

Audit



Report

OFFICE OF THE INSPECTOR GENERAL

**MANAGEMENT OF DOD INTEROPERABILITY EFFORTS
FOR TACTICAL COMMAND, CONTROL, AND
COMMUNICATIONS**

Report Number 93-050

February 2, 1993

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The following acronyms are used in this report.

AFB.....Air Force Base
ASD(C3I).....Assistant Secretary of Defense (Command, Control,
Communications and Intelligence)
C2.....Command and Control
C3.....Command, Control, and Communications
C3I.....Command, Control, Communications, and Intelligence
C4.....Command, Control, Communications, and Computers
CINC.....Commander in Chief
DISA.....Defense Information Systems Agency
FIA.....Functional Interoperability Architecture
IIP.....Interoperability Improvement Program
J-6.....Joint Staff Command, Control, Communications, and
Computer Systems Directorate
J-7.....Joint Staff Operational Plans and Interoperability
Directorate
JIEO.....Joint Interoperability and Engineering Organization
MOP.....Memorandum of Policy
NATO.....North Atlantic Treaty Organization
SINCGARS.....Single Channel Ground and Airborne Radio Systems
SINISS.....Single Channel Ground Airborne Radio System Imbedded
Communications Security Nonimbedded Communications
Security Integrated Support Software



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February 2, 1993

MEMORANDUM FOR ASSISTANT SECRETARY OF DEFENSE (COMMAND, CONTROL,
COMMUNICATIONS AND INTELLIGENCE)
DIRECTOR, JOINT STAFF

SUBJECT: Audit Report on Management of DoD Interoperability
Efforts for Tactical Command, Control, and
Communications (Report No. 93-050)

This report is one of two issued as part of our overall audit of U.S. interoperability with North Atlantic Treaty Organization (NATO) tactical command, control, and communications. The report addresses the lack of combined (U.S. and Allied forces) doctrine, tactics, techniques, and procedures; the effectiveness of the Interoperability Improvement Program; and the DoD's management of tactical C3 architectures.

A draft of this report was provided to the addressees for comment on August 25, 1992. Replies were received from the Assistant Secretary of Defense (Command, Control, Communications and Intelligence) and from the Joint Staff on November 10, 1992.

DoD Directive 7650.3 requires that all audit recommendations be resolved promptly. A chart provided at the end of each finding identifies the unresolved recommendations and the specific requirements to be addressed in your comments on this final report. Recommendations are subject to resolution in accordance with DoD Directive 7650.3 in the event of nonconcurrence or failure to comment. Your comments are requested within 60 days of the date of this report.

The courtesies extended to the audit staff are appreciated. If you have any questions on this audit, please contact Mr. John A. Gannon on (703) 692-2906 (DSN 222-2906) or Ms. Evelyn R. Klemstine on (703) 692-2831 (DSN 222-2831). The distribution of this report is listed in Appendix F.

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CC:
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Office of the Inspector General, DoD

AUDIT REPORT NO. 93-050
(PROJECT NO. 1RA-0048.01)

February 2, 1993

MANAGEMENT OF DOD INTEROPERABILITY EFFORTS
FOR TACTICAL COMMAND, CONTROL, AND COMMUNICATIONS

EXECUTIVE SUMMARY

Introduction. Tactical command, control, and communications (C3) systems are those systems that integrate various tactical combat elements into a focused, efficient, fighting force in conducting offensive and defensive ground, sea, and air operations. Interoperability is the ability of systems or forces to provide services to and accept services from other systems, units, or forces and to use the services to enable systems, units, or forces to operate effectively together. The Assistant Secretary of Defense (Command, Control, Communications and Intelligence) is responsible for the overall supervision of C3 matters. The Joint Staff Command, Control, Communications, and Computers (C4) Systems Directorate (J-6), is responsible for developing policies, plans, and programs for C3 systems to ensure adequate C3 support to the Commanders in Chief and the National Command Authorities for joint (U.S. forces only) and combined (U.S. and Allied forces) military operations. The Joint Staff Operational Plans and Interoperability Directorate (J-7) is responsible for increasing the warfighting capabilities of the unified and specified commands through joint doctrine, tactics, techniques, and procedures.

Objectives. This audit evaluated DoD's management of combined tactical C3 interoperability. In addition, we determined whether internal controls were in place in DoD to ensure that maximum interoperability was achieved.

A related report was previously issued as part of this project. Audit Report No. 93-015 was issued November 3, 1992, addressing matters that pertained to U.S. participation in the North Atlantic Treaty Organization (NATO) Air Command and Control System, DoD's implementation of Standardization Agreement 2101, "Establishing Liaison," and NATO test initiatives.

Audit results. The audit determined that DoD has not shown a strong enough commitment to joint and combined tactical C3 interoperability.

o Joint Staff Publications 6-0 series, "Command, Control, Communications, and Computer Systems Support to Joint Operations," do not address combined tactical C4 operations.

Without combined doctrine, tactics, techniques, and procedures, U.S. Forces cannot establish well-organized C4 systems to support combined military operations (**Finding A**).

- o The Interoperability Improvement Program (IIP) has not met its objective to resolve critical C3 interoperability issues. In addition, the IIP duplicated the functions of other Joint Staff C3 forums. Critical C3 interoperability issues either have not been addressed or remain unresolved (**Finding B**).

- o Minimum essential C3 interoperability requirements as prescribed by the various DoD C3 architectures have not been implemented by the Services. Without DoD guidance for the development and implementation of C3 architectures, the Services will continue to develop their own incompatible communications equipment (**Finding C**).

Internal controls. The audit identified internal control weaknesses in that critical duties of the IIP were not separated and a sufficient audit trail had not been established to support closure of issues. Part I of the report describes the controls we assessed, and Finding B discusses the weaknesses in detail.

Potential benefits of audit. Implementation of the recommendations will strengthen the DoD's commitment to interoperability by establishing C3 doctrine for combined operations, consolidating C3 forums under one organization, and providing implementing procedures for C3 architecture interoperability requirements. Appendix D describes the specific benefits resulting from the audit.

Summary of recommendations. We recommended that the Joint Staff define the information exchange requirements among tactical command and control systems in combined operations and develop a combined publication series to support combined C4 operations. Also, we recommended that the various Joint Staff C3 forums be consolidated and that duties of key functions be segregated. Further, we recommended that guidance be established for the development and implementation of C3 architectures.

Management comments. The Assistant Secretary of Defense (Command, Control, Communications and Intelligence) (ASD[C3I]) responded that work was under way by the Joint Staff and the Defense Information Systems Agency that addressed establishing guidance for the development and implementation of C3 architectures. The Director, Joint Staff, nonconcurred with defining information exchange requirements among tactical command and control systems in combined operations and with developing a combined publication series to support combined C4 operations. The Joint Staff concurred with moving the IIP under the Military Communications-Electronics Board. With that move, some key functions have been segregated and follow-up procedures have been

established for closed IIP issues. In addition, the IIP has been made the primary focal point for addressing C4 interoperability issues.

The Joint Staff stated that since the end of the audit data collection effort in February 1992, action had been taken on many of the report recommendations. Several other recommendations are being addressed through a new concept being developed by the J-6. In addition, the Architecture and Integration Division was formed within the J-6 to provide a central office for addressing C4 interoperability issues, standards, and architectures.

Details on managements' comments and audit responses are in Part II of the report, and the full texts of managements' comments are in Part IV. The ASD(C3I) and the Joint Staff are requested to provide comments on unresolved issues within 60 days of the date of this report.

TABLE OF CONTENTS

	<u>Page</u>
TRANSMITTAL MEMORANDUM	
EXECUTIVE SUMMARY	i
PART I - INTRODUCTION	
Background	1
Objectives	2
Scope	2
Internal Controls	3
Prior Audits and other Reviews	3
PART II - FINDINGS AND RECOMMENDATIONS	
A. Combined C4 Doctrine, Tactics, Techniques, and Procedures	5
B. Interoperability Improvement Program	15
C. Management of C3 Architectures	27
PART III - ADDITIONAL INFORMATION	33
APPENDIX A - Joint Publication 6-0 Series Outline of Major Functional Areas	35
APPENDIX B - Analysis of Closed IIP Issues	37
APPENDIX C - Interoperability Improvement Program Issues Prematurely Closed	39
APPENDIX D - Summary of Potential Benefits Resulting from Audit	43
APPENDIX E - Activities Visited or Contacted	45
APPENDIX F - Report Distribution	49
PART IV - MANAGEMENT COMMENTS	51
Assistant Secretary of Defense (Command, Control, Communications and Intelligence)	53
Joint Staff	59

This report was prepared by the Readiness and Operational Support Directorate, Office of the Assistant Inspector General for Auditing, DoD. Copies of the report can be obtained from the Secondary Reports Distribution Unit, Audit Planning and Technical Support Directorate (703) 614-6303 (DSN 224-6303).

PART I - INTRODUCTION

Background

Interoperability. Joint Publication 1-02, "Department of Defense Dictionary of Military and Associated Terms," defines interoperability as the ability of systems or forces to provide services to and accept services from other systems, units, or forces and to use the services to enable systems, units, or forces to operate effectively together. To achieve communication interoperability, the Services need interoperable equipment as well as operational procedures, such as codes and formats. For the purposes of this report, the Services include the Army, Navy, Air Force, and Marine Corps. The overall plan, or design, to develop and assure compatibility is referred to as the command, control, and communications (C3) architecture, which is essential to the achievement of interoperability.

Tactical C3. DoD has defined tactical C3 systems as systems that provide the means of integrating various tactical combat elements into a focused, efficient, fighting force for conducting offensive and defensive ground, sea, and air operations. Interoperability of tactical C3 systems requires integration of surveillance and identification systems, command centers, communication systems to transmit orders, and navigation and positioning systems. Command and control (C2) has historically been defined as the authority and direction by a commander over assigned forces to accomplish the mission. Command and control has been expanded to include communications. Over time, interoperability has evolved to include command, control, communications, and computers (C4).

Interoperability infrastructure. The Assistant Secretary of Defense (Command, Control, Communications and Intelligence) (ASD[C3I]) is responsible for the overall DoD supervision of command, control, communications, and intelligence (C3I) matters. ASD(C3I) reviews DoD-wide C3 issues, develops policy, provides guidance, and establishes priorities to ensure that C3I requirements are fully considered in the development of C3I plans and programs. The Joint Staff Command, Control, and Communications Systems Directorate (J-6) is responsible for developing policies, plans, and programs for C3 systems to ensure adequate C3 support to the Commanders in Chief (CINCs) and the National Command Authorities^{1/} for joint (U.S. forces only) and combined (U.S. and Allied forces) military operations. The Joint Staff Operational Plans and Interoperability Directorate (J-7) is responsible for increasing the warfighting capabilities of the unified and specified combatant commands by improving the interoperability of the Services through joint doctrine; joint

^{1/} The National Command Authorities are the President and Secretary of Defense or their deputized alternates or successors.

tactics, techniques, and procedures; joint training and education; exercises; joint materiel requirements; and war planning.

Joint Tactical Command, Control, and Communications Agency. In 1984, the Joint Tactical Command, Control, and Communications Agency (the Agency) was chartered as a result of congressional and DoD concerns about the ability of tactical C3 systems supporting the military forces to interoperate in joint and combined operations. The Agency executed its charter through the development and maintenance of joint and combined architectures, standards, testing, and certification of tactical C3 systems. The Agency initially reported to the Director, J-6; however, in January 1987, the Agency was merged with the Defense Information Systems Agency (DISA).

Joint Interoperability and Engineering Organization. In February 1992, the Agency was consolidated with other DISA engineering organizations to form the Joint Interoperability and Engineering Organization (JIEO). The basis of the reorganization was to provide the DoD with a single engineering organization responsible for C3. The JIEO mission is to ensure the end-to-end interoperability of strategic and tactical C3 and information systems used by the National Command Authorities and the Services.

Objectives

The audit was divided into two segments. The overall objective of the audit was to evaluate U.S. interoperability with North Atlantic Treaty Organization (NATO) tactical C3 systems. The objectives for this segment of the audit were to evaluate DoD's management of combined tactical C3 interoperability. In addition, we determined whether internal controls were in place in DoD to ensure that maximum interoperability was achieved.

Audit Report No. 93-015, "DoD Participation in North Atlantic Treaty Organization Tactical Command, Control, and Communications Interoperability," pertaining to the first segment of the audit was issued on November 3, 1992. That segment of the audit addressed U.S. participation in the NATO Air Command and Control System, DoD's implementation of NATO Standardization Agreement 2101,^{2/} and NATO test initiatives.

Scope

We reviewed the mission and functions of the directorates within JIEO responsible for ensuring joint and combined interoperability. We reviewed JIEO's responsibilities for the

^{2/} NATO Standardization Agreement 2101, "Establishing Liaison," defines a liaison as the communication link necessary between different elements of military forces to ensure interoperability among multinational forces.

management of Joint Staff Publication 6-05, volumes 1-7, "Manuals for Employing Joint Tactical Communications Systems," as well as the adequacy of JIEO Handbook 8000, Second Edition, April 1989, Joint Connectivity Handbook, to support combined operations. We reviewed the Joint Staff Program Directive for the development of Joint Staff Publication 6-02, "Joint Operational/Tactical C4 Systems Doctrine," and Joint Publication 6-02.1, "Joint Operational/Tactical C4 Systems Overview" to determine their capacity to support combined operations. We reviewed the minutes of the Interoperability Improvement Program (IIP) meetings for the period July 1988 through October 1991 and determined whether IIP issues that had been closed during the 1990 through 1991 program cycle had been adequately resolved. We reviewed and assessed the ability of the joint tactical C3 architectures to ensure interoperability of tactical C3 systems and determined whether the Services implemented recommendations identified in the C3 architectures. The documentation we reviewed was dated from January 1986 to February 1992. Our audit did not address intelligence systems.

The audit was performed from April 1991 through February 1992 at the activities listed in Appendix E. This program audit was made in accordance with auditing standards issued by the Comptroller General of the United States as implemented by the Inspector General, DoD, and accordingly, included such tests of internal controls as were considered necessary.

Internal Controls

In assessing internal controls, we evaluated the IIP procedures for resolving critical C3 interoperability issues. We found that the IIP process did not meet IIP objectives as prescribed by Memorandum of Policy (MOP) 160, "Compatibility and Interoperability of Tactical Command, Control, Communications, and Intelligence Systems," January 1986. There was no separation of critical duties of the IIP, and a sufficient audit trail was not available to verify, support, or analyze whether issues had been adequately addressed and resolved. The internal control weaknesses are discussed in Finding B in Part II of the report.

Prior Audits and Other Reviews

"Interoperability, DoD's Efforts To Achieve Interoperability Among C3 Systems," April 1987. In Report No. NSIAD-87-124 (Office of the Secretary of Defense Case No. 7291), the General Accounting Office concluded that DoD efforts to achieve interoperability among C3 systems were impeded by DoD's decentralized management structure, lack of clearly defined joint requirements, and the absence of an effective central enforcement authority to make interoperability decisions. The report recommended that the Secretaries of the Military Departments be required to certify that equipment being developed and procured would provide the needed degree of interoperability with other C3 equipment to satisfy operational plans. The report also

recommended that the Military Departments seek congressional funding only for items that will provide the needed degree of interoperability or for items for which a waiver for Service-unique requirements has been approved. In response to the report, the Assistant Secretary of Defense (Command, Control, Communications and Intelligence) (ASD[C3I]) stated that corrective actions had already begun to address many of the reported deficiencies.

"Defense Communications Agency," May 1991. Office of the Assistant Inspector General for Inspections, DoD, Inspection Report No. 910-INS-08 concluded that no centralized enforcement authority existed within the DoD for interoperability. The report identified delays in the development and validation of Functional Interoperability Architectures (FIAs); a lack of attention to the development, funding, and implementation of interoperability standards; and the lack of a well-defined, coordinated effort to develop and review fielding plans for tactical C3 systems. The report recommended that the J-6 enforce a more rigid time schedule for validation of FIAs to prevent unnecessary delays and encourage expeditious resolution of interoperability issues. The report recommended that "the use of fielding plans ensure interoperability of tactical C3 systems." In response to the report, the Director, J-6, and the ASD(C3I) agreed to "coordinate and publish a shortened validation schedule for tracking all future FIAs." The ASD(C3I) agreed that the lead Service or agency for each acquisition should issue timely fielding plans for distribution. The Director, J-6, agreed to develop stronger enforcement guidance to ensure maximum interoperability of tactical C3 systems.

"DoD Participation in North Atlantic Treaty Organization Tactical Command, Control, and Communications Interoperability," November 1992. Office of the Assistant Inspector General for Auditing, DoD, Audit Report No. 93-015 recommended that the requirement for the Services' C3 systems to integrate with the NATO Air Command and Control System program be validated and that a joint program office be established for U.S. participation in the program. In addition, the report recommended that guidance be issued to implement a liaison team requirement and that the Army and Marine Corps incorporate the requirement into their doctrine and equip and train for the requirement. Lastly, the report recommended that a test link be established between the U.S. Interoperability Test Center and NATO. In response to the report, the ASD(C3I) agreed to establish goals and milestones for U.S. participation in the NATO Air Command and Control System program. The Director, Defense Information Systems Agency, agreed with establishing a test link between the U.S. Joint Interoperability Test Center and NATO. As of the date of this report, other issues are unresolved.

PART II - FINDINGS AND RECOMMENDATIONS

A. COMBINED C4 DOCTRINE, TACTICS, TECHNIQUES, AND PROCEDURES

Joint Staff Publications (Joint Publications) 6-0 series, "Command, Control, Communications, and Computer Systems Support to Joint Operations," do not provide the necessary guidance to plan, train, conduct, and support combined operations. This series of Joint Publications are not mandated to include the combined multinational force requirement and U.S. national military strategy. As a result, U.S. Forces lack the doctrine, tactics, tested techniques, and procedures necessary to establish well-organized command, control, communications, and computers (C4) systems in support of combined military operations.

DISCUSSION OF DETAILS

Background

Joint Publication 1-01, "Joint Publication System Joint Doctrine and Joint Tactics, Techniques, and Procedures (JTTP) Development Program," change 2, June 1, 1990, provides an organizational framework for publishing Joint Publications in a series according to functional areas. C4 systems support to joint operations is designated by the number 6; hence, all Joint Publications in the 6-0 series pertain to C4 systems support to joint operations. Joint Publication 6-0, "Doctrine for Command, Control, Communications, and Computer (C4) Systems Support to Joint Operations," June 3, 1992, the keystone publication for the 6-0 series, establishes the doctrine for C4 systems support to joint operations.

Joint Publication 6-0 is broad in scope and addresses the entire spectrum of C4 systems supporting joint commanders. It outlines the responsibilities of Services, agencies, and combatant commands with respect to ensuring effective C4 support to joint commanders. Joint Publication 6-0 addresses in general terms how C4 systems are configured, emplaced, and operated. Joint Publication 6-0 states that joint and Service C4 systems must maintain the necessary interoperability to ensure success of joint and combined military operations. To ensure interoperability of C4 systems, all aspects of achieving that state must be addressed, including the development of joint and combined C4 doctrine, concepts, and operational procedures. Further, Publication 6-0 states that combined communications agreements should be made with potential allies. Communications agreements should cover principles, procedures, and overall communications requirements arrived at by agreement in advance of war. When communications agreements have not been reached prior to hostilities, Allied forces will adopt the procedures of

one ally. Joint Publications 6-01 through 6-06 provide more detailed technical discussions of C4 systems. See Appendix A for a description of the major functional areas in the 6-0 series.

Interoperability Among Multinational Forces

In July 1990, the "London Agreement" was issued by the North Atlantic Council^{3/} to address the fundamental changes that have occurred in the NATO Alliance force structure and strategy. The command structural changes reflect the lower force levels and changes in the use of forces. Multinational forces made up of national units will be a characteristic of NATO's future defense efforts. The units will depend heavily on interoperable tactical C4 systems to sustain a credible warfighting capability. With anticipated budget reductions, NATO will scale back the readiness of its active units by reducing training requirements and the number of NATO exercises. The NATO Alliance will rely heavily on the ability to build up larger forces if and where they might be needed.

Higher operational flexibility, mobility, and responsiveness, the ability to reinforce and maneuver troops rapidly, and the need for quick reactions to changing situations will demand flexible and interoperable C4 systems. Information needed by the various headquarters officials will need to be transmitted not only in a hierarchical manner but also across the chain of command and between adjacent national networks. This transmission of information between the various tactical C4 systems in use will require highly efficient interfaces and highly effective interworkings.

New National Military Strategy

The primary focus of DoD planning is to provide the necessary forces for any contingency, from crisis or conventional operations to strategic nuclear operations, and to operate in Service component, joint, or combined task organizations as required. A high degree of interoperability is required among U.S. components and with allied organizations that are part of the combined operation. Effective joint or combined operations require preplanning of command and control capabilities to support anticipated and unanticipated information exchange requirements with automated interoperable systems. A common framework for responding to commands is essential for the chain of command to establish and maintain control of the forces. This framework relies on a common set of rules, interpretations, and disciplined responses; training and training objectives; and predefined bounds on subordinate commanders' initiatives. It is particularly difficult to achieve interoperability in a combined

^{3/} North Atlantic Council is the highest political and military authority in the NATO Alliance and is made up of representatives from all 16 NATO Alliance countries.

force. However, the need for effective, interoperable forces is fundamental for command and control systems used for joint and combined operations.

Major changes and implications. The National Military Strategy Document, FY 1994 through FY 1999 (working draft copy), Annex C, "Command, Control, Communications, and Computer Systems," contains a summary of major changes in the national military strategy and their associated command and control implications. It states:

The national military strategy relies on the employment of contingency force packages that can operate in joint or combined task organizations. Command and control of these forces cannot rely on the ad hoc assembly of service unique systems-- a high degree of interoperability is required. Effective joint and combined operations require C4 interoperability that supports anticipated force packages from contingency plans, with the flexibility to accommodate changes in the deployed force as required.

Furthermore, the National Military Strategy Document states that procedures and doctrine are difficult to achieve, particularly when conducting combined or multinational force operations. However difficult, commonality of procedures and doctrine must be optimized to enable U.S. Forces to train, exercise, and fight more effectively in joint and combined commands.

Joint Staff study. A Joint Staff study, "Command and Control Functional Analysis and Consolidation Review Panel Report," October 1991, states that U.S. defense interests and priorities are broadening from fixed theaters and scenarios toward a more global contingency focus. The unpredictable nature and location of future crises and conflicts will require precise employment of forces with little preparation time. Hence, the U.S. strategy includes adapting responses to the situations by being able to assemble, deploy, and sustain forces that provide flexibility to meet the wide range of potential operational requirements. The study concluded that a concept of flexible forces should be developed, and the role of the joint task force or combined task force should be central to contingency planning.

Operation Desert Shield/Storm. Although Joint Publications were used by command and control units deployed in Operations Desert Shield and Storm to establish joint interoperability among the Services, doctrine in the Joint Publications could not be easily applied from a joint tactical C4 interoperable environment to a combined tactical C4 environment. Joint Universal Lessons Learned System Reports from Operations Desert Shield and Storm concluded that combined tactical communications interoperability

can be improved by developing and maintaining communications standards and procedures with potential allies. During Operations Desert Shield and Storm, the United States took a lead role and provided the substantial thrust of military force in the Persian Gulf region. In future conflicts, U.S. Forces may take a similar lead. The United States would need to be interoperable with potential allies as stated in Joint Publication 6-0. Accordingly, Joint Publications 6-0 series should be updated, or new publications should be created to ensure doctrinal interoperability of combined tactical C4 systems.

Joint Publications 6-0 Series

Combined tactical C4 doctrine. Combined tactical C4 planning would be enhanced if combined tactical C4 doctrine was developed among the U.S. and other NATO allies most likely to be deployed as a combined task force. However, the combined tactical C4 doctrine does not exist. Officials from the Joint Staff and Joint Interoperability and Engineering Organization (JIEO) have stated that because there is no Joint Staff operational requirement for combined doctrine, existing technical, procedural, and operational C4 standards and data from lessons learned reports on combined tactical C4 interoperability have not been incorporated into the Joint Publications 6-0 series or established in a new series of publications. The following is a synopsis of some of the available joint tactical C4 doctrine.

Joint tactical C4 doctrine.

Joint Publication 6-02, "Joint Operational/Tactical C4 Doctrine." At the time of our audit, Joint Publication 6-02 was being developed and was not expected to include combined tactical C4 information for combined operations, but to focus primarily on joint doctrine for the employment of operational and tactical C4 systems supporting a joint operation. The purpose of Publication 6-02 was to consolidate joint doctrine for the employment of operational and tactical C4 systems into one concise publication complementing the Joint Publication 6-0 series. During the audit, joint doctrine for employment of operational and tactical C4 systems was distributed in multiple publications that were not readily available to a joint C4 planner. Consolidating joint C4 doctrine into one publication is expected to significantly enhance doctrinally sound planning for joint C4 systems.

Joint Publication 6-02.1, "Joint Operational/Tactical C4 Systems Overview." Joint Publication 6-02.1 (in development as of the time of audit) is an overview publication, which will cover technical and procedural subjects involved in the use of operational/tactical C4 systems in joint operations. The publication gives the joint planner a comprehensive directory of planning factors germane to C4 systems. A similar directory of planning factors does not exist for combined operations. To date, no combined tactical C4 publication has been planned.

Joint Publication 6-02.2, Joint Connectivity Handbook.

One of the most effective tools used by joint C4 planners is the Joint Connectivity Handbook, April 1989. The handbook was originally developed and produced by the JIEO in collaboration with the Services and the unified and specified Commands. The handbook will be transferred to the Joint Publication System and will be designated Joint Publication 6-02.2. The purpose of Publication 6-02.2 will be to provide operational and C4 staff planners a common reference for coordinating joint tactical C4 connectivity requirements and for planning the implementation, operation, and maintenance of communications networks in support of joint military operations. Publication 6-02.2 will contain information derived from documents previously published by the Services, the Joint Staff, and various Defense agencies, representing a consolidation of C4 information relevant to joint operations. Although Publication 6-02.2 was being developed specifically for joint operations, JIEO examined the feasibility of including information on combined C4 connectivity as early as September 1990. Joint Staff representatives stated that there had been discussions about including information on C4 connectivity with English-speaking allies (Canada, United Kingdom, Australia, and New Zealand). However, no action had been taken at the end of the audit fieldwork.

Joint Publication 6-05, Joint Tactical Communication System. Publication 6-05 is a comprehensive seven-volume document that provides the operational standards necessary for communication planners and communication system maintainers to establish a Joint Task Force tactical communications system. Publication 6-05 focuses on the communications network used to link the Joint Task Force, the Joint Special Operations Task Force, the Services, and the Defense Communications System (a composite of specific DoD communications systems under the control of the Defense Information Systems Agency) by a combination of satellites, microwaves, and high-frequency transmission systems. These transmission systems support the tactical telephone, message, data, facsimile, and other special-purpose communications services essential for a theater commander in chief to effectively command and control forces. Publication 6-05 is based on a rapidly deploying joint task force response to a worldwide non-NATO contingency in an undeveloped theater of operations. Therefore, Publication 6-05 lacks the guidance necessary to ensure C4 interoperability between the U.S. tactical communications systems and NATO member nations.

Combined Communication Publications

U.S. communication planners often rely on a number of diverse sources for guidance on combined operations with NATO member nations. The JIEO publishes various reports designed to provide C4 planners and operators information that is often not readily available through conventional channels. The information contained in the reports has not been incorporated into any Joint Publication.

For example, the Joint Interoperability Test Center "Lessons Learned Report," published in September 1989, contains the C4 operational standards required to ensure interoperability between U.S. tactical communications systems and the French and German tactical communications systems. The C4 operational standards could be included in Joint and Combined Publications, resulting in enhanced combined interoperability.

Joint and combined interface procedures. Joint and combined interface procedures provide the C4 operational standards necessary to ensure interconnection of selected communications equipment or systems. For example, in August 1989, a Joint/Combined Interface Procedure was published that contained the operational standards necessary to install the NATO Analog Interface with the U.S. Mobile Subscriber Equipment.^{4/} That interface procedure allows NATO and U.S. Forces to interconnect their tactical communications systems and interoperate via "dial up" telephone service. The interface procedure could be included in Joint and Combined Publications, providing enhanced C4 combined interoperability.

Combined interoperability assessment reports. Combined interoperability assessment reports are published to provide an assessment of the interconnections required to certify interoperability between specific communications equipment or systems. A combined interoperability assessment report published in April 1988 assessed the ability of the United States and Germany to interconnect their tactical communications systems using an agreed upon NATO standard (Standardization Agreement 5040). The interconnection allows U.S. and German forces to interoperate by way of "dial up" telephone service. Again, the C4 operational standards detailed in the assessment report could be included in Joint Publications, resulting in enhanced combined interoperability.

From Joint to Combined Operations: a Logical Evolution

Joint Publications have proved their value in Operations Desert Shield and Storm and NATO exercises; however, Joint Publications have not been developed for combined operations. Joint Publications should focus on the expected increase of combined multinational force deployment and new, U.S. national military strategy. Combined C4 doctrine, tactics, techniques, and procedures should be developed and included in either existing Joint Publications or new Combined Publications.

^{4/} The Mobile Subscriber Equipment is a secure communications system fielded by the U.S. Army that enables commanders to command and control their forces in the battlefield.

Joint Publication 1, "Joint Warfare of the U.S. Armed Forces," November 11, 1991, states:

We should work with our partners to exploit the unique capabilities of the various national forces available. Interoperability of equipment, techniques, and procedures is often of major importance. Even when dealing with a temporary coalition, the effort and resources previously expended to achieve combined doctrine and interoperability with allies becomes helpful in working with newly found partners.

With the scale and frequency of combined exercises being reduced, more reliance will have to be placed on fully developed combined tactical C4 doctrine, and joint tactics, techniques, and procedures. The need for combined guidelines to bridge the gap between joint and combined tactical C4 systems exists, and the creation of a Combined Publications series could fill that gap and prove invaluable for combined operations.

RECOMMENDATIONS, MANAGEMENT COMMENTS, AND AUDIT RESPONSES

We recommend that the Director, Joint Staff:

1. Define the requirements for information exchange among the elements of tactical command and control systems in combined operations.

Management comments. The Joint Staff neither concurred or nonconcurred with the recommendation. The response stated that Finding A addressed combined operations in general and that Recommendations A.1. and A.2. specifically concerned NATO. The response stated that action has already been taken on Recommendation A.1. with the development of the NATO Interoperability Handbook. In addition, the concept of NATO multinational corps and divisions is still being developed. This new concept, including strategic to tactical interoperability, is being worked, with U.S. participation, in the NATO Post-2000^{5/} documents. The response also stated that the audit report should take into account the 50-plus Allied Communications Publications that are managed directly by the Combined Communications-Electronics Board. Those publications provide the procedures, protocols, and interface requirements for combined C4 operations that are used by all NATO and 60 other Allied nations.

Audit response. We recognize the existence of the Allied Communications Publications, the development of the NATO Interoperability Handbook, and NATO Post-2000 documents.

^{5/} NATO Post 2000 documents focus on the future tactical communication capabilities of NATO.

However, those publications are applicable only to a NATO sanctioned war. During Operation Desert Storm, only a few NATO procedures were used, usually as a model, in planning similar arrangements with non-NATO coalition forces. A lack of requirements for information exchange among the elements of tactical C3 systems in combined operations remains a deficiency. Generic information exchange requirements are needed for military operations ranging from humanitarian efforts to combat. Those exchange requirements should outline how the United States will communicate (e.g., voice, data link) with its Allies and should be used in developing combined C4 doctrine, tactics, techniques, and procedures. As stated in the Joint Staff response, the finding addressed combined operations; thus, the recommendation should not have been NATO-specific. The recommendation has been changed in the final report to reflect the Joint Staff's comments. We request that the Joint Staff comment on the revised recommendation in response to the final report.

2. Develop a Combined Publications series that identifies doctrine for command, control, communications, and computers systems support for combined operations and that defines the responsibilities of the Services, Defense agencies, and combatant commands in ensuring effective command, control, communications, and computer support to commanders.

Management comments. The Joint Staff nonconcurred with Recommendation A.2. and stated that documents already existed or were being developed to address NATO-specific interoperability. The response stated that a combined publication series would not provide any additional benefit. Specific procedures and standards are already developed on a nation-by-nation or coalition basis. Operation Desert Storm demonstrated that future coalition operations may be conducted with nations that are not currently considered allies. Nations have different doctrine and tactics based on their equipment and capabilities. It would be impossible to capture all the differences in one combined publication. Combined interoperability is now a focus of the Command, Control, Communications, Computers and Intelligence for the Warrior^{6/} concept.

Audit response. Since the time of our audit fieldwork, the Joint Staff has made significant progress in recognizing and addressing combined C4 interoperability. Most notably is the development of the Command, Control, Communications, Computers, and Intelligence for the Warrior concept and the formation of the J-6 Architecture and Integration Division as the central focal point for addressing C4 joint and combined interoperability issues. However, development of a Combined Publications

^{6/} The Command, Control, Communications, Computers, and Intelligence for the Warrior concept provides an interoperable fully integrated command, control, communications, and intelligence system for the warfighter to assess, respond, lead, and fight.

outlining C4 information exchange requirements for combined operations would further enhance combined interoperability. Although the United States has developed specific procedures and standards with certain allied nations, those arrangements do not constitute doctrinal guidance. As Operation Desert Storm demonstrated, future operations could be conducted with nations for which we have not established specific procedures or standards. Because nations have different doctrine and tactics, the development of combined C4 doctrine, tactics, techniques, and procedures becomes critical to the planning process to assist in standardization.

As stated in the finding, Joint Staff Publication 6-0 identifies the importance of a combined publications series. Publication 6-0 states that joint and Service C4 systems must possess the interoperability necessary to ensure success in combined operations. This success includes the development of combined C4 doctrine, concepts, and operational procedures. Recommendation A.2. was NATO-specific in the draft report and has been changed in the final report. We request that the Joint Staff comment on the revised recommendation in response to this report.

3. Review Joint Interoperability Test Center Lessons Learned Reports, Joint/Combined interface procedures, and Combined Interoperability Assessment Reports to identify the C4 operational standards that should be incorporated into the new series of Combined Publications.

Management comments. The Joint Staff nonconcurred with Recommendation A.3., stating that its nonconcurrence followed from its response to Recommendation A.2. The Joint Staff stated that if standards, operating procedures, and communications are already detailed in one document, there is no need to duplicate them in another. Combined interoperability will be addressed in general terms as the Joint Publications 6-0 series is reviewed and updated. The Joint Staff stated that it will work with JIEO to review the Joint Publications as they are updated in keeping with the Command, Control, Communications, Computers, and Intelligence for the Warrior concept. This procedure will ensure that lessons learned from Operations Desert Shield and Desert Storm, reports from the Joint Interoperability Test Center, and deficiencies and recommendations from the FIA's are incorporated or addressed.

Audit response. Since the time of our audit, the Joint Staff has initiated steps to include combined standards in Joint Publications. Most significant, although general in nature, is the inclusion of combined C4 information in Joint Publication 6-02. The intent of the recommendation was to ensure that lessons learned reports, combined interface procedures, and Combined Interoperability Assessment Reports were incorporated in Joint Staff C4 doctrine, tactics, techniques, and procedures. C4 issues that have joint operations applicability should be

incorporated into the Joint Publication 6-0 series, and issues applicable to combined operations should be incorporated into Combined Publications. The Joint Staff's nonconcurrence to this recommendation was based on its response to Recommendation A.2., the development of a combined series of publications. We request that the Joint Staff reconsider its position on this recommendation due to the revision of Recommendation A.2.

RESPONSE REQUIREMENTS ON RECOMMENDATIONS

Responses to this report are required from the addressee shown for the items indicated with an "X" in the chart below.

<u>Number</u>	<u>Addressee</u>	<u>Response to Final Report Should Include</u>		
		<u>Concur/Nonconcur</u>	<u>Proposed Action</u>	<u>Implementation Date</u>
A.1.	D/JS <u>1/</u>	X <u>2/</u>	X	X
A.2.	D/JS	X <u>2/</u>	X	X
A.3.	D/JS	X <u>3/</u>	X	X

1/ Director, Joint Staff

2/ Recommendation has been revised.

3/ Response should provide reconsideration of position.

B. INTEROPERABILITY IMPROVEMENT PROGRAM

The Joint Staff's Interoperability Improvement Program (IIP) has not met its objective to resolve critical command, control, and communications (C3) interoperability issues. Issues are considered annually for submission into the IIP, and the review process for acceptance of a critical issue can take a minimum of 8 months. Procedures and criteria for closing issues are often changed, resulting in issues being closed before resolution. Additionally, the duties and responsibilities of the IIP's resolution process have not been segregated. Further, other C3 interoperability forums within the Joint Staff duplicate the functions of the IIP. As a result, critical interoperability issues either have not been properly addressed for resolution or remain unresolved.

DISCUSSION OF DETAILS

Background

The Joint Staff Memorandum of Policy (MOP) No. 160, "Compatibility and Interoperability of Tactical Command, Control, Communications, and Intelligence Systems," January 1986, established the IIP for the annual review, coordination, and resolution of critical C3 interoperability issues of the CINCs, Services, and Defense agencies. The overall goal of the IIP is to achieve and maintain compatibility and interoperability of tactical C3I systems to meet the mission-essential needs of operational commanders. The IIP addresses those issues relevant to tactical C3I equipment and systems that interface or integrate with one another and that are operated by a Service, agency, or Allied nation. Guidance and direction for the IIP is provided by the Director, J-6. The Director of JIEO serves as the IIP's Executive Agent. As Executive Agent, JIEO manages the IIP for the Joint Staff. Specifically, JIEO prepares or assists in preparing recommended solutions to issues, monitors the progress of all issues, prepares agendas for meetings, maintains minutes, and prioritizes interoperability issue submissions for the IIP.

Issue Resolution Process

The IIP's annual cycle of events prevents rapid resolution of interoperability issues. We reviewed 12 interoperability issues closed during the 1990 through 1991 program cycle and found that the average turnaround time, from acceptance of the issue into the IIP to closure of the issue, had been approximately 23 months (see Appendix B for a detailed analysis of each issue).

Issue submission. JIEO Circular 3101, "Tactical C3I Interoperability Improvement Program," April 1987, identifies responsibilities and establishes the annual schedule of events for the IIP. The Circular requires that the Working Group, Screening Board, and Prioritization Board, components of the IIP,

coordinate and review interoperability issue submissions annually; however, the Circular does not specify milestone dates for IIP acceptance of submitted issues. Interoperability issues can be submitted for consideration to the IIP any time during the year; however, action on the issues is delayed until the issue is officially accepted by the IIP.

Our review of past IIP cycles showed that the Working Group normally met in October or November to screen issues nominated for consideration and to review progress on existing issues. From November until about March, the Working Group conducted research and prepared background papers on the accepted issues for distribution and review by the Screening Board. In March, the Screening Board normally met to develop recommendations for resolution and to prioritize the issues accepted by the Working Group. Final review of the Screening Board's recommendations for funding prioritization was normally accomplished at the June meeting of the Prioritization Board. The Prioritization Board approves the Screening Board's recommendations, develops new recommendations, or refers the matter to a Service or agency for additional research. Consequently, it took about 8 months before an issue was officially accepted before the resolution process began.

Closing IIP issues. MOP 160 and JIEO Circular 3101 do not provide guidance for establishing closing criteria for interoperability issues. The closing criteria or plan of action for resolution of the issue is usually established by the IIP's Working Group or Screening Board upon acceptance of the issue. With the approval of the Working Group or Screening Board, closing criteria can be changed or modified. Any IIP member (Working Group, Screening Board, or Prioritization Board) can request a change to the closing criteria, but any change must be approved by a majority vote. Of the 12 issues we reviewed, 5 had been closed before resolution of the issue. Of those five issues, either the closing criteria had not been met, or the closing criteria were changed, and the issue was prematurely closed. As a result, C3 interoperability problems remain unresolved (Appendix B).

Issues prematurely closed. The Link Encryption of Tactical Digital Information Link B is an example of an issue that had been prematurely closed. This issue was accepted into the IIP in March 1988. The Army's equipment fielding and message coding procedures differed from the other Services' procedures, resulting in a communications gap with the Air Force and the Marine Corps. The lack of interoperability between the Services caused major delays in establishing a secure joint link during tactical operations. After acceptance by the IIP, closing criteria required the Joint Staff to develop a joint data link encryption (coding a message for transmission through secure communication lines) standard. The issue was closed in January 1990 based on the Joint Staff's determination that joint doctrine would not resolve the issue. The Joint Staff stated

that only a small number of Army units were affected worldwide and that the problem could be easily solved by providing those units the additional equipment to make them interoperable with the Air Force and the Marine Corps. The problem resurfaced again as an interoperability shortfall during Operation Desert Storm. Complicated adjustments had to be made for the Army to establish an effective, secure Tactical Digital Information Link B data link with the Air Force and the Marine Corps. The issue has been resubmitted and accepted by the IIP for resolution. The other four issues we determined as prematurely closed are discussed in Appendix C.

Document controls. DoD Directive 5010.38, "Internal Management Control Program," April 1987, requires that all significant events be clearly documented and readily available for examination. During our review, we were unable to obtain adequate documentation from JIEO or the Joint Staff to verify, support, or analyze whether 2 of the 12 issues submitted during the 1990 through 1991 IIP cycle had been adequately addressed and resolved. For example, we could not determine whether the Logistics Interoperability issue had been adequately closed since documentation was unavailable. The JIEO was unable to provide a Joint Staff point of contact, and the U.S. European Command, which had submitted the issue, could not provide documentation to support closure of the issue. As a result, we were unable to determine whether U.S. European Command initial concerns had been addressed.

Separation of duties. DoD Directive 5010.38 requires that key duties and responsibilities in authorizing, processing, recording, and reviewing be separated among individuals. JIEO Circular 3101 states that individuals who authorized acceptance of issues also developed closing criteria for resolution of issues and closed issues during the IIP cycle. As previously stated, any IIP member could establish or change existing closing criteria and recommend that the issue be closed based on those changes. A separation of duties and higher level oversight may have prevented premature closure of critical C3 issues.

Follow-up. JIEO Circular 3101 does not establish a follow-up procedure for closed issues to ensure that the problem had been adequately resolved. As previously stated, of 12 issues, 5 were prematurely closed. An effective follow-up or oversight process would have disclosed this weakness in the IIP. A follow-up process must be established to ensure adequate resolution of the issues.

Other Forums that Address C3 Interoperability Issues

The IIP is not the only forum within the J-6 that addresses critical interoperability issues. The Military Communications-Electronics Board (Electronics Board) and the Joint Tactical

Fusion Interoperability Steering Group (Steering Group) are also chartered to identify, coordinate, address, and resolve C3 interoperability issues.

Electronics Board. DoD Directive 5100.35, "Military Communications-Electronics Board," May 1985, established the Electronics Board as a corporate body responsible to the Secretary of Defense and the Joint Staff. The Electronics Board serves as the Joint Staff element involved in top-level communications-electronics management within DoD. Its primary mission is to coordinate with the DoD Components (i.e., Office of the Secretary of Defense; Joint Staff; Services; unified and specified commands; Office of the Inspector General, DoD; and the Defense agencies) and other Government agencies and between the DoD and foreign nations. The Electronics Board provides information, guidance, and direction for military communications-electronics matters referred to it by the Office of the Secretary of Defense, the Joint Staff, the C3 Review Council, the Secretaries of the Military Departments, and the DoD Component heads.

Functional responsibilities. The Electronics Board supports virtually every discipline and activity within C3. As Chairman, the Director, J-6 determines whether matters referred to the Electronics Board are appropriate for consideration or subject to final action. Based on the Chairman's decision, panel members, comprised of action officers, perform the preliminary staff work before a decision is made by the Coordinators. The Coordinators, comprised of senior level officers, colonels, or captains, conduct the day-to-day business of the Electronics Board and resolve the majority of C3 issues. The Coordinators meet monthly to determine which issues are necessary for final consideration by the Principals. The Principals, which consist of flag and general officers and senior executives, establish guidance and policy for the Electronics Board. The Principals meet on a monthly basis to discuss and resolve the most pressing issues in the C3 arena. As the "driving force" of the Electronics Board, the Principals are authorized to assign tasks, solve problems, and make final decisions.

IIP issues referred. The Electronics Board coordinates and resolves issues referred to it by the IIP. For example, the Hierarchy of Standards issue (see Appendix C) was elevated to the Electronics Board Data Systems Interoperability Panel for discussion and was presented to the Principals for resolution. In January 1990, the Principals approved an action plan to address the problem. It was decided that the Electronics Board process would resolve all future Hierarchy of Standards conflicts on a case-by-case basis. The Electronics Board ultimately closed the issue.

Steering Group. Director, Joint Staff Memorandum 727-89, "Joint Tactical Fusion Lead and Interoperability Steering Group," June 1989, chartered the Steering Group with providing Joint

Staff oversight for developing and enforcing interoperability standards relating to joint tactical fusion systems. Fusion is a mechanized process of integrating reports from enemy and friendly sources to present a commander's area of interest to assist in the C3I function. The Steering Group, chaired by the Director, J-6, is a senior-level forum that discusses and resolves, or presents for Joint Requirements Oversight Council consideration, a broad range of interoperability issues. The Steering Group addresses interoperability among joint tactical fusion systems and interoperability with C3I systems at the theater, national (i.e., United States), and allied levels. The Steering Group's short-term goal is to review policy and guidance on the development of interoperability requirements and standards. The long-term goal of the Steering Group is to establish interoperability standards and to ensure compliance with those standards throughout the life cycle of C3I systems.

At a July 1991 Steering Group meeting, an ASD(C3I) official stated that C3I was and would continue to be the "number one" priority. At that meeting, it was requested that a "Discovery Process" be established to identify high-priority C3I systems containing interoperability shortfalls and to resolve those issues quickly. In response, the Steering Group formed an "ad hoc" Discovery Team, composed of representatives from the Defense Intelligence Agency, Defense Information Systems Agency, the Services, and the Joint Staff. The Discovery Team reviewed results from a Defense Intelligence Agency sponsored survey. The results included Joint Universal Lessons Learned data, joint exercise lessons learned data, Operation Desert Storm experiences, and unified and specified command data. After reviewing the survey results, in August 1991, the Discovery Team identified and prioritized the six most critical DoD interoperability issues:

- Digital Entry Devices,
- Secondary Imagery Dissemination Systems,
- Air Tasking Order,
- Integrated Data Base,
- Airborne Warning and Control System Ultrahigh Frequency Vision AM Baseband, and
- Technical Training Center-39/42.

Digital entry devices. Of the six issues, the Digital Entry Devices (the devices) issue was selected for quick resolution. The devices are portable, hand-held message transfer equipment that transmit and receive short messages in digital bursts. At the time of the resolution, each Service was developing and fielding its own device to meet Service-unique information exchange requirements for fire support. The individual Service devices could not communicate with each other. The ASD(C3I) identified the lack of interoperability as a problem that required immediate resolution before the widespread fielding of the devices throughout the Services.

A special working group was formed by the JIEO to find an interoperable solution. The special working group developed a standard definition for the devices; identified and updated joint requirements for information exchange based on the requirements established in the Functional Interoperability Architectures; identified potential joint interfaces; and initiated an examination of common message sets and protocols. Joint Fire Support interoperability standards for the devices have been established. Although the overall standardization issue for the devices has not been completely resolved, the identification of and immediate action on this critical C3 issue has had a positive effect on the Steering Group's effort to develop an interoperability standards management policy.

Other issues. Of the remaining five critical issues, two, the Secondary Imagery Dissemination Systems and Technical Training Center-39/42, were submitted to the FY 1991 through 1992 IIP cycle for resolution. The Air Force was tasked to resolve the Air Tasking Order and Airborne Warning and Control System issues, and the Integrated Data Base issue was assigned to the Director for Joint Staff Support, Defense Intelligence Agency, for resolution.

Consolidation of C3 forums. As the principal enforcement mechanism for C3 interoperability, the Electronics Board should provide unity between the IIP and the Steering Group's Discovery Team. Consolidating the Discovery Team and the IIP under one "umbrella" program chaired by the Electronics Board would eliminate any duplication of effort that exists between these C3 forums. Consolidation of the forums would provide a process for resolving C3 issues that require an immediate response and for resolving long-term interoperability issues under the auspices of a single high-level group of officials.

IIP and Steering Group. The IIP and the Steering Group's Discovery Team are tasked to address and resolve tactical C3I interoperability issues. Both organizations are chaired by the Director, J-6, and submit recommendations to the Electronics Board for resolution of interoperability issues. In addition, both programs identify and develop requirements for establishing standards to ensure interoperability and to provide direction for future system and interface developments.

IIP and Electronics Board. The Electronics Board and the IIP have similar functions in resolving critical C3 interoperability issues. In comparing the two, the responsibilities of the Electronics Board Coordinators are equivalent to the responsibilities of the IIP's Screening Board. The Coordinators and the members of the Screening Board determine the actions necessary to resolve interoperability issues and submit recommendations to a higher level authority: the Screening Board to the Prioritization Board and the Coordinators to the Principals. Furthermore, the Electronics Board Principals perform the same duties as the IIP's Prioritization Board. In

both cases, high-ranking officials (i.e., flag and general officers and senior executives) are responsible for the final review of C3 issues and for approval of recommendations. By merging the IIP under the Electronics Board, the functions of the IIP's Screening Board and Prioritization Board could be eliminated.

RECOMMENDATIONS, MANAGEMENT COMMENTS, AND AUDIT RESPONSES

We recommend that the Director, Joint Staff:

1. Revise the Military Communications-Electronics Board Terms of Reference to provide guidance in establishing closing criteria for interoperability issues and to state who is authorized to accept interoperability issues and who is authorized to change closing criteria.

Management comments. The Joint Staff nonconcurred with Recommendation B.1. The response stated that Joint Staff MOP 160 is no longer the governing directive for the IIP. The IIP was approved under the Electronics Board charter, and resolution of issues is now governed by the Electronics Board Terms of Reference.

Audit response. Since the time of our audit fieldwork, significant changes have occurred with the IIP. As of July 16, 1992, the IIP became one of nine panels of the Electronics Board. As a result of the reorganization, the following changes occurred:

- Three of the original five IIP objectives were either modified or rescinded.

- The JIEO Circular 3101 is no longer in effect and was replaced by with the Electronics Board Terms of Reference.

- The Electronics Board Terms of Reference require that:

- Issues are reviewed for a period of 1 year after closure to verify that issues were successfully resolved.

- Issues are reviewed every 2 months to ensure that action is taken to keep the issue moving and visible within the C4 community.

Therefore, the recommendation has been changed to reflect the Military Communications-Electronics Board Terms of Reference. Our review of the Terms of Reference disclosed that the establishment of closing criteria and authorization for acceptance and changes to closing criteria remain desegregated. A separation of duties for these vital functions still remains a

critical deficiency of the IIP. We request that the Joint Staff comment on the revised recommendation in response to this final report.

2. Require that Interoperability Improvement Program officials document all actions taken on interoperability issues during the resolution process.

Management comments. The Joint Staff concurred with Recommendation B.2. and stated that the Chairman for the IIP will ensure all actions are well documented. Additionally, the implementation of a new automated data base for quick retrieval of issue status and archived information pertaining to closed issues will improve documentation efforts.

Audit response. Actions taken meet the intent of the recommendation. We request that the anticipated date for implementation be provided in response to this report.

3. Revise Joint Interoperability and Engineering Organization Circular 3101, "Tactical C3I Interoperability Improvement Program," to establish follow-up procedures to ensure that interoperability issues have been adequately resolved.

Management comments. The Joint Staff nonconcurred with Recommendation B.3. The response stated that JIEO Circular 3101 had been rescinded and that follow-up procedures were detailed in the Electronics Board Terms of Reference.

Audit response. The Electronics Board Terms of Reference require that once an issue has been closed, the IIP Executive Agent will continue to monitor implementation of and compliance with the closure criteria for 1 year. Since the JIEO Circular 3101 was replaced by the Electronics Board Terms of Reference, the action taken meets the intent of the recommendation.

4. Charter the Interoperability Improvement Program under the Military Communications-Electronics Board.

Management comments. The Joint Staff concurred with Recommendation B.4. and stated that the recommended action has been completed.

5. Consolidate the Discovery Team with the Interoperability Improvement Program under the Military Communications-Electronics Board.

Management comments. The Joint Staff nonconcurred with Recommendation B.5. The response stated that this recommended action was evaluated at both the action officer and general officer level and that the decision was made to keep the Joint Tactical Fusion Lead Interoperability Working Group under the Joint Requirements Oversight Council. The J-6 Architecture and

Integration Division will ensure that actions of the Joint Tactical Fusion Lead Interoperability Working Group and IIP are coordinated.

Audit response. Although the J-6 Architecture and Integration Division has been designated the central point for addressing C4 interoperability issues and for coordinating efforts in the various forums, we maintain that the Joint Tactical Fusion Lead Interoperability Working Group should be consolidated under the Military Communications-Electronics Board as part of the new IIP panel. As stated in the finding, the Joint Tactical Fusion Lead Interoperability Working Group (which replaced the Discovery Team) is chartered to provide the Joint Staff with oversight for developing and enforcing interoperability standards relating to joint tactical fusion systems. The Electronics Board IIP panel's mission is to promote, enhance, and maintain compatibility and interoperability of command, control, communication, computers, and intelligence systems. The missions and functions of these two groups remain duplicative in resolving C4 interoperability issues. We request that the Joint Staff reconsider its position in responding to this report.

6. Require the Military Communications-Electronics Board Coordinators to develop recommendations for the resolution of interoperability issues and to prioritize the acceptance of those issues.

Management comments. The Joint Staff partially concurred with Recommendation B.6. The response stated that the Electronics Board Coordinators will review all work performed by the IIP for final disposition of issues. However, within the Terms of Reference, the Coordinators will not prioritize the acceptance of new issues.

Audit response. The intent of the recommendation was to ensure that the Electronics Board Coordinators were an integral part of the IIP issue resolution process and that issues requiring immediate action could be submitted to the IIP at any time. The Electronics Board Terms of Reference require the IIP panel to draft and approve new issue closure criteria and to officially close an issue when the closure criteria have been completely satisfied. However, the Terms of Reference do not establish whether the Electronics Board Coordinators are responsible for officially closing an issue or are only briefed on the recommendations and actions undertaken by the IIP panel in resolving an issue. The Terms of Reference also do not stipulate the prioritization process of newly accepted issues; however, the Terms of Reference require that issues needing immediate attention be forwarded to the IIP panel Chairman to determine whether an unscheduled panel meeting is necessary to address the issue. The Joint Staff needs to clarify the role of the Electronics Board Coordinators in the closure of IIP issues and the process for prioritizing issues submitted by the CINC's,

Services, and Defense agencies. We request that the Joint Staff reconsider its position in responding to this report.

7. Require that the Military Communications-Electronics Board Principals close interoperability issues.

Management comments. The Joint Staff partially concurred with Recommendation B.7. The response stated that in accordance with the Electronics Board Terms of Reference, the Electronics Board is the final review authority for closure of issues. However, the IIP panel will recommend closure based on majority vote of the membership.

Audit response. The Electronics Board Terms of Reference do not state that the Electronics Board is the final review authority for closure of issues. The Terms of Reference state that, "the final disposition of all issues and matters presented to the panel will be determined by a majority vote of the C4I [Command, Control, Communications, Computers and Intelligence] IIP representatives (members)." The Terms of Reference also state that an issue will be forwarded to the Electronics Board Coordinators for review or decision only when the IIP panel is unable to resolve issue conflicts. The intent of the recommendation was to provide a separation of duties between those responsible for drafting and approving closing criteria for issues and those responsible for officially closing an issue. Unless these critical responsibilities are desegregated, IIP issues will continue to be improperly or prematurely closed. We request that the Joint Staff reconsider its position in responding to this report.

8. Amend the charter of the Interoperability Improvement Program to delete the requirement for a Screening Board and Prioritization Board.

Management comments. The Joint Staff concurred with Recommendation B.8. and stated that the Screening Board was abolished under the Electronics Board Terms of Reference.

Audit response. We request that in responding to the final report, the Joint Staff provide the action taken concerning the IIP Prioritization Board.

RESPONSE REQUIREMENTS ON RECOMMENDATIONS

Responses to this report are required from the addressee shown for the items indicated with an "X" in the chart below.

<u>Number</u>	<u>Addressee</u>	<u>Response Requirements on Recommendations</u>		
		<u>Concur/Nonconcur</u>	<u>Proposed Action</u>	<u>Implementation Date</u>
B.1.	D/JS <u>1/</u>	X <u>2/</u>	X	X
B.2.	D/JS	N/A <u>3/</u>	N/A	X <u>4/</u>
B.3.	D/JS	N/A	N/A	N/A
B.4.	D/JS	N/A	N/A	N/A
B.5.	D/JS	X <u>5/</u>	X	X
B.6.	D/JS	X <u>5/</u>	X	X
B.7.	D/JS	X <u>5/</u>	X	X
B.8.	D/JS	N/A	X	X

1/ Director, Joint Staff

2/ Recommendation has been revised.

3/ No additional response required.

4/ Response should provide implementation date.

5/ Response should provide reconsideration of position.

C. MANAGEMENT OF C3 ARCHITECTURES

The Services have not implemented the minimum essential C3 interoperability requirements as prescribed in various C3 architectures. The ASD(C3I) has not designated a central control and coordination activity for the management of C3 architectures. In addition, DoD guidance and standardization have not been established for the CINCs, JIEO, and Service C3 architecture development and implementation process. As a result, a proliferation of C3 architectures has occurred without assurance that the architectures effectively complement one another. Further, the Services continue to develop their own noninteroperable communications equipment.

DISCUSSION OF DETAILS

Background

CINC interoperability architectures. The JIEO is responsible for the development of CINC interoperability architectures (CINC architectures) at the request of a unified or specified command. A CINC architecture is tailored to the specific needs of the requesting CINC and identifies and documents the C3 interoperability requirements related to tactical forces, operational plans, levels of conflict, and other specific factors specified by the CINC. The CINC architecture is approved by the requesting CINC and becomes the property of that CINC. The cost to develop a CINC architecture ranges from \$250,000 to \$400,000.

Functional Interoperability Architectures (FIAs). Joint Staff MOP 160 states that the basis for achieving compatibility and interoperability of tactical C3I systems will be through an approved joint C3 architecture. The Joint Tactical C3 Architecture defines joint force connectivity requirements and is developed and maintained by the JIEO. The C3 architecture is used to assist the Joint Task Force Commander in ensuring interoperability and information flow among command and control elements. The architecture is comprised of the following nine FIAs:

- Air Defense and Air Space Control,
- Fire Support,
- Special Operation Forces,
- Combat Service Support,
- Joint Task Force Intelligence Operations,
- Land Combat Operations,
- Joint Task Force Headquarters,
- Air Operations, and
- Maritime and Amphibious Operations.

The FIAs provide a common foundation that applies to any joint task force operation. The FIAs are based on existing policy and joint doctrine, tactics, operational concepts, and procedures.

The objective of an FIA is to document requirements for the joint interoperable exchange of command and control information. FIAs are validated by the Joint Staff and approved by the Office of the Secretary of Defense. Once approved, the FIAs are sent to the CINCs, Services, and DoD agencies for implementation. The cost to develop an FIA ranges from \$250,000 to \$750,000.

Architecture Development and Implementation

Service architectures. Each of the Services has independently developed its own Service-unique C3 architecture. The Army has the Army Tactical Command and Control Systems architecture; the Navy, the Copernicus architecture; the Marine Corps, the Marine Tactical Command and Control System architecture; and the Air Force, the Tactical Deployable Systems architecture. The Service-unique architectures focus only on the essential interoperability requirements within the applicable Service. Each Service has its own definition, format, and implementing procedure. Service-unique architectures do not contain joint requirements and are validated only by the applicable Service.

Architecture management. We found over 200 CINC, Service, and other C3 architectures within DoD. No single depository was available within DoD to identify, coordinate, and control the various C3 architectures that already existed or were in development. A centralized data base of existing and ongoing C3 architectures had not been developed to ensure that duplication among the various architectures did not occur. In implementing the recommendations in IG, DoD, Inspection Report No. 91-INS-08, the Joint Staff completed a review of C3 architecture requirements and the development process in May 1991. The focus of the review had been to determine whether more control was required over the development of architectures and whether there was a duplication of effort among the various C3 architectures. The review showed that the development process needed more control, a clearer definition, and better coordination during the architecture development process. In addition, the review recommended that the ASD(C3I), in collaboration with the Joint Staff, establish policy, definitions, procedures, and standards for the development of architectures.

In a May 15, 1991, memorandum to the ASD(C3I), the Joint Staff proposed that the J-6 Directorate take the lead in addressing and resolving the recommendations of the review. As of the audit completion date, the ASD(C3I) had not responded to the Joint Staff proposal. As a result, the recommendations of the Joint Staff review have not been implemented. In addition, the management mechanisms needed to prevent duplication, needless additional costs, and excessive delays in C3 architectures are still lacking.

Guidance

The DoD has not established guidance that defines the term architecture, prescribes an architecture hierarchy, and establishes procedures for the implementation, enforcement, and follow-up of the various C3 architecture interoperability requirements.

Definition. A uniform definition for the term architecture does not exist within DoD. Architecture has been defined in various DoD documents, but those definitions are open to interpretation. For example, MOP 50, "Command, Control, and Communications Systems Master Plans, Assessments, and Evaluation," December 1990, defines architecture as "a framework or structure that portrays relationships between and among all elements of the subject force, system, or activity." JIEO's Interoperability Architecture Handbook defines architecture as "an aggregate or set of elements systematically associated and structured to accomplish a purpose and is characterized by the unique organization of its element." No standard definition is recognized and used by all the organizations developing architectures.

Architecture hierarchy. Joint Staff Memorandum 684-88, "Policies and Procedures for Management of Command, Control, and Communications Systems," August 1988, identified the five types of hierarchical C3 architectures as: System Architectures, Mission Area Architectures (e.g., FIA's), Subordinate or Component Command Architectures, Theater Architectures, and National Military Command Systems Architectures. The hierarchy of C3 architectures in Joint Staff Memorandum 648-88 was based on a "building block" concept. The system architecture was the foundation, and the successive architectures were built on the preceding architectures. The architecture segment of Joint Staff Memorandum 684-88 has been "subsumed" by Joint Staff MOP 50; however, MOP 50 does not address a hierarchy for C3 architectures. As a result, no DoD guidance exists that defines precedence for architecture requirements implementation.

Architecture Interoperability Requirements

DoD guidance does not require the CINCs to implement CINC architecture interoperability requirements. We found that the JIEO had developed a CINC architecture for the European Command. Although the CINC architecture identified 24 recommendations to correct interoperability deficiencies in theater, the European Command did not adopt the recommendations.

The Joint Staff "Command and Control Functional Analysis and Consolidated Review Panel Report," October 1991, states:

. . . joint functional interoperability architectures (FIAs) have identified standards developed by the Services for

information exchanged in specific functional areas (e.g., Forward Area Air Defense Data Link), but these standards may not be well implemented across Service boundaries.

MOP 160 requires that once an FIA is completed, validated by the Joint Staff, and approved by the Secretary of Defense, the architecture is to be implemented. The Services are required to "plan, program, and budget for implementation of the approved portions" of the FIA. However, MOP 160 does not specify to what extent the interoperability requirements of the FIAs are to be implemented. As a result, the FIA's joint interoperability requirements are not addressed in the Service-unique architectures.

Enforcement. Although the JIEO is responsible for developing FIAs, it does not have the authority to require the Services to implement architecture interoperability requirements. Each Service played an active role in staffing the draft FIAs. However, the Services used the validated FIA architectures as an additional reference document for their Service-unique C3 architectures, not as a basis for achieving joint interoperability. For example, each Service was developing Service-unique, multifunctional battlefield C2 terminals. The terminals provide the warfighter the ability to display that Service's order of battle information. Nevertheless, there is no single battlefield C2 terminal in existence for a Joint Task Force commander to display all or any portion of the battlefield information. Because a joint requirement for a battlefield C2 terminal has not been developed, a joint task force commander is required to have a different C2 terminal from each Service in order to achieve interoperability. As a result, the divided display of the battlefield information unnecessarily restricts the commander's capability to respond in a timely manner.

Follow-up. Follow-up procedures have not been developed to ensure that FIAs and CINC architectures are implemented by the appropriate activity. We determined that generally, FIA recommendations had not been addressed by the responsible Services. For example, the Joint Tactical C3 Architecture for "Air Defense and Airspace Control in a Combat Zone," November 1987, recommends establishment of specific operational and C3 requirements for a low-altitude airspace control system. As of the audit conclusion date, no requirement existed within DoD to address that area.

Summary

The C3 architecture coordination, development, and implementation process lacks standardization and guidance. A hierarchy for the implementation of C3 architecture interoperability requirements does not exist. Because the Services have not implemented FIA and CINC architectures joint interoperability requirements, the

various C3 architectures have been ineffective in ensuring joint interoperability. In addition, the Services continue to develop Service-unique architectures with little regard to joint operations.

RECOMMENDATIONS, MANAGEMENT COMMENTS, AND AUDIT RESPONSES

We recommend that the Assistant Secretary of Defense for Command, Control, Communications and Intelligence:

1. Designate one official to identify, coordinate, and control the development of command, control, and communications architectures.

Management comments. The ASD(C³I) responded that the DISA charter addressed Recommendation C.1. The Joint Staff concurred with Recommendation C.1. stating that rather than an office or an official, a forum or panel with CINC, Service, and Defense agency representation could identify, coordinate, and control the development of C3 architectures.

Audit response. DoD Directive 5105.19, "Defense Information Systems Agency (DISA)," June 25, 1991, states that DISA is responsible for developing "joint" architectures for tactical C3 and information systems and for maintaining those architectures they develop. The Directive does not designate DISA as the central control and coordination activity for the management of all C3 architectures. We request that the ASD(C³I) reconsider the matter in responding to this report.

2. Establish guidance for command, control, and communications architecture that:

a. Defines the term architecture.

b. Defines the content, purpose, and format of the various command, control, and communications architectures.

c. Establishes a hierarchy for command, control, and communications architectures.

d. Defines the Services' implementation requirements for the Functional Interoperability Architecture and the Interoperability Architectures for the Commanders in Chief.

e. Establishes responsibilities for centralized management of command, control, and communication architectures.

Management comments. The Assistant Secretary stated that Joint Staff and DISA initiatives would address the establishment of guidance for command, control, and communications architectures. The Joint Staff concurred with the recommendation adding that a hierarchy for vertical and horizontal integration of command, control, and communications architectures be

established. The Joint Staff also stated that in addition to centralized management of command, control, and communications architectures, a central repository for all current C3 architectures and an automated data base with pertinent information should be established.

Audit response. We agree that the Joint Staff and DISA have made significant improvements in the area of C3 interoperability since the end of our audit fieldwork. For example, the Joint Staff formed an ad hoc Architecture and Integration Council to coordinate C4 architectural efforts between the Services and Defense agencies. The council is a forum to exchange information concerning command, control, communications, computers, and intelligence architectures between the Services and Defense agencies. However, the Architecture and Interoperability Council is not responsible for establishing C3 architecture guidance, and DoD guidance for C3 architectures is still lacking. DoD Directive 5137.1, "Assistant Secretary of Defense for Command, Control, Communications, and Intelligence," assigns the responsibility for establishing C3I policy and providing direction to the Services and Defense agencies to the Office of the ASD(C3I). We request that the ASD(C3I) reconsider the matter in responding to this report.

RESPONSE REQUIREMENTS ON RECOMMENDATIONS

Responses to this report are required from the addressee shown for the items indicated with an "X" in the chart below.

<u>Number</u>	<u>Addressee</u>	<u>Response to Final Report Should Include</u>		
		<u>Reconsideration of Position</u>	<u>Proposed Action</u>	<u>Implementation Date</u>
C.1.	ASD(C3I) ^{1/}	X ^{2/}	X	X
C.2.	ASD(C3I)	X ^{2/}	X	X

^{1/} Assistant Secretary of Defense (Command, Control, Communications and Intelligence)

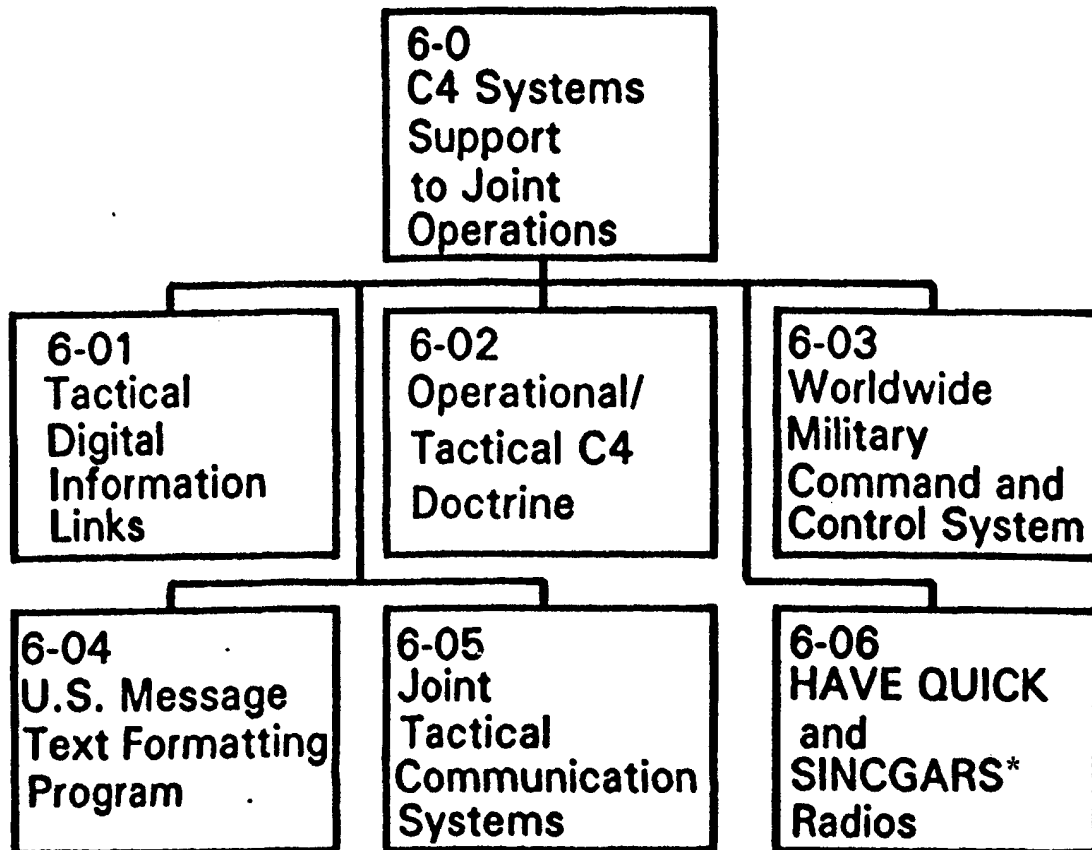
^{2/} Response should provide reconsideration of position.

PART III - ADDITIONAL INFORMATION

- APPENDIX A - Joint Publication 6-0 Series Outline of Major Functional Areas
- APPENDIX B - Analysis of Closed IIP Issues
- APPENDIX C - Interoperability Improvement Program Issues Prematurely Closed
- APPENDIX D - Summary of Potential Benefits Resulting from Audit
- APPENDIX E - Activities Visited or Contacted
- APPENDIX F - Report Distribution

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APPENDIX A: JOINT PUBLICATION 6-0 SERIES OUTLINE OF MAJOR FUNCTIONAL AREAS



*Single Channel Ground and Airborne Radio System

6-0, "Command, Control, Communications, and Computer Systems Support to Joint Operations," June 3, 1992, is the keystone publication that constitutes the doctrinal foundation of the publication 6-0 series.

6-01, the "Tactical Digital Information Links" set, provides joint tactics, techniques, and procedures for Tactical Digital Information Links. Modern C4 systems use a variety of complex digital message designs called Tactical Digital Information Links that link together and provide tactical information to C4 participants via point-to-point transmission or over-the-air broadcasts. Tactical Digital Information Links are used by C2 teams to obtain real-time information necessary for threat detection and assessment and weapons targeting. Equipment with Tactical Digital Information Link capability can reduce the need for voice communications among the various linked participants and can promote overall force effectiveness through enhanced communications, navigation, and identification of friend or foe capabilities.

**APPENDIX A: JOINT PUBLICATION 6-0 SERIES OUTLINE OF MAJOR
FUNCTIONAL AREAS (Cont'd)**

6-02, the "Operational/Tactical C4 doctrine" set, provides operational or tactical C4 systems doctrine and joint tactics, techniques, and procedures. It includes systems descriptions and procedures, discussions of C4 system architectures, and C4 planning systems.

6-03, the "Worldwide Military Command and Control System" set, provides joint tactics, techniques, and procedures for the Worldwide Military Command and Control System (the System). The System provides the means for strategic and operational direction and technical administrative support for the command and control of U.S. military forces. The Systems ensures effective connectivity among the National Command Authorities, the Chairman of the Joint Chiefs of Staff, other components of the National Military Command System, and the Service Component commanders.

6-04, the "U.S. Message Text Formatting Program" set, provides joint tactics, techniques, and procedures for Message Text Formats. A Message Text Format is a highly structured character-oriented message in either printed (record) or spoken (voice) form. There are 174 joint and 65 combined Message Text Formats in existence (as of the time of the audit), each with its own syntax, vocabulary, and operating procedures tailored to satisfy identified information exchange requirements. Message Text Formats have been developed to support Air Operations, Intelligence, Operations Control, Fire Support, Maritime, and Combat Service Support. Using Message Text Formats improves the exchange of information across system, organizational, and cultural boundaries.

6-05, the "Joint Tactical Communication Systems" set, provides joint tactics, techniques, and procedures for Joint Task Force Commanders and Component commanders for planning and installing joint tactical communications systems.

6-06, the "HAVE QUICK and SINCGARS Radios" set, provides joint tactics, techniques, and procedures essential for planning the joint employment of HAVE QUICK radios and Single Channel Ground and Airborne Radio Systems (SINCGARS).

APPENDIX B: ANALYSIS OF CLOSED IIP ISSUES

IIP Issue	IIP Issue Resolved	Issue Well-Defined	Closing Criteria Adequate	Closing Criteria Changed	Length of Process		
					Start Date	Close Date	Months
1. Data Requirements	No	Yes	No	Yes	Oct. 1990	Mar. 1991	5
2. Joint Tactical Information Distribution System	Yes	No	Yes	Yes	Jan. 1987	Jan. 1990	36
3. Single Channel Ground Airborne Radio System Imbedded Communications Security Nonimbedded Communications Security Integrated Support Software Joint Configuration Management	No	Yes	Yes	No	Dec. 1988	Aug. 1990	20
4. Joint Standards for Internal Message Routing	Yes	Yes	Yes	No	Oct. 1989	Mar. 1991	17
5. Allied Surface-to-Air Missile	*	File Purged	*	No	Mar 1988	May 1990	26
6. Single Channel Ground-Air Radio System	Yes	No	Yes	Yes	Jan. 1987	Aug. 1990	43
7. Data Packet Switching Tactical/Strategic Interface	No	Yes	No	Yes	Nov. 1987	Aug. 1990	33
8. Hierarchy of Standards	No	Yes	No	Yes	Oct. 1989	Aug. 1990	10
9. Link Eleven Improvement Program	Yes	Yes	No	Yes	Oct. 1988	Mar. 1991	27
10. Logistics Systems Interoperability	*	Yes	*	No	Dec. 1988	Jan. 1990	13
11. Link Encryption of Tactical Digital Information Link	No	Yes	Yes	No	Mar. 1988	Jan. 1990	22
12. Ground Mobile Forces Super High Frequency Satellite Terminal Phase Burst Problem	Yes	Yes	Yes	No	Dec. 1988	Mar. 1991	27
Average Months to Resolve Issues							23.3

* Undeterminable

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APPENDIX C: INTEROPERABILITY IMPROVEMENT PROGRAM ISSUES
PREMATURELY CLOSED (Cont'd)

developed with guidance published in a DoD directive. The issue was then referred to the Electronics Board for coordination and resolution. The issue was later closed based on ongoing work at the Electronics Board and Joint Staff. As of the close of the audit, a hierarchy of standards had not been established for the precedence of joint and combined standards.

Data Requirements

Data requirements are used to support inter-Service and Service-unique communication decisions. The requirements include data accuracy, timeliness of response, security, precedence categories, and mobility. The JIEO "Data Switching Technology Assessment" report, May 1990, states that as the military forces increase their use of computers and computer systems, well-defined communication data must be available to support the anticipated increase.

Tactical and strategic data requirements need to be clearly identified to match requirements with the applicable communication systems to provide and achieve the most effective exchange of information between the users. However, neither current nor future data requirements were clearly identified in CINC, Service, and Defense agency documents. In addition, a Mission Needs Statement or a Multicommand Required Operational Capability did not exist for validating data communication requirements.

To close this issue, two-fold criteria had been established. The criteria required that either a validated Mission Needs Statement reflecting inter-Service data requirements or a validated Multicommand Required Operational Capability reflecting inter-Service data requirements be developed. The issue was closed based on an ASD(C3I) initiative to define data communications requirements for DoD. However, it was later found that the initiative did not address data requirements, and the Joint Staff concluded that closure of this issue may have been premature. As a result, JIEO was required to monitor this issue and to reintroduce it for resolution if warranted. As of the close of the audit, the Data Requirements issue had not been resubmitted to the IIP.

Software Configuration Management

The Army developed the Single Channel Ground Airborne Radio System Imbedded Communications Security Nonimbedded Communications Security Integrated Support Software (SINISS) as a module of the Battlefield Electronic Communications/Electronics

APPENDIX C: INTEROPERABILITY IMPROVEMENT PROGRAM ISSUES
PREMATURELY CLOSED (Cont'd)

Operating Instructions System software. SINISS allows Single Channel Ground and Airborne Radio Systems (SINCGARS) users to establish secure radio communications during military operations.

Changes made to the Army's software could result in interoperability problems with similar software developed by the other Services. Specifically, the Air Force was developing the Key Distribution Management System software for its version of SINCGARS. To ensure interoperability and to provide for secure communication among all the Services, the SINISS generated information needed to be identical to the information generated in the other Services' radios. Therefore, software changes to the SINISS module needed to be controlled to prevent future interoperability problems with other radios. The closing criteria for the issue required joint configuration management of the SINISS module. The Joint Staff directed the Services to form the Joint Configuration Management Working Group to address the requirement for joint SINISS configuration management. Based on the requirement to control software changes, a joint software configuration management plan for the SINISS module was developed. However, the configuration management plan has not been approved. The issue was closed based on the Joint Staff recommendation and because progress had been made in developing a configuration management plan.

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APPENDIX D: SUMMARY OF POTENTIAL BENEFITS RESULTING FROM AUDIT

<u>Recommendation Reference</u>	<u>Description of Benefits</u>	<u>Type of Benefit</u>
A.1., A.2., and A.3	Program Results. Improves combined force effectiveness by developing a combined publication series.	Nonmonetary
B.1.	Program Results. Improves overall effectiveness by establishing closing criteria and identify the authority level to accept issues and change closing criteria.	Nonmonetary
B.2. and B.3.	Program Results. Increases effectiveness by establishing an audit trail and follow-up procedures.	Nonmonetary
B.4.	Program Results. Improves overall effectiveness of the IIP by chartering it under the Electronics Board.	Nonmonetary
B.5.	Program Results. Improves overall effectiveness of C3 forums by consolidating the Discovery Team and the IIP under the Electronics Board.	Nonmonetary
B.6.	Program Results. Improves overall effectiveness by requiring the Electronics Board Coordinators to develop recommendation and prioritize issues.	Nonmonetary
B.7.	Program Results. Improves overall effectiveness by requiring the Principles to close issues.	Nonmonetary
B.8.	Program Results. Decreases duplication by eliminating the IIP's requirement for a Screening Board and Prioritization Board.	Nonmonetary
C.1.	Program Results. Provides authority to designate an office responsible for the development of C3 architectures.	Nonmonetary

APPENDIX D: SUMMARY OF POTENTIAL BENEFITS RESULTING FROM AUDIT
 (Cont'd)

<u>Recommendation Reference</u>	<u>Description of Benefits</u>	<u>Type of Benefit</u>
C.2.a., C.2.b., and C.2.c.	Program Results. Improves overall effectiveness by defining C3 architecture requirements and establishing a hierarchy.	Nonmonetary
C.2.d.	Program Results. Increases effectiveness by defining the implementation requirements for the Services.	Nonmonetary
C.2.e.	Program Results. Increases effectiveness by establishing centralized management for C3 architectures.	Nonmonetary

APPENDIX E: ACTIVITIES VISITED OR CONTACTED

Office of the Secretary of Defense

Under Secretary of Defense for Acquisition (International Programs), Washington, DC
Assistant Secretary of Defense (Command, Control, Communications and Intelligence), Washington, DC
Assistant Secretary of Defense (International Security Policy), Washington, DC
Assistant Secretary of Defense (Program Analysis and Evaluation) Washington, DC
Strategic Defense Initiative Organization, Washington, DC
U.S. Mission, North Atlantic Treaty Organization, Brussels, Belgium

The Joint Staff

Office of the Director, Operations (J-3), Washington, DC
Office of the Director, Command, Control, and Communications (J-6), Washington, DC
Office of the Director, Operational Plans and Interoperability (J-7), Washington, DC
Office of the Secretary, Joint Staff, Documents Division, Washington, DC

Department of the Army

Chief of Staff, U.S. Army, Washington, DC
Office of the Deputy Chief of Staff For Operations and Plans (Force Development), Washington, DC
Office of the Director, Information Systems for Command, Control, Communications, and Computers, Washington, DC
U.S. Army Operational Test and Evaluation Command, Alexandria, VA
U.S. Army, Europe, and Seventh Army, Campbell Barracks, Heidelberg, Germany
Headquarters, 32d Army Air Defense Command, Darmstadt, Germany
U.S. Army Central Command, Fort McPherson, GA
U.S. Army Training and Doctrine Command, Fort Monroe, VA
U.S. Army Combined Arms Command, Fort Leavenworth, KS

Department of the Navy

Chief of Naval Operations, U.S. Navy, Washington, DC
Office of the Director, Space and Electronic Warfare, Command and Control Electronic Warfare Systems, Washington, DC
U.S. Navy Europe, London, England

APPENDIX E: ACTIVITIES VISITED OR CONTACTED (Cont'd)

Department of the Air Force

Chief of Staff, U.S. Air Force, Washington, DC
Office of the Deputy Chief of Staff for Plans and Operations,
Washington, DC
Office of the Deputy Chief of Staff for Command, Control,
Communications, and Computers, Washington, DC
Headquarters, Tactical Air Command, Langley Air Force Base
(AFB), VA
U.S. Air Forces, Europe, Ramstein Air Base, Germany
Headquarters, 601st Tactical Control Wing, Sembach Air Base,
Germany
1st Combat Communications Squadron, Lindsey Air Base, Germany
Aeronautical Systems Division, Wright-Patterson AFB, OH
Electronics Systems Division, Hanscom AFB, MA
U.S. Central Command Air Forces, Shaw AFB, SC
Headquarters, Ninth Air Force, Shaw AFB, SC
Headquarters, 507th Tactical Air Control Wing, Shaw AFB, SC

Marine Corps

Commandant, U.S. Marine Corps, Washington, DC
Headquarters, U.S. Marine Corps, Arlington, VA
Office of the Deputy Chief of Staff for Aviation, (Plans, Policy
and Requirements Division), Arlington, VA
Office of the Director, Command, Control, Communications, and
Computer Division (Command and Control Interoperability
Division), Arlington, VA
U.S. Marine Corps Combat Development Command (Warfighting Center)
Quantico, VA
Headquarters, 2d Marine Aircraft Wing, Marine Corps Air Station,
Cherry Point, NC

Other U.S. Commands and NATO Command

Headquarters, U.S. European Command, Patch Barracks,
Stuttgart-Vaihingen, Germany
U.S. Central Command, MacDill AFB, FL
Central Army Group, North Atlantic Treaty Organization, Campbell
Barracks, Heidelberg, Germany

Defense Agencies

Defense Information Systems Agency, Arlington, VA
Joint Engineering and Interoperability Organization, Reston, VA
Joint Interoperability Test Center, Fort Huachuca, AZ

APPENDIX E: ACTIVITIES VISITED OR CONTACTED (Cont'd)

Non-Government Activities

Institute for Defense Analyses, Alexandria, VA
Intelligence Communications Architecture Project Office, Reston,
VA
Veda, Alexandria, VA

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APPENDIX F: REPORT DISTRIBUTION

Office of the Secretary of Defense

Assistant Secretary of Defense (Command, Control, Communications
and Intelligence)

Assistant Secretary of Defense (International Security Policy)

Department of the Army

Secretary of the Army

Inspector General

Auditor General, U.S. Army Audit Agency

Department of the Navy

Secretary of the Navy

Commandant of the Marine Corps

Assistant Secretary of the Navy (Financial Management)

Auditor General, Naval Audit Service

Department of the Air Force

Secretary of the Air Force

Assistant Secretary of the Air Force (Financial Management and
Comptroller)

Air Force Audit Agency

The Joint Staff

Director, Joint Staff

Other Commands

U.S. Atlantic Command

U.S. Central Command

U.S. European Command

U.S. Pacific Command

U.S. Southern Command

Defense Agencies

Defense Information System Agency

Non-DoD Activities

Office of Management and Budget

U.S. General Accounting Office, National Security and
International Affairs Division, Technical Information Center

APPENDIX F: REPORT DISTRIBUTION (Cont'd)

Non-DoD Activities (Cont'd)

Chairman and Ranking Minority Member of the Following
Congressional Committees and Subcommittees:

Senate Committee on Appropriations
Senate Subcommittee on Defense, Committee on Appropriations
Senate Committee on Armed Services
Senate Subcommittee on Readiness, Sustainability, and Support,
Committee on Armed Services
Senate Subcommittee on Conventional Forces and Alliance Defense,
Committee on Armed Services
Senate Committee on Budget
Senate Committee on Governmental Affairs
Senate Select Committee on Intelligence
House Committee on Appropriations
House Subcommittee on Defense, Committee on Appropriations
House Committee on Armed Services
House Subcommittee on Readiness, Committee on Armed Services
House Committee on Government Operations
House Subcommittee on Legislation and National Security,
Committee on Government Operations
House Committee on Foreign Affairs
House Subcommittee on Europe and the Middle East,
Committee on Foreign Affairs
House Permanent Select Committee on Intelligence

PART IV - MANAGEMENT COMMENTS

Assistant Secretary of Defense (Command, Control, Communications,
and Intelligence)

Joint Staff

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Comments from Assistant Secretary of Defense (Command, Control, Communications and Intelligence)



COMMAND CONTROL
COMMUNICATIONS
AND
INTELLIGENCE

ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D C 20301-3040

10 November 1992

MEMORANDUM FOR INSPECTOR GENERAL, DEPARTMENT OF DEFENSE

SUBJECT: Draft Audit Report on Management of DoD
Interoperability Efforts for Tactical Command,
Control, and Communications (Project No. 1RA-0048.01)

This is the reply to your memorandum of August 25, 1992,
subject as above. We reviewed the draft audit report and offer
the comments in the attachment for your consideration.

A handwritten signature in dark ink, appearing to read "Duane P. Andrews".

Duane P. Andrews

Attachment

**Comments from Assistant Secretary of Defense (Command,
Control, Communications and Intelligence) (Continued)**

**Final Report
Reference**

**ASSISTANT SECRETARY OF DEFENSE FOR COMMAND, CONTROL,
COMMUNICATIONS AND INTELLIGENCE COMMENTS ON DoDIG DRAFT AUDIT
REPORT (PROJECT NO. 1RA-0048.01)**

- i 1. Page i, Audit Results. Comment: Do not concur with the statement that DoD has not shown a strong commitment to joint and combined interoperability. A number of initiatives by this office and the Joint Staff have been taken to enhance joint and combined interoperability. Examples are the updated DoD Directive 4630.5 soon to be reissued, the C4I for the Warrior Concept developed by the Joint Staff, and the improvements to the IIP process.
- i 2. Page i, Audit Results, (Finding A). Comment: Do not concur with the finding. Joint publications are not intended to address combined tactical C4 operations. Combined tactical C4 operations are addressed in combined publications such as the various Allied Communications Publications (ACPs) which provide procedures, protocols, and interface requirements for combined C4 operations.
- ii 3. Page ii, Audit Results, (Finding B). Comment: Do not agree with the statement that the IIP has not met its objective to resolve critical C3 interoperability issues. The IIP has achieved success and with the changes made within the past year, it's role as the focal point to address C3 interoperability issues has been strengthened.
- ii 4. Page ii, Summary of Recommendations. Many of the recommendations are now being addressed through the development by the Joint Staff of the C4I for the Warrior concept and the formation of the J6I as a central focal point for addressing C4 interoperability issues, standards, architectures, and coordination of corresponding efforts in the various forums addressing these areas.
- 3 5. Page 6, Internal Controls. The concerns noted in this paragraph have been resolved with the establishment of the IIP as a panel under the MCEB with new Terms of Reference. We do not believe that "separation of critical duties" creates any problem for accepting or resolving issues within the IIP. Responsibilities for members of the IIP are clearly stated in the Term of Reference (TOR) governing management of the IIP. Under the new MCEB TOR, the MCEB reviews all closed IIP issues at the Coordinator and Principal level to prevent premature closure.
- 5 6. Page 9, Finding A. Do not concur with the finding. As stated in paragraph 2 above, it does not necessarily follow that U. S. forces lack the doctrine, tactics, techniques, and procedures necessary to support combined military operations. Combined operations require close and extensive coordination with allied nations and the results of these efforts are

**Comments from Assistant Secretary of Defense (Command,
Control, Communications and Intelligence) (Continued)**

**Final Report
Reference**

- documented in different publications described in paragraph 2 above. The Department is also participating with other NATO nations through the Allied Tactical Communications Agency (ATCA) to develop an interoperability handbook to address NATO combined interoperability. Further, work is being done to enhance interoperability in the "NATO Post-2000" efforts. The C4IFTW concept also focuses on combined interoperability. It's goal is to achieve combined interoperability through adoption of international commercial standards whenever practical.
- 8 7. Page 15, Non concur with the statement concerning Joint Publications 6 series should be updated to ensure doctrinal interoperability of combined tactical C4 systems for the reasons stated in the above paragraph.
- 8 8. Page 15, Combined Tactical C4 Doctrine. Partially concur with the paragraph. There is no Joint Staff operational requirement for combined doctrine because this must be worked out in detail on a nation or coalition basis. Joint Publication 6-02 is currently being rewritten within the Joint Staff to address the implications of combined operations but these will be addressed in a general nature. Specifics will continue to be worked out on a case by case basis through development of various allied publications.
- 8 9. Page 16, Joint Tactical C4 Doctrine. Non concur with the statement that Joint Publication 6-02 will not include C4 information for combined operations. It will address this area but this information will be general in nature.
- 9 10. Page 17-18, Joint Connectivity Handbook. Information on C4 systems of the members nations of the Combined Communications Electronics Board will ~~be~~ included in automated Joint/Combined Interoperability Planning System Data Base.
- 9 11. Page 19, Joint Publication 6-05, last sentence. Publication 6-05 never was designed to ensure combined C4 interoperability. Other documents are designed to address the area.
- 10 12. Page 20, Joint and Combined Interface Procedures. Non concur with the recommendation in this paragraph that interface procedures described in other documents be incorporated into joint publications. Incorporation of this information into joint publications will create voluminous documents that duplicate the same material already contained in other publications.
- 10 13. Page 20, Combined Interoperability Assessment Reports. Non concur with the recommendation for the same reason as above. It should be noted that NATO agreements do not necessarily apply to other non-NATO nations. Where we can, we will attempt to use NATO standards for other allies.

**Comments from Assistant Secretary of Defense (Command,
Control, Communications and Intelligence) (Continued)**

**Final Report
Reference**

10

14. Page 21, lines 4-6. Non concur the idea of creating a new set of combined publications to deal with combined operations. Specific procedures and standards are already developed on a nation by nation or coalition basis. Different nations have their own doctrine and tactics based upon their equipment and capabilities. It would be impossible to capture all these in one combined publication.

11

15. Page 22, Recommendations for Corrective Action.

11

a. Recommendation 1. This action is already being addressed in the ATCA development of the NATO Interoperability Handbook and NATO Post-2000 documents.

12

b. Recommendation 2. Non concur. As discussed in various items above, there are already documents in existence or being developed to address NATO interoperability.

13

c. Recommendation 3. Non concur. If standards, operating procedures and communications are already detailed in one document, there is no need to duplicate them in another.

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16. Page 23, Finding B, Interoperability Improvement Program. Non concur that the IIP has not met its objectives. As stated in paragraph 3 above, we feel that the IIP is meeting its objectives and that the process has been significantly improved under the MCEB. Under the new TOR the IIP issues are taken upon receipt.

15

17. Page 23, Finding B, Interoperability Improvement Program, third sentence. Many factors may impact the manner in which an issue is resolved and therefore the closing criteria may change because of changes in technology, funding, and doctrine.

15

18. Page 23, Finding B, Interoperability Improvement Program, fourth sentence. Not sure of what segregation of duties and responsibilities would achieve.

15

19. Page 23, Finding B, Interoperability Improvement Program, fifth sentence. We do not feel that the IIP duplicates the efforts of other forums working interoperability issues. It provides a focal point for resolving issues and a conduit to raise critical issues to MCEB as required.

15

20. Page 23, Finding B, Interoperability Improvement Program, last sentence. Non concur with this statement. The Joint Staff's Centralization of responsibility for interoperability issues to J6I has ensured that interoperability issues are properly addressed by the appropriate forum and that they do not remain unresolved.

15

21. Page 23, Background. It should be noted that a new CMOP 160 and DoD Directive and Instruction covering interoperability are soon to be published.

**Comments from Assistant Secretary of Defense (Command,
Control, Communications and Intelligence) (Continued)**

Final Report

Reference

- 15 22. Page 24, Issue Resolution Process. The new TOR requires that issues be cycled every two months to ensure that action is taken to keep the issues moving and visible within the C4 community.
- 15 23. Page 25, Issue Submission. The referenced circular is no longer in effect. Issues are submitted in accordance with the new TOR.
- 17 24. Page 29, Other Forums that Address C3 Interoperability Issues, first paragraph. The IIP has been moved under the MCEB as a panel. The JTFISG was constituted by the JROC to support a specific subject area. The J6I provides the secretary for the JTFISG and ensures that its efforts do not duplicate that of the IIP and that the efforts of both bodies are coordinated.
- 21 25. Page 35, Recommendations for Corrective Action.
- 22 a. Recommendation 1. Non concur. MOP 160 is being revised but the move of the IIP under the MCEB, a TOR was submitted and approved under the MCEB charter to govern resolution of issues.
- 22 b. Recommendation 2. Concur.
- 22 c. Recommendation 3. Non concur. JTC3A circular 3101 has been rescinded. New procedures are covered in TOR.
- 22 d. Recommendation 4. Concur.
- 22 e. Recommendation 5. Non concur. The Joint Staff has evaluated the merits of doing this and have decided to keep the JTFISG under the JROC.
- 23 f. Recommendation 6. Partially concur. MCEB coordinators will review all work performed by the IIP for final disposition of issues. However, they will not prioritize the acceptance of new issues.
- 24 g. Recommendation 7. Partially concur. The MCEB is final review authority for closure of issues. However, the IIP will recommend closure base upon majority vote of the membership.
- 24 h. Recommendation 8. Concur. The screening board has been abolished.
- 27 26. Page 39, Finding C. Management of C3 Architectures.
Comment: Do not agree with the statement that the ASD (C3I) has not designated a central control and coordination activity for the management of C3 architectures. DoD Directive 5105.19, Defense Information Systems Agency (DISA), June 25, 1991, assigns DISA the responsibility for management of C3

**Comments from Assistant Secretary of Defense (Command,
Control, Communications and Intelligence) (Continued)**

**Final Report
Reference**

31

architectures. Additionally, the Joint Staff J6 has recently established an Architectural and Integration (A&I) Council to coordinate C3 architectural efforts between the Services and Defense Agencies and under their C4I for the Warrior Concept they will produce an Objective Concept designed to achieve unity of effort for Service and CinC C3 architectures.

27. Page 47, Recommendations for Corrective Action. Comment: With regard to recommendation 1, we feel that the tasking in the DISA's charter addresses this recommendation. We feel that the work being done by the Joint Staff and DISA will address the establishment of guidance called for in recommendation 2.

Comments from Joint Staff



THE JOINT STAFF
WASHINGTON, DC

Reply ZIP Code:
20318-0300

DJSM-1322-92
10 November 1992

MEMORANDUM FOR THE INSPECTOR GENERAL, DEPARTMENT OF DEFENSE

Subject: Draft Audit Report on Management of DOD
Interoperability Efforts for Tactical Command,
Control, and Communications (Project No. 1RA-0048.01)

1. As requested,* the Joint Staff has reviewed the draft audit report and provides the enclosed comments.
2. The Joint Staff point of contact is Lieutenant Colonel Michael Balderman, USA, extension 43442.


HENRY VICCELLIO, JR.
Lieutenant General, USAF
Director, Joint Staff

Enclosure

Reference:

- * DOD IG memorandum, 25 August 1992, "Draft Audit Report on Management of DoD Interoperability Efforts for Tactical Command, Control, and Communications (Project No. 1RA-0048.01)"

Comments from Joint Staff (Continued)

Final Report Reference

ENCLOSURE

JOINT STAFF COMMENTS ON DRAFT AUDIT REPORT (PROJECT NO. 1RA-0048.01)

- i 1. Page i, "Objectives." Comment: The objectives stated for this draft audit report are not consistent with the content and material covered in the report. The stated objective is to evaluate DOD management of efforts to attain NATO tactical interoperability. The report, instead, focuses on the general areas of Combined C4 Doctrine, Tactics, Techniques, and Procedures; the Interoperability Improvement Program (IIP), and management of C4 architectures.
- i 2. Page i, "Audit Results." Comment: Nonconcur in the statement that the Department of Defense has not shown a strong commitment to joint and combined interoperability. Joint Pub 1 is the keystone of the DOD commitment to Joint Warfare of the Armed Forces. Annex C to the National Military Strategy Document, the upcoming revision of JCS MOP 160, the development of the C4I for the Warrior Concept, and formation of the Architecture and Integration Division (J6I) as the J-6 focal point reflect the criticality with which the J-6 and Joint Staff view both joint and combined interoperability.
- i and ii 3. Pages i and ii, "Audit Results," (Finding A). Comment: Nonconcur. The comment is made that Joint Staff Pubs do not address combined tactical C4 operations, and that without combined doctrine tactics, techniques, and procedures, the United States cannot establish well-organized C4 systems. Joint Pubs are by their very nature and title, joint in focus--not combined. The audit report should take into account the 50-plus Allied Communications Publications (ACPs) that are managed directly by the Combined Communications-Electronics Board (CCEB). These documents provide the procedures, protocols, and interface requirements for combined C4 operations that are used by all NATO and 60 other allied nations. This effort represents a significant interoperability success.
- ii 4. Page ii, "Audit Results," (Finding B). Comment: Nonconcur. The IIP has met its objective. Although the IIP has not been the proactive force in resolving interoperability issues it was originally designed to be, we have made numerous changes within the last 18 months to reenergize this body. Additional changes made since the end of the audit report data collection effort in February have achieved many of the audit report recommendations and made the IIP the primary focal point for addressing C4 interoperability issues. Additionally, this forum is the only forum that maintains full CINC representation.

Comments from Joint Staff (Continued)

Final Report Reference

- ii 5. Page ii, "Internal Controls," 5th line. Change "Finding B" to "Part II."
- REASON: Administrative accuracy.
- ii 6. Page ii, "Summary of Recommendations." Comment: Action has been taken on many of the audit report recommendations. Many of those remaining are now being addressed through the development of the C4I for the Warrior (C4IFTW) concept by J-6 and the formation of J6I within J-6 as a central focal point for addressing C4 interoperability issues, standards, architectures, and coordination of corresponding efforts in the various forums addressing these areas.
- 1 7. Page 1, "Interoperability," 7th and 8th lines, and throughout document. Comment: The term "compatible" is used in the wrong context. Compatible is not a synonym for interoperable. See Joint Pub 1-02 for approved definition.
- 2 8. Page 3, "Joint Interoperability and Engineering Organization," 6th through 8th lines. Comment: This paragraph discusses the Joint Interoperability and Engineering Organization (JIEO) as being responsible for "C3I" with the "I" standing for intelligence, but the next sentence discusses "C3 and information systems." Recommend that the "I" be deleted because JIEO is not responsible for intelligence. Intelligence communications architectures responsibility rests with the Intelligence Communications Architecture (INCA) Project Office formed at the direction of the House Permanent Select Committee on Intelligence in 1982.
- 3 9. Page 5, 1st paragraph, 9th line; and page 6, 4th line. Change "IPP" to "IIP."
- REASON: Accuracy.
- 3 10. Page 5, 2d paragraph. Comment: This paragraph states that the audit was completed in February of 1992. Between February and the end of August of this year, many changes have taken place within J-6 that directly impact both joint and combined interoperability. The primary action has been the formation of J6I within J-6 to implement the C4IFTW concept with its intense focus on achieving interoperability in both the joint and combined arenas.
- 3 11. Page 6, "Internal Controls." Comment: Nonconcur in the comment that the IIP process does not meet the IIP objectives as prescribed by JCS MOP 160. A breakdown of the goals is as follows:
- a. Identify, coordinate, prioritize, and resolve current interoperability issues. Goal met. Over 100 issues have been identified and 34 resolved.

Comments from Joint Staff (Continued)

Final Report Reference

- b. Identify and prioritize CINC interoperability needs and requirements. Goal was modified when IIP became a panel under the Military Communications-Electronics Board (MCEB) to "focus and assist the CINCs in achieving their C4I interoperability needs and requirements." In this manner, the IIP is assisting the CINC's priorities.
- c. Prioritize and coordinate funding for tactical C3I programs with identified interoperability requirements. Goal was partially met. Example programs include HAVEQUICK and SINCGARS.
- d. Coordinate fielding plans. Goal was modified when IIP became a panel under the MCEB. Fielding plans of specific systems as well as introduction of standards have been closely monitored. The latest of these involved HAVEQUICK.
- e. Identify and prioritize requirements for inter-operability standards. This objective was rescinded with the establishment of the Center for Standards in JIEO.
- 3 12. Page 6, "Internal Controls," 5th and 6th lines. Comment: We do not believe that "separation of critical duties" creates any problem for accepting or resolving issues within the IIP. Responsibilities for all members were clearly stated in the current JCS MOP 160 and in the current terms of reference (TOR) governing management of the IIP. See paragraph 35 for additional information.
- 3 13. Page 6, "Internal Controls," 5th through 8th lines. Comment: Partially concur in the statement concerning lack of an audit trail. This problem was recognized when the IIP became a panel under the MCEB. The TOR were written to ensure that the IIP continues to review issues for a period of 1 year after closure to verify the issue has been successfully resolved.
- 5 14. Page 9, "FINDING A. COMBINED C4 DOCTRINE, TACTICS, TECHNIQUES, AND PROCEDURES." Comment: Nonconcur. Building on the comment in paragraph 3 above, it does not necessarily follow that US forces lack the doctrine, tactics, techniques, and procedures necessary to support combined military operations. This requires close and extensive coordination with allied countries, and the results are documented in different publications as described in paragraph 3, above. Additionally, the United States is participating with the other NATO countries through the Allied Tactical Communications Agency (ATCA) to develop an interoperability handbook to address NATO combined interoperability. The new concept of NATO multinational corps and divisions is still being developed. This new concept, including strategic to tactical interoperability, is being worked in the NATO Post-2000 documents with US participation. Combined interoperability is also a focus of the C4IFTW concept. One goal is to achieve combined interoperability through adoption of international commercial standards when practical.

Comments from Joint Staff (Continued)

Final Report Reference

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15. Page 15, under heading "Operation Desert Shield/Storm," 10th to 12th lines. Comment: Nonconcur for reasons stated in paragraph 14, above.

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16. Page 15, "Combined tactical C4 doctrine." Comment: Partially concur in the paragraph. There is no Joint Staff operational requirement for combined doctrine because this must be worked out in detail on a nation-by-nation or coalition basis. Joint Pub 6-02 is currently being rewritten within J-6 to address the implications of combined operations, but these implications will be addressed in a general nature. Specifics will continue to be worked out on a case-by-case basis through development of Allied Data Publications, Standard NATO Agreements, ACPs, and similar documents.

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17. Page 16, "Joint tactical C4 doctrine." Comment: Nonconcur that Joint Pub 6-02 will not include C4 information for combined operations. The Pub will address this area, but the information will be general in nature.

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18. Pages 17 and 18, "Joint Publication 6-02.2, Joint Connectivity Handbook." Comment: This paragraph discusses the Joint Connectivity Handbook and makes the statement that no action had been taken to include allied C4 data in the handbook. The information in the handbook has been automated by JIEO in the Joint/Combined Interoperability Planning System Data Base (IADB). The allied countries of the CCEB (Canada, United Kingdom, Australia, and New Zealand) have agreed to supply data on their C4 systems, equipment, and equipment strings for inclusion in this automated data base. Therefore, action is being taken to include combined information.

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19. Page 18, "Joint Publication 6-05," 18th to 20th lines. Comment: Joint Pub 6-05 was never designed to ensure combined C4 interoperability. As discussed in paragraph 14, other documents are designed to address this arena.

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20. Page 20, under "Joint and combined interface procedures." Comment: Nonconcur in the recommendation in this paragraph that interface procedures described in other documents be incorporated into Joint Pubs. The procedures described in the Mobile Subscriber Equipment example are already included in an ACP and will be incorporated into the NATO Interoperability Handbook. Incorporation of this information into Joint Pubs will create voluminous, unusable documents and duplicate the same material in numerous publications.

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21. Page 20, "Combined interoperability assessment reports." Comment: Nonconcur for the same reason as in paragraph 20, above. It should also be noted that NATO agreements do not necessarily apply to other non-NATO nations. Efforts are under way to obtain NATO release of their standards to Pacific rim nations.

Comments from Joint Staff (Continued)

Final Report Reference

10

22. Page 21, 4th through 6th lines. Comment: Nonconcur in the idea of creating a new set of combined publications to deal with combined operations. Specific procedures and standards are already developed on a nation-by-nation or coalition basis. Operation DESERT STORM demonstrated the fact that future coalition operations may be conducted with nations that are not currently considered allies. Different nations have different doctrine and tactics based upon their equipment and capabilities. It will be impossible to capture all these differences in one combined publication.

23. Page 22, "RECOMMENDATIONS FOR CORRECTIVE ACTIONS." Comment: For the most part, the discussion in Part II of the draft audit report addressed combined operations in general. Paragraphs 1 and 2 are specifically concerned with NATO.

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a. Paragraph 1. Comment: This action is already being addressed in the ATCA development of the NATO Interoperability Handbook and NATO Post-2000 documents.

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b. Paragraph 2. Comment: Nonconcur. As discussed in various paragraphs above, there are already documents in existence or being developed to address NATO-specific interoperability. We believe that a combined publication series would not provide any additional benefit.

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c. Paragraph 3. Comment: Nonconcur. This follows from the nonconcurrence in paragraph 2. If standards, operating procedures, and communications are already detailed in one document, there is no need to duplicate them in another. Combined interoperability will be addressed in general terms as the Joint Pub 6-0 series is reviewed and updated. We will work with JIEO to review the Joint Pubs as we update them in keeping with the C4I/TW concept to ensure that lessons learned from Operations DESERT SHIELD and DESERT STORM, reports from the Joint Interoperability Test Center, and deficiencies and recommendations from the Functional Interoperability Architectures are incorporated or addressed.

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24. Page 23, "FINDING B. INTEROPERABILITY IMPROVEMENT PROGRAM," 1st to 3d lines. Comment: Nonconcur that the IIP has not met its objectives. See paragraphs 4 and 11, above, for rationale.

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25. Page 23, "FINDING B. INTEROPERABILITY IMPROVEMENT PROGRAM," 3d to 6th lines. Comment: The IIP has always accepted new issues throughout its cycle--not just annually. This has been further clarified under the new TOR (since the IIP was made a panel under the MCEB), which allow for immediate action by the chair, upon receipt of a potential new issue. It has never taken 8 months for issue acceptance. Even under the

Comments from Joint Staff (Continued)

Final Report Reference

- old process, issues were normally submitted 4 to 6 weeks before a meeting and were either accepted or rejected at that time with a maximum time between meetings of no more than 16 weeks.
- 15 26. Page 23, "FINDING B. INTEROPERABILITY IMPROVEMENT PROGRAM," 6th and 7th lines. Comment: Many factors (technology, funding, doctrine) may impact the manner in which an issue is resolved and, therefore, the closing criteria may change. This does not necessarily result in issues being closed before resolution. The new TOR require the IIP to continue to review issues for 1 year after closure to ensure the issue was resolved.
- 15 27. Page 23, "FINDING B. INTEROPERABILITY IMPROVEMENT PROGRAM," 8th and 9th lines. Comment: The point of this sentence is not understood. What type of segregation is the DOD IG looking for in the resolution process? The IIP has a membership of 25 voting members and there is no conflict of interest involved in the voting process to close an issue.
- 15 28. Page 23, "FINDING B. INTEROPERABILITY IMPROVEMENT PROGRAM," 9th to 11th lines. Comment: Although there are other forums working interoperability issues, the IIP does not duplicate these efforts. The move of the IIP under the MCEB has made it the focal point for resolving interoperability issues. It has also become the conduit for raising critical interoperability issues to the MCEB level as required. Because J6I is the J-6 focal point for interoperability, this division is in a position to ensure that issues are not addressed by duplicate forums. In fact, through one J6I action, the Theater and Tactical Command, Control, and Communications Panel was disbanded and its functions were incorporated into the IIP.
- 15 29. Page 23, "FINDING B. INTEROPERABILITY IMPROVEMENT PROGRAM," 11th to 13th lines. Comment: Nonconcur. Centralizing responsibility for interoperability issues within J6I has ensured that interoperability issues are properly addressed by the appropriate forum, and that they do not remain unresolved.
- 15 30. Page 23, "Background." Comment: An updated JCS MOP 160 is being formally coordinated. Approval is pending publication of the revised DOD Directive 4630.5. The IIP has been placed under the MCEB as a panel and new TOR have been written as a result.
- 15 31. Page 24, "Issue Resolution Process." Comment: The new TOR require that issues be cycled every 2 months to ensure that action is taken to keep the issues moving and visible within the C4 community.
- 15 and 16 32. Page 25, "Issue Submission." Comment: The referenced circular is no longer in effect. The new TOR for the C4I IIP

Comments from Joint Staff (Continued)

Final Report Reference

- became effective in July 1992 and state that the chair will elicit action on new or existing issues between meetings, as required.
- 16 33. Page 25, 2d paragraph. Comment: Nonconcur in the statement that it takes 8 months before an IIP issue is officially accepted and the resolution process begins. Prioritization Board concurrence for issue acceptance was never required for initial action on an issue. The IIP chair can elicit action on new or existing issues between meetings as required. Additionally, under the new MCEB TOR, the MCEB principals perform the functions previously done by the Flag Officer Board. IIP issues can, therefore, be put before the MCEB every month.
- 16 and 17 34. Page 26, "Issues prematurely closed." Comment: Nonconcur. See explanation in paragraph 26 above. Additionally, the new TOR require the MCEB to review all issues prior to closure. The TOR also require that the IIP continue to review an issue for 1 year after closure.
- 17 35. Page 28, "Separation of duties." Comment: Nonconcur in the conclusion that a separation of duties may have prevented premature closure of critical C3 issues. The report fails to note that 25 members must vote and approve both changes to closure criteria and closure of an issue. Under the new MCEB TOR, the MCEB must review all closed IIP issues at both the Coordinator and Principal level to prevent premature closure.
- 17 36. Page 28, "Follow-up." Comment: JIEO Circular 3101 is no longer in effect and has been replaced with the MCEB TOR. See explanation in paragraph 34, above, for corrective action.
- 17 37. Page 29, "Other Forums that Address C3 Interoperability Issues," 1st and 2d lines. Comment: It should be noted that the IIP has been placed under the MCEB as a separate panel. A similar action was contemplated for the Joint Tactical Fusion Interoperability Steering Group (JTFISG); however, it was decided to keep that forum as a separate body because it was constituted by the Joint Requirements Oversight Council to support a specific subject area. J6I also provides the secretary for the JTFISG and ensures that JTFISG efforts do not duplicate that of the IIP and the efforts of both bodies are coordinated.
- 20 38. Page 34, "Consolidation of C3 forums." Comment: It should be noted that the Discovery Team is no longer in effect for the JTFISG and has been replaced by an action officer-level working group under the JTFISG. Also see the comment in paragraph 37, above.
- 20 and 21 39. Page 35, "IIP and Electronics Board." Comment: Concur. Action to place the IIP under the MCEB has been completed.

Comments from Joint Staff (Continued)

Final Report Reference

- 21 40. Pages 35 through 37, "RECOMMENDATIONS FOR CORRECTIVE ACTION"
- a. Paragraph 1. Comment: Nonconcur. JCS MOP 160 is being revised, but with the move of the IIP under the MCEB, TOR were submitted and approved under the MCEB charter to govern resolution of issues.
- 22 b. Paragraph 2. Comment: Concur. J6I is the J-6 focal point for interoperability. As such, the division chief acts as the chair for the IIP. The chair will ensure all actions are well documented. Additionally, the implementation of a new automated data base for quick retrieval of issue status and archived information pertaining to closed issues will improve documentation efforts.
- 22 c. Paragraph 3. Comment: Nonconcur. JTC3A circular 3101 has been rescinded. Follow-up procedures have been detailed in the new TOR.
- 22 d. Paragraph 4. Comment: Concur. Action has been completed.
- 22 e. Paragraph 5. Comment: Nonconcur. This recommended action was evaluated at both the action officer and general officer level, and the decision was made to keep the JTFIWG under the JROC. J6I will ensure actions of both the JTFIWG and IIP are coordinated.
- 23 f. Paragraph 6. Comment: Partially concur. The MCEB coordinators will review all work performed by the IIP for final disposition of issues. However, within the new TOR, the coordinators will not prioritize the acceptance of new issues.
- 24 g. Paragraph 7. Comment: Partially concur. In accordance with the new TOR, the MCEB is final review authority for closure of issues. However, the IIP will recommend closure based upon majority vote of the membership.
- 24 h. Paragraph 8. Concur. The Screening Board was abolished under the new TOR.
- 27 41. Page 39, "FINDING C. MANAGEMENT OF C3 ARCHITECTURES," 6th line. Change "JIEO" to "Defense agencies."
- REASON: JIEO is not the only organization developing C3 architectures. The Intelligence Communications Architecture (INCA) Project Office, DISA, and NSA also develop C3 architectures or related documents. The IG audit also did not address these other architectures within its report.

Comments from Joint Staff (Continued)

Final Report Reference

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| 29 | 42. <u>Page 43, "Guidance."</u> Comment: It should be noted within the report that J6I has formed the ad hoc Architecture and Integration Council to coordinate C4 Architectural efforts between the Services and Defense agencies at the O-6 level. Two successful meetings have been held to date. |
| 29 | 43. <u>Page 44, "Architecture hierarchy."</u> Comment: It should be noted that the new CJCS MOP 50 was never designed to subsume the architecture portion of JCSM 684-88; that is why CJCS MOP 50 contains no hierarchy for C3 architectures. |
| 29 and 30 | 44. <u>Page 44, "Architecture Interoperability Requirements."</u> Comment: It should be noted that the J-6 C4IFTW concept will produce an Objective Concept designed to achieve unity of effort for Service and CINC C3 architectures and interoperability efforts. |
| 30 | 45. <u>Page 46, "Follow-Up."</u> Comment: As part of the J-6 effort to update the Joint Pub 6-0 series in accordance with the C4IFTW concept, a coordinated effort with JIEO will ensure that findings within the Functional Interoperability Architectures pertaining to Joint Tactics, Techniques, and Procedures are addressed within the appropriate Joint Pub. |
| | 46. <u>Pages 47 and 48, "RECOMMENDATIONS FOR CORRECTIVE ACTION"</u> |
| 31 | a. Paragraph 1. Comment: Concur with comment. Rather than an office, a forum or panel with CINC, Service, and Defense agency representation could perform the same function. |
| 31 | b. Subparagraph 2a. Comment: Concur. |
| 31 | c. Subparagraph 2b. Comment: Concur. |
| 31 | d. Subparagraph 2c. Comment: Concur with comment. The recommendation should read "Establishes a hierarchy for vertical and horizontal integration of command, control, and communications architectures." Establishing a hierarchy in itself is not important. How the various C3 architectures are integrated together is critical. |
| 31 | e. Subparagraph 2d. Comment: Concur with comment. The FIA process is now completed. This recommendation may, therefore, no longer be valid. |
| 31 | f. Subparagraph 2e. Comment: Concur with comment. Besides centralized management, there should also be a centralized repository for all current C3 architectures and an automated data base with pertinent information. |

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INTERNET DOCUMENT INFORMATION FORM

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