

to transcribe mountains of data into charts and graphs and carry these documents from office to office. Technology exists which can link offices, command centers, or mobile units from terminal to terminal. There is only one obstruction preventing the possession of this sort of instant communication. That obstruction is created by Armed Services parochialism.[9] While the Services are attempting to capitalize on greater connectivity and better data exchange internally, (e.g., Navy ships, aircraft, and submarines being able to use the Naval Tactical Data Link for tactical information) there is an enormous reluctance to share data. It would seem that, as in the scenario presented at the beginning of this paper, an officer at Transportation Command would need material requirements for forces deploying to a remote location. Similarly, officers at other supporting commands, Service operations centers, as well as all intelligence organizations would also need to share data. Decision briefings require video, graphic, and digital data which should be compatible from terminal to terminal.

A staff officer should have the means to electronically prepare and transport a briefing for the Secretary of Defense to the Services, headquarters, combat commanders, and government agencies affected. The editing of questionable or incomplete sections within the briefing can be accomplished by the appropriate officer prior to review by the crisis staff at each organization. Return of the corrected briefing could be accomplished electronically to the originating officer for

presentation as necessary. Comments by the SECDEF would then be transported as either annotations or in corrected format for use by all involved parties.

Incorporating Service-wide connectivity for all communications media would appear to be a simple procedure, however, this is a difficult goal to achieve. There has been movement by all Services and agencies to make Automated Data Processing systems interoperable. What has caused the inability to make such a connectivity capability achievable? The lack of compliance with established CJCS policies is the answer. Even within the Pentagon, with the close proximity of all the Services and the Joint Staff, there is currently an inability to exchange the full spectrum of data between operations centers. The software, protocols, and architectures used by each Service and the Joint Staff are often incompatible. There is even less similarity and compatability for either the Services or the Joint Staff to share data with any of the theater or operational commanders.

A common argument concerning the ability access such information is the lack of the necessary security clearance of the inquiring individual. The use of multi-level security on a single communications net is a realistic concept near techincal resolution, but which is currently mired in a bureaucratic tangle among several military and civilian security agencies. There is no intent to suggest the release of highly classified or sensitive data to any person who turns on a computer terminal.

Any person holding the requisite security clearance to enter a secure location and use a computer terminal in that area can hardly have unrestricted access. However, Automatic Data Processing network management combined with available security badge technology can prevent unauthorized personnel from accessing highly classified data. Security should be that last argument preventing the implementation of joint connectivity and data exchange.

The Joint Staff, in concert with the Defense Information Systems Agency(DISA), has both the technical knowledge and the regulatory authority to bring all the Services and theater commanders into compliance with current directives. An excellent opportunity to build a state of the art data network is available in the currently planned Pentagon renovation. The JCS has approved a proposal to place the NMCC and all Service operations centers in a central location on the building's newly created mezzanine. The renovation is a unique opportunity to create layered security zones for personnel and information exchange. Several corporate headquarters facilities have already built extremely flexible data processing networks permitting access to mulitple security levels.

If the Services were to implement the architecture and protocols necessary to permit access from one center to another, from terminal to terminal, at a minimum two immediate benefits could be realized: (1) Data of practically any band width could be exchanged between action officers, greatly enhancing

operations for the Services and the Joint Staff, (2) The perception that separate Automated Data Processing systems enhance Service identity and relevance would be surmounted. Once the Pentagon elements could communicate in such a manner, resistance by other theater operations centers or the various Service commands would be inexcusable within the constraints of each organization's budget to support the necessary software or architectural changes. Such a transformation can be achieved today because commercially available technology meets standards for interoperability and compatibility.

The Joint Staff can facilitate interoperability and compatibility by asserting its authority in Automatic Data Processing and communication systems standardization. The Joint Staff can direct the Defense Information Systems Agency to address the problem and propose cost effective, near term solutions. Joint Staff approval of any proposed solutions would affirm the need for all the Services to move quickly and in unison in resolving one of the most vexing issues facing the Armed Forces today.

Information Technology and Beyond

Improvement in the communication technology field is undoubtedly the key to a quantum leap in force capability. There are other facets of information technology and weapons system development at the Joint level requiring immediate attention.

The incorporation of advanced decision making aids or smartware, will permit table-top wargaming by senior decision

makers.[10] Top level commanders could select and review scenario options without ever engaging combat forces. The ability to accurately predict conflict outcome by a table-top method is limited today, but this capability is immediately available and merits immediate implementation. The expense necessary to engage mulitple combat commanders, the Joint Staff, and the Services in worldwide war games is becoming prohibitive. The development of the wargaming center at the Army War College and its projected connectivity to other major Army commands must be precursor the necessary connectivity between all Service, theater, and Joint Staff command centers.

Thoughtful consolidation of capabilities and systems will greatly enhance the Armed Forces efficiency. The historical ownership of some systems or programs mandates the Joint Staff arbitrate potential disputes.[11] Each theater commander submits an Integrated Priority List to the Joint Staff. These lists should be the basis for Service priorities. There are theater unique requirements that may differ from existing Service unique requirements which will require resolution. Due to the Joint Oversight processes nature, the concurrence or reasoned objections of all concerned Services will be encountered early, and an agreeable presentation should enable the budgeting process to be improved. The Joint Staff logistics and force planning directorates are in a unique position to arbitrate and coordinate the inputs of the Services for all programs. In fact, the logistics directorate may have the greatest potential for leading

the Armed Forces into the 21st century. Acquisition, procurement, repair, and transport are all areas requiring reform and intensive integration. The Joint Staff logistics directorate must be cognizant of the maintenance and support requirements for new systems. Dwindling Research and Development funds, rising manufacturing costs, and restricted budgets are compelling reasons to embark on Joint programs that have been traditionally pursued individually by the Services. Several examples follow:

Fighter/Attack Aircraft: The Navy and Air Force have fighter and attack aircraft that require follow-on programs to maintain technological superiority or prevent airframe obsolescence. Future development of two aircraft is prohibitive. Agreement must be reached upon an airframe that meets each Service's unique requirements for range, speed, ceiling, and ordnance capability. The effort must extend to the use of similar armaments, avionics, and engines wherever practical. The reduction and streamlining of supply, support, and maintenance requirements is obvious. The F-111 aircraft program attempted to accomplish much of what is proposed in the 1960s. Necessity is driving the Services back to this type of approach, but experience and wisdom should prevent the failure that befell the ill-fated F-111 Joint procurement program. The F-4 aircraft was successfully used by the Air

Force, Navy, and Marine Corps. One possible point of departure on future aircraft programs would be a review of that highly successful program.

Gun Systems: Decommissioning battleships with 16" guns has limited the Navy to supporting Marine Corps or Army units ashore with only 5" weapons. Naval Surface Fire Support is a major issue for the ground forces which requires more attention from the Navy. Previous large caliber gun programs were unsuccessfully completed however, the need for a weapon with increased range and lethality merits reconsideration. Additionally, every effort must be made to increase the range and accuracy of existing guns.

One method of pooling resources might be to make changes to all three Services' gun capabilities simultaneously. The main gun on the M1A2 tank is only slightly smaller than the 5" shipboard gun. Manufacturing a common barrel should permit more efficient production for all the Services. The adoption of similar guns should also extend to common ammunition production. Further, if the Navy re-introduces a larger caliber gun aboard ship, this weapon should be of similar caliber to those used by both the Army and Marine Corps.

Helicopters: The Navy does not presently possess the capability to fire missiles from its helicopters. A

missile system's adaptation to the Navy's helicopters will fill a void which existed during the Gulf War. Surface combatants are frequently employed independently of the Carrier Battle Groups, so the value-added of an armed helicopter becomes increasingly important.

With the exception of the Apache and the H-60 series, many helicopters being used by the Services are near the end of their service life. One airframe, the H-60, is common in the Army and the Navy. There is no reason that similar programs for future medium or heavy lift, scout, and attack helicopters cannot be implemented.

Service Unique Capabilities: Regardless of the economy realized by consolidating aircraft and gunnery needs, there are some capabilities which cannot be merged. The Air Force has the "deep strike" mission.[12] This may well require an additional aircraft not suitable for carrier use. The Marine Corps will continue to require high speed, heavy lift amphibious vehicles, and the Navy will continue to be the sole service requiring surface combatants, submarines, sea-lift, and aircraft carriers. The Army must maintain the ability to conduct land warfare with heavy forces and have the capability to sustain these forces well inland. The highly specialized industrial base necessary to sustain these types of systems may not be amenable to consolidation.

Common Training: A Hard Choice

No matter how well hardware issues are resolved, there are still some other chronic problem areas that require resolution. For example, an initiative to train all rotary wing pilots at a single location is being pursued by the Services.[13] The training syllabus would separate pilots when they need to acquire specialized skills such as shipboard landing qualifications. This is an entirely reasonable and cost effective approach. The benefit of pilots from all Services training together early in their careers is inestimable. But this is not enough.

There are currently four Service Academies. The Service unique missions each Academy prepares its graduates for what will be required well into the next century. The need for each Service to imbue traditions and culture as well as specialized skills in not in question.[14] The question is, what is the difference between Mechanical Engineering or History degrees at Annapolis, Colorado Springs, Groton, or West Point?

Take for example, the Japanese Maritime Self Defense Force (JMSDF) officer accession process. The JMSDF Academy provides a common undergraduate program for all three branches of its force. Following graduation, the candidates then proceed to Service specific training at locations such as the Naval Officers School at Eta Jima. For the U.S. Armed Forces, one possibility could be that each existing institution would provide a four year bachelor's degree for a specified number of candidates. Summer training programs would permit the candidates to either "sample"

the various Services, or permit them to choose a specific Service for training. Upon graduation, the follow-on Service specific training would be conducted at the appropriate institution. As the size of the Armed Forces decreases, it would be logical that all prospective officers, regardless of accession source, (i.e., the Academies, Reserve Officer Training Corps, or officer candidate programs) would also receive advanced training such as the Surface Warfare Officer's basic course at these institutions.

A more radical approach is necessary for the Senior Service Colleges. Do the curricula at any one of these institutions substantially vary from any other? If the intent of all the Senior Service Colleges is to develop and encourage strategic and operational thought upon a Joint foundation, then all the Senior Service colleges should be consolidated under the aegis of the National Defense University. The numbers of officers requiring Joint education is greater than any one campus can accomodate. The existing colleges would have a single focus, and would guarantee the similarity of education for all officers regardless of Service. The Prussian War Academy system institutionalized combat efficiency by ensuring that in a given situation different staff officers, educated to a common fighting doctrine, would arrive at approximately the same solution to employ the available forces most effectively. In addition to personnel, this system depended conformity to a commmon fighting doctrine and common operational procedure.[15] This is what is required today for the U.S. Armed Forces.

The era of a single Service preparing for a future conflict exclusively featuring its strengths and platforms is past. Officers must be able to understand the cultural basis, operational capablities and weaknesses of their counterparts from other Services since they will train and fight together.

The Joint Staff Officer Today

The Joint Staff, indeed all theater command staffs, are substantially different than the staffs of a decade ago. The requirement stipulated by the Goldwater-Nichols Act for officers to receive Joint Professional Military Education, to be competitive for command and promotion, and the mandate that all officers to be promoted to General (Flag) rank to have Joint Duty after 1 January 1994 has positively affected the quality of the personnel and planning of the Joint Staff. The Joint Staff is no longer a place to assign an officer who has been passed over for command or who is trying to finish out a career. The Joint Staff roster now represents the best each Service has to offer.

The Way Ahead

The marginal interoperability sucesses of the U.S. Armed Forces in Grenada confirmed what had been plainly apparent since 1947. The Armed Forces were fragmented, independent organizations that had not kept pace with the nation's priorities nor learned the necessary lessons.[16]

The Goldwater-Nichols Act has provided a tremendous impetus for change. It is a superb foundation upon which to implement

the substantive changes required within the Joint Staff.[17] The CJCS has a much stonger role in the chain of command. The creation of the Vice Chairman, Joint Chiefs of Staff (VCJCS) position furnishes the structure with a legitimate deputy to the CJCS. Operational planning and force structure directorates now address serious readiness and budget issues concerning all the Services. Finally, officers on the Joint Staff must meet strict rules regarding tour length and qualification. All of these measures have already born fruit in Armed Forces operations today.

Of particular interest is the VCJCS duty to chair the Joint Oversight Review Council (JROC) process.[18] The JROC process, supported by the Joint Staff Exercise Directorate, is designed to be the foundation for planning, budgeting, requirements review, interoperablity, force integration, and prioritization for all the Services.

Achieving the force integration and interoperability begun with the JROC process within the Services requires one fundamental organizational change. An example of the necessary change resides within the Israeli Defense Force. It operates in a mode similar to that of the German General Staff in World War II. All Service chiefs, theater commanders, and staff functions are subordinate to the Chief of the General Staff.[19] The nature of the United States Armed Forces is substantially different from the primarily ground force focus of either Israel or Germany. Exact replication the IDF's organization may not be optimal.

Therefore, the proposed change to the current structure would be to subordinate the Service chiefs to the CJCS while the theater (combatant) commanders would retain their status. (A similar change is warranted for the Service Secretaries vis a vis the Secretary of Defense.)

If the Service chiefs were subordinate to the Chairman, then the various directorates of each staff could coordinate with the other Services through the Joint Staff. Programs requiring interoperability would be identified and evaluated appropriately. Electronic connectivity implementation discussed earlier would significantly reduce the time currently necessary to process actions. The top heavy structure of all the staffs in the Pentagon would be reduced. The aggregate effect of the subordination of the Service staffs reduces both the size and seniority of all the Staffs. The amount of time devoted to the preparation and review of actions would also be reduced.

The Joint Oversight process would be significantly enhanced due to the necessity for each Service to coordinate very early for budgetary and program requirements. The Joint action process would provide a forum for all Services and theater commanders to ensure interoperability. Rigid adherance to the Joint oversight process would permit consideration of programs that were Service unique and require justification in terms of the value added to the Armed Forces. Likewise, those programs that were candidates for consolidation would receive scrutiny from the appropriate Services and Joint Staff directorates prior to presentation and

approval.

Conclusions

Very few, if any, of the issues raised in this paper are new or particularly startling. Proposals for reorganizing the Armed Forces have been made by noteworthy individuals such as Generals Dwight Eisenhower, David Jones[20], and General Edward "Shy" Meyer.[21] These proposals often met with skepticism from the the uniformed military. In each individual's era the civilian leadership generally considered the proposals as either disengenuous or unachieveable. One major reason for ignoring past proposals was that there was generally enough funding available to permit each Service to continue on its own course. The Roles and Missions review conducted by the Joint Chiefs under General Colin Powell[22] reinforced this perception since there was little, if any, meaningful consolidation or compromise proposed by the Services. In an article titled "Beyond Goldwater-Nichols" concerning the possibility of more drastic changes to the Armed Forces, the author believes that, "Neither Congress nor civilian leaders are likely to initiate reform."[23] Unfortunately, the Services have resisted fundamental change to such a degree that it is unlikely that the Congress will be content with only minor changes in the present structure. To paraphrase a commonly heard cry thoughout the U.S. Naval Academy just prior to any formation, "Time, tide, and formation wait for no man!" There is no more time to wait in streamlining the four Services into an effective Joint Force.

Recommendations

1. The Service chiefs and staffs should be subordinated to the Chairman of the Joint Chiefs of Staff. Additionally, the Joint Staff has enacted manning reductions which should be stopped. The Joint Staff manning requires review and readjustment to permit it to carry out the planning, review, doctrinal, and logistical functions necessary to oversee or implement the concepts discussed herein.

2. A concerted effort to comply with industry standards consistent with the complex, redudndant, and unique requirements for global command and control must be mandated and led by the Joint Staff. All future Automatic Data Processing, communications, and information systems must be compatible between all Service operations centers, theater command centers, the Service staffs, and the NMCC as a minimum.

3. The acquisition objectives stated in the Final Report to the President, "A Quest for Excellence" must be implemented immediately.[22] These objectives must preserve necessary Service unique capabilities. Whenever an industry standard exists or minimal modification will make a product acceptable to all Services, the desires of each must be subordinate to

the need for interoperability, maintainability, and affordability.

4. The Joint Oversight process, the budgeting process, and the National Military Strategy must become interlocking pieces supporting a single purpose. Matters concerning data exchange, connectivity, maintenance, acquisition, or depot repair must be subjected to the JROC process. There is no other way to ensure that future systems or families of systems will have a fair hearing and compete against all other warfighting requirements.

The United States has lost many first battles in its wars. This nation is unlikely, and would be imprudent, to remove itself from the forefront of international politics. Therefore, the inevitable conclusion is that there will be another first battle. The military has proved that it does not have to lose that engagement. The requisite vision, intelligence, and ability reside within the Armed Forces today to effect changes far beyond the scope of those that have been legislated. The global capabilities of the United States Armed Forces are unique and deserve enhancement to guarantee future combat effectiveness. The Joint Staff must complete the metamorphosis begun as a result of the Goldwater-Nichols Act, and capitalize on the technological revolution underway to lead the Armed Forces into the 21st century.

ENDNOTES

1. Spenser Wilkinson, The Brain of An Army: A Popular Account of the German General Staff, (Westminster: Archibald Constable & Co., 1895), 43-60.

2. Arden Bucholz, Moltke, Schlieffen and Prussian War Planning, (New York: St. Martin's Press, 1991), 57.

3. Charles E. Heller, Economy of Force: A Total Army, The Israel Defense Force Model, (Carlisle Barracks: Strategic Studies Institute, US Army War College, 1992), 7-25.

4. Walter Goerlitz, History of the German General Staff, (Praeger Inc, New York, NY,1953., 15-49.

5. Boyce B. Burley, The Joint Staff Officer's Guide 1993 AFSC Pub 1, Armed Forces Staff College, Norfolk, Va. 1992, 2-10 - 2-21.

6. Goerlitz, 58.

7. Ashley Brown, ed., Encylopedia of the World's Air Forces, (New York, Facts on File, 1988), 78-79., Bernard Prezlin, ed., The Naval Institute Guide to Combat Fleets of the World, (Annapolis: Naval Institute Press, 1993), 282-286., Christopher Foss, ed., Jane's Armour and Artillery, 14th Edition, (Guildford and King's Linn: Biddles Ltd., 1993), 58-65.

8. Several documents discuss standards, trends, and requirements for communications and Automatic Data Processing. The Command, Control, Communications, Computers, and Intelligence Directorate (J-6) of the Joint Staff is working diligently to standardize all aspects of C4I standardization including the design of command centers. The Operations Directorate (J-3) is also working on design standardization of command centers as the lead Joint Staff organization concerning the Pentagon renovation as it applies to the NMCC and Service operations centers. MOP 58, JCS Instruction 6212.1, and the Command Center Design Handbook (DISA) support standardization as do the initiatives for Corporate Information Management being lead by the Office of the Secretary of Defense under Mr. Strassman.

9. Interview with Carl H. Builder, Rand Corporation, Carlisle Barracks, Pa., 7 April 1994. The interview followed a lecture to the USAWC, The Roles and Missions Debate Through a Cultural Prism, Mr. Builder stressed the parochialism of the Navy and the changes that were evident in the policies of this Service when various communities (e.g., Submariners, Surface Warfare Officers, or Aviators) were dominant in the Service staff.

10. U.S. Department of Defense. Chairman, Joint Chiefs of Staff. Joint Pub 3-0: Doctrine for Joint Operations, 9 September 1993, III-40. This sections discusses rehearsals for all types of operations and specifically the rehearsal at the operational level using computer-aided simulations. U.S. Department of Defense. Chairman, Joint Chiefs of Staff. Joint Pub 3-02: Joint Doctrine for Amphibious Operations, 8 October 1992, XII-4. This references the expanding use of computer simulations to enhance amphibious operations and ensure operational security. More research is being done by several firms which would permit evolutions such as predicting enemy force locations.

11. Builder, Roles and Missions.

12. U.S. Department of Defense. Chairman, Joint Chiefs of Staff. Chairman of the Joint Chiefs of Staff Report on the Roles, Missions, and Functions of the Armed Froces of the Unites States, report prepared for the Congress by Colin L. Powell, The Pentagon, Washington, D.C., February 1993, pp. III-13 - III-15.

13. Powell, xvi.

14. Builder, Roles and Missions.

15. Bucholz, 53.

16. Richard A. Gabriel, Military Incompetence: Why the American Military Doesn't Win, (New York: Hill and Wang, 1985), 199.

17. Goldwater-Nichols Department of Defense Reorganization Act of 1986, Public Law 99-433, 99th Y,S. Congress, 1 October 1986, 25-31.

18. U.S. Department of Defense. Chairman, Joint Chiefs of Staff. JROCM-052-92: Administrative Instruction, 6 July 1992. This document is the charter for the JROC. It describes the essential functions of the JROC and the mission and membership.

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