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WSEG REPORT 159

COMMAND, CONTROL, AND COMMUNICATIONS PROBLEMS (U)

Volume I: Summary

February 1971

Including

IDA REPORT R-172

Ronald A. Finkler, *Project Leader*

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REPORT R-172

COMMAND, CONTROL, AND COMMUNICATIONS PROBLEMS (U)

Volume I: Summary

Ronald A. Finkler, *et al.*

February 1971

This report has been prepared by the Science and Technology Division of the Institute for Defense Analyses in response to the Weapons Systems Evaluation Group Task Order SD-DAHC15 67 C 0012-T-156, dated 2 December 1969.

In the work under this Task Order, the Institute has been assisted by military personnel assigned by WSEG.

IDA

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WEAPONS SYSTEMS EVALUATION GROUP
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ARLINGTON, VIRGINIA 22202

24 February 1971

MEMORANDUM FOR CHAIRMAN, JOINT CHIEFS OF STAFF

SUBJECT: Command, Control, and Communications Problems Study (U)

I. FOREWORD

(U) The abstract of WSEG Report 159 is contained in Section II below. Detailed WSEG comments on the study are contained in Section III.

II. ABSTRACT

(U) Title: WSEG Report 159, "Command, Control, and Communications Problems (U)," February 1971.

(U) Conducted by: WSEG For: JCS

(~~C~~) Purpose: To identify the major problem areas within the Worldwide Military Command and Control System (WWMCCS) and to recommend a time-phased study program designed to assist in solving these major problem areas, including recommendations for priority of effort.

(U) Methodology: The major problems within the WWMCCS were identified through (1) analysis of previous studies, (2) visits and discussions with representatives from the Unified and Specified commands, the Component commands, the Service headquarters, the DoD agencies, the National Military Command System and the Joint Staff, (3) analysis of current procedures and reporting systems, and (4) analysis of previous and current command and control exercises. Problems identified were grouped into major problem areas and study tasks were defined for each area. The tasks were then grouped into specific studies and time-phased into an overall study program with priority of effort identified.

(~~TS~~) Principal Findings:

(~~C~~) 1. The WWMCCS operates in an environment of divided responsibility

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and independent organizations within the Department of Defense and the over-all National Security Community. It does not have a definitive charter from which to operate nor has it been given active and consistent management guidance.

(~~S~~) 2. At the present time, no single JCS/DoD activity exercises responsibility for the over-all management of the WWMCCS. There is no master objectives plan that specifically delineates the structure, interfaces, capabilities, and standards to be achieved by elements of the WWMCCS to support the system's mission. Since the elements and assets of the WWMCCS are not specifically defined, it is not possible to directly relate the assets of the WWMCCS to program elements that are specified in the Five Year Defense Program (FYDP).

(~~S~~) 3. A capability to provide timely decision support information for the President is [ ] There is insufficient coordination and cooperation at the staff level within the national security community, limited coordination between the intelligence and operations systems, and limited but improving coordination between the JCS operations systems and the individual information systems of the Services. The responsiveness of intelligence and operations activities is diminished by organizational structures and arrangements. There is [ ] associated with the quality, timeliness, relevance and selection criteria for the information provided by the information support systems of the WWMCCS.

(~~TS~~) 4. [ ]

(~~S~~) 5. Measures of performance are not applied consistently throughout the WWMCCS nor are they designed to evaluate the effectiveness of command and control in such terms as cost and utility.

(~~S~~) 6. The WWMCCS is required to function in operational situations involving joint and combined activities of the U. S. military, U. S. nonmilitary, and U. S. allies to an extent that often it cannot support the organizational and command arrangements through which it normally operates. Even within

the U. S. military community, the division of responsibility among several command chains can make current operational information unavailable in the WWMCCS for significant time periods during planned or crisis operations.

(S) 7. Automatic Data Processing (ADP) capabilities in the WWMCCS appear to be [ ]

(S) 8. Communications are [ ] for operations in crises, and [ ] by non-nuclear as well as nuclear weapon effects.

(S) 9. To address the major problems identified, eight studies are defined and structured in a coordinated study program that is time-phased over a period of 42 months and requires a total level of effort of 111 man-years. The study titles are ranked below according to the priority assigned in the proposed study program.

STUDY	TITLE
1	Develop an Institutional Framework for Managing, Planning, Programming, and Budgeting the WWMCCS
2	Determine the Adequacy of Command and Control and Other Staff Support Systems in the Washington National Security Community and Establish their Mutually Dependent Requirements
3	Evaluate Information Flow and Convergence
4	Evaluate Command and Control for Execution of U. S. Strategic Forces in Retaliation
5	Evaluate Command and Control for the Conduct and Termination of Strategic Operations
6	Determine Information Systems Needed for Strategic Nuclear Decision Support

STUDY	TITLE
7	Define Concepts of Command and Control and Establish Methodology for Measuring Performance and Cost
8	Develop Procedures to Provide for Flexibility of Command and Control within EUCOM and PACOM

III. WSEG COMMENTS

(U) 1. The study is responsive to DJSM-1812-69, 29 November 1969. In accordance with the directive, the study did not provide solutions to problems, but rather identified major problem areas and recommended a study program. Since the study is problem oriented, it emphasizes disadvantages or shortcomings rather than advantages or strengths attributed to the WWMCCS. Accordingly, the study should not be used in isolation for evaluating the worth of the WWMCCS.

(~~C~~) 2. This study presents the first comprehensive examination of the WWMCCS over its entire mission spectrum of day-to-day operations, crisis situations, limited war and strategic nuclear war. The major problems with the WWMCCS have been identified throughout this mission spectrum, and structured to permit systematic examination under the recommended time-phased study program. This study program should be useful to the Joint Chiefs of Staff in considering the thrust of future studies to improve the WWMCCS on a systematic basis rather than by a piecemeal approach to handle individual problems. Further, to insure continuity of effort and minimize redundancy, it is recommended that the Joint Staff use the study program as a master plan for coordinating and conducting current and future efforts in this area, as well as update the study program as required by the results of follow-on studies and other future considerations.

(~~TS~~) 3. [

]

study at a higher level, although DoD participation will be essential.

(TS) 4. The time-phased study program set forth in Volume I identifies two study tasks in the strategic area which are considered outside the scope of the WWMCCS. Study Task 5.2 proposes to examine requirements and capabilities for SAFEGUARD-MINUTEMAN coordination, and the potential degradation to the MINUTEMAN force because of launch constraints imposed by SAFEGUARD warhead detonations. Study Task 5.3 proposes to develop time-sensitive SIOP and RISOP planning factors and force employment doctrines that are significant to developing effective command and control. Other strategic study tasks identified in Appendix K, Volume IX, were not included in the time-phased study plan because they were considered completely outside the scope of the WWMCCS. The latter studies consider capabilities, vulnerabilities and time-sensitivities of sensor systems, strategic weapons and weapons control systems. All of the above studies emphasize critical problems of strategic command and control relating to the employment of strategic weapons at the force level, and should be studied in that context, rather than in the context of the WWMCCS.

(S) 5. Except for the comment in paragraph 4, WSEG concurs in the problem structuring and the time-phased study program. Study Task 1.1 (Inputs to the Objective Plan for Relating Program Elements to Assets), Study Task 2.1 (Requirements for WWMCCS Support of the National Security Community), and Study Task 4.2 (Survival of Command Posts), are recommended for immediate study in the time-phased study program. These studies are considered reasonable points of departure for both immediate and long-range payoff for solving problems within the WWMCCS. WSEG can support these initial studies within its programmed budget and recommends that they be initiated as soon as possible.

Arthur W. Oberbeck

ARTHUR W. OBERBECK
Lieutenant General, USA
Director

FOREWORD

(U) This report is a product of the Institute for Defense Analyses and was done in conjunction with the Weapon Systems Evaluation Group. The research that forms the basis for this report was carried out by a project group under the general leadership of Ronald A. Finkler. The members of the project staff were from the Science and Technology Division, the Systems Evaluation Division, and the International and Social Studies Division as well as from WSEG. The staff included

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(U) An advisory and review panel reviewed the work and assisted the study effort by providing comments and advice. The members of the panel were

Ali B. Cambel
Eugene G. Fubini
Eugene J. Webb
Thomas C. Schelling
Robert H. Scherer

PREFACE

(U) The Institute for Defense Analyses has conducted this study of the Worldwide Military Command and Control System in response to Weapons Systems Evaluation Group (WSEG) Task Order DAHC15 67 C 0012-T-156.*

(U) The WSEG task was designed to implement the study approach described in WSEG Staff Study 153, Study Plans for Command, Control, and Communications Problems, wherein selected portions of the baseline, analytical, and scenario-based study plans were proposed. As outlined in WSEG Staff Study 153, the baseline study would provide a description of the WWMCCS structure and operation and would identify both current and potential WWMCCS problem areas, the analytical study was to provide guidelines for selecting problems for analysis and for the consideration of the feasibility of developing performance measures for the WWMCCS, and the scenario feasibility study would consider the feasibility of constructing and using scenarios for the identification of the WWMCCS problems. This report has been published in ten volumes and is intended as a total response to the task order.

(U) This volume contains an Executive Summary which is a Brief of the total study. In it, the problems that were isolated and the time-phased study program that has been recommended to attack those problems are presented. Subsequent sections of this volume deal with the problem areas and the recommended studies in more detail.

*A copy of the Task Order appears in the Appendix.

(U) The results of this study are based on the formal and informal information made available to the project staff. Readers with access to information not uncovered by our staff must evaluate our results accordingly. The project staff takes the responsibility for all interpretations of the information contained herein.

(U) Report R-172, Command, Control, and Communications Problems, consists of the Summary, Vol. I, and the following supporting volumes:

II. Worldwide Military Command and Control System (WWMCCS): Background and Evolution, Lloyd B. Tidd, Col., USAF

III. The Washington National Security Community and the Role of the WWMCCS, Delbert D. Arnold

IV. The Organizational and Operational Matrix of the WWMCCS in Europe, Leonard Wainstein

V. The Organizational and Operational Framework of the WWMCCS in the Pacific Theater, John Ponturo

VI. Intelligence Support for the WWMCCS, Delbert D. Arnold

VII. Operational Reporting in the WWMCCS, Jonathan A. Seaman

VIII. WWMCCS Facilities and Subsystems, Norman D. Jorstad, LTC, USA

IX. Problems in Command and Control of U.S. Strategic Forces in General Nuclear War, 1971-1980,

Part 1: Summary, Richard H. Briceland, Harold A. Knapp, Joseph M. Aein

Part 2: Supporting Appendices, Joseph M. Aein, Richard H. Briceland, Harold A. Knapp

X. Performance Measures for the WWMCCS, James J. Bagnall, Jr., Richard A. Bihr, Capt., USN, and John D. Waller

(U) Three working papers were prepared during the course of the study but have not been included as part of this report. They are:

Guidelines for Selecting Problems for Analysis, Blaine O. Vogt, Col., USA, and James J. Bagnall, Jr.

Feasibility of the Scenario-Based Approach, Joseph Nay, Leonard Wainstein, and Bob M. Johnson, Col., USAF

A Survey and Report on the Status of Documented WWMCCS Problems, Eloise L. Graham

CONTENTS

	EXECUTIVE SUMMARY	1
	Purpose	1
	The Worldwide Military Command and Control System	1
	Background and Observations	2
	Principal Findings	7
	Recommended Study Program	13
	Supporting Documents	24
I.	INTRODUCTION	27
II.	THE NATIONAL SECURITY COMMUNITY	29
	A. Background Discussion	29
	B. Specific Study	32
III.	OPERATIONAL ORGANIZATION, COMMAND STRUCTURE, AND RESOURCES	37
	A. Background Discussion	37
	B. Specific Study	48
IV.	INFORMATION FLOW AND CONVERGENCE	51
	A. Background Discussion	51
	B. Specific Study	57
V.	STRATEGIC NUCLEAR WAR	63
	A. Background Discussion	63
	B. Specific Studies	70
VI.	OPERATIONAL CONTEXT OF THE WWMCCS	87
	A. Background Discussion	87
	B. Specific Studies	96
	Appendix--WSEG Task Order	107

EXECUTIVE SUMMARY

PURPOSE

(Ø) The purpose of this study is to identify major problem areas within the Worldwide Military Command and Control System (WWMCCS) and to recommend a time-phased study program to assist in solving these major problem areas, including recommendations for priority of effort. The time period of interest is 1970-1980. Proposals for the solution of problems would be the result of follow-on studies and are beyond the scope of this report.

THE WORLDWIDE MILITARY COMMAND AND CONTROL SYSTEM

(Ø) The mission of the WWMCCS is:

> The WWMCCS provides National Command Authorities with the information on world situations needed for accurate and timely decisions, to include the communications required for reliable transmission of those decisions with a minimum of delay under all conditions of peace and war for the national direction of the U.S. military forces.*

(Ø) The WWMCCS supports the requirements of the chain of command from the National Command Authorities (NCA) down to and including the component commanders of the Unified and Specified Commands and such contingency commands as exist or may be established.

---

*DoD Directive S-5100.30, "Concept of Operation of the Worldwide Military Command and Control System," October 16, 1962.

(C) The WWMCCS consists of communications, equipment, facilities, personnel, and procedures that provide: (1) the operational and technical support required to command and control the U.S. military forces; (2) the means by which the President, Secretary of Defense, and the Joint Chiefs of Staff can receive information, select responses, and apply military resources; and (3) the means for the NCA to direct the Unified and Specified Commands.

BACKGROUND AND OBSERVATIONS

(C) The Worldwide Military Command and Control System (WWMCCS) and many of its fundamental problems are a result of the 1958 Amendments to the National Security Act. Because of national concern over a "general staff" military organization, the amendments continued the existing concept of a decentralized military structure. Authority to command the forces was given to the Unified and Specified Commands while the Services maintained their responsibilities for the development, generation, and support of the military forces. Both groups remained subject to the "direction, authority, and control" of the Secretary of Defense, but he later delegated to the Joint Chiefs of Staff the duties of serving as his advisors and as his military staff in the operational chain of command.

(C) The command and control (C&C) systems which were developing in support of the Unified and Specified Commands were formally incorporated into the WWMCCS by DoD Directive S-5100.30 of 1962. The directive which outlined the concept of worldwide operations was an attempt to give the Unified and Specified Commands a greater voice in developing and implementing a C&C system, in the interest of making the system more responsive to the needs of the [ ] Basically,

standardization and cooperation of the Service-owned and oriented C&C systems was to be enforced by controls over the operational specifications of the system, with the specifics of requirements and management left open for later resolution.

(~~S~~) This directive has not been changed since its inception, even though several revisions have been attempted. The organizations within the WWMCCS are shown in Fig. 1 along with those that it must accommodate and serve. When the directive was written in 1962, many of these organizations already had C&C systems in operation, but the section of the directive dealing with its implementation did not indicate how these systems were to interface in the new organization.

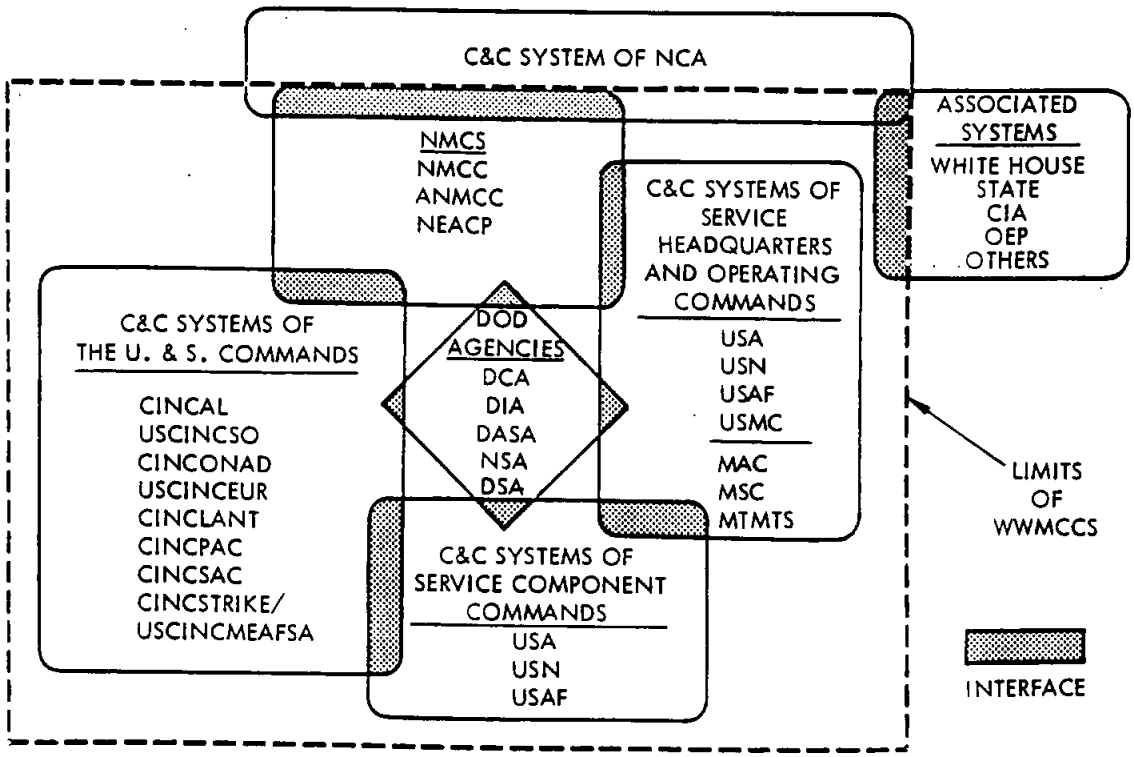


FIGURE 1 (U). WWMCCS Interfaces

(S) A description of the objectives and current capabilities of the WWMCCS has been developed for this study. Many of the problems discussed in this report have persisted for some time with little rationale for their continuance. It must be concluded that the differences between the objectives of the policy directives and the JSOP on one hand, and the resources allocated to meet the JSOP objectives on the other, constitute unresolved issues which manifest themselves as "persistent" problems. Recognition of this situation is contained in a statement by the Deputy Secretary of Defense in the FY72-76 Fiscal and Logistics Guidance to the JCS, dated 24 March 1970:

> However, disparities between the fiscal and strategy guidance should be noted to assist in making any revions to the strategy guidance which may be needed to ensure that the strategy and fiscal guidance are consistent.

While this approach does not solve basic problems, it does recognize that basic policy directives and the JSOP have to be sufficiently consistent and realistic to define objectives which can be met within actual budgetary limitations. These objectives can then be used to guide the development and implementation of the WWMCCS, as well as other elements of our defense posture.

(S) Rational future development of a system as diverse and complex as the WWMCCS requires more than statements of policy and objectives. There is also a need for a body of information derived from real world experiences and controlled exercises sufficient to measure and predict the performance of the system in a range of plausible situations. In gathering information on the WWMCCS for this study, it was found that there was no systematic compilation of such information, representing the years of command and control experience, performance

evaluation, and experience in crisis situations upon which to base any significant theoretical or analytical investigation of command and control. Little, if any, information exists in three critical areas:

- Predicted C&C demands arising from U.S. involvements worldwide
- The relation between command and control and force effectiveness
- The relation between the WWMCCS and the commanders it supports.

(S) The constantly changing nature of the relations between the U.S. and other nations has in the past always stressed the WWMCCS. While not all problems are predictable, closer coordination with policy planning could have provided facilities and procedures for the WWMCCS in some areas where problems actually arose. Increased demands will also be placed on the WWMCCS over the next decade if anticipated developments occur in the Soviet nuclear submarine force, the nuclear weapon capabilities of other countries, and in new systems which may threaten the survivability of critical sensors and communications. [

]

(C) The best methods available for judging the value of proposed improvements in our C^3 resources appears to be limited to straightforward comparisons of cost and efficiency for alternative solutions in rigidly specified functions, such as communications, ADP, reporting systems, reliability, and vulnerability. Little effort has been given to the development of basic information and analytical methods required to compare

the relative value of improvements in command and control versus improvements in the strategic weapons themselves.

(S) Although a mission of the WWMCCS is to support national decision making, members of the [ ] in its worldwide exercises and have not interacted with it in a consistent manner in crisis situations. Only experience in interacting with the WWMCCS in real and postulated circumstances can give national decision-makers the confidence they need to use it effectively and to specify their requirements to guide its future development. Lack of knowledge of the capabilities and limitations of the WWMCCS has had a circular effect. It has led to a [ ] has made it difficult for the WWMCCS staff to develop the information which may be requested of it. The immediate unavailability of information has led to a lack of confidence in the system and is a reason that it has been circumvented.

(S) While this study found that the WWMCCS cannot fully meet its mission requirements, many significant changes now taking place mitigate some of its deficiencies. These include: implementation of the "Peacetime Emergency Situation" procedures and All-Source Information Centers of the Pacific Command (PACOM) and the JCS-proposed and DoD-approved "Emergency Operating Procedures of the Joint Chiefs of Staff"; revision of the basic directive* for the WWMCCS (S-5100.30) to clarify the management responsibilities of the Joint Staff and the Services; designation of the Minimum Essential Emergency Communication Network (MEECN) system engineer to assist the JCS in management

* A revised version of the directive has been approved by JCS and submitted to OSD.

of the system; recognition and development within the Services of an integrated approach to command and control and information systems, providing coordinated information support both to commanders and to their administrative support organizations; revision and restructuring of the JSOP, Annex E, "Command and Control," to reflect and specify the requirements for command and control in consonance with national and military objectives with an attempt to identify appropriate program elements; procurement of the WWMCCS ADP update program; establishment of the Joint Technical Support Agency (JTSA) to provide centralized technical support for the WWMCCS standard ADP system; and creation of the Office of Assistant to the Secretary of Defense (Telecommunications) as a management focal point for all DoD telecommunications and possibly for all DoD Automatic Data Processing (ADP) resources. Additionally, JCS studies of the type reported here indicate an effort to improve operations of the WWMCCS in an ordered fashion.

PRINCIPAL FINDINGS

WWMCCS Structure and Management

(U) Viewing the WWMCCS from many aspects, this study found that many of the major problems and deficiencies of the WWMCCS were partially the result of its current structure and management and that a program to improve its effectiveness should begin with an attempt to resolve that issue.

(~~C~~) The WWMCCS still consists of a number of independent subsystems; it is not a totally integrated system. The directive which established the WWMCCS concept in 1962 has not been implemented in the sense that the WWMCCS continues to this date without a master plan, without basic policy guidance, without a definitive and responsive management structure, without a

program manager, and without clearly defined budgetary control of its major elements. Major difficulties persist at all levels of command concerning the role and mission of the WWMCCS and the interaction between the C&C subsystems which comprise it. Resolution of these difficulties appears necessary if the WWMCCS is to become a useful tool to support the C&C needs of the National Command Authorities.

The National Security Community

(S) The WWMCCS and related systems in several other government organizations must provide information support to the President on matters of national security under both normal and crisis situations. While there is extensive formal and informal staff coordination it has been ineffective in providing information satisfying Presidential needs. As a result, it is doubtful that this information support community can be effectively utilized in times of tension and conflict. Two problems are readily identifiable and should be addressed.

(S) Problem 1: A capability to provide timely decision support information for the President is not assured because of ineffective coordination and cooperation at the staff level within the national security community. (See page 30)

(S) Problem 2: The role of the WWMCCS in supporting crisis operations under the NSC system is not defined precisely and, on occasion, the WWMCCS has not been prepared to provide information in predictable areas of Presidential interest related to policy planning studies. (See page 31)

Operational Organization, Command Structure, and Resources

(U) The WWMCCS coordinates selected activities of many independent organizations. Its functions are defined independently

of the organizational and operational structures, i.e., the military systems, that are controlled through the WWMCCS. Consequently, as these organizations change (through time) in response to external pressures, the operating procedures or even the operational structure of the WWMCCS become inappropriate for the performance of some of its functions. Some operational problems of this type have been recognized and solved in varying degrees, while others can be anticipated and handled through preplanning. The following problems fall into one or both of these categories.

(S) Problem 1: The WWMCCS is required to function in operational situations involving joint and combined activities of the U.S. military, U.S. nonmilitary, and U.S. allies to an extent that it often cannot be supported by the existing organizational and command arrangements through which it normally operates. (See page 38)

(S) Problem 2: Even within the U.S. military community, the division of responsibility among several command chains can make current operational information unavailable in the WWMCCS for a significant period of time. (See page 40)

(S) Problem 3: Command chains are more flexible than the WWMCCS in operational situations, adding to the difficulty of maintaining current operational information in the WWMCCS. (See page 42)

(S) Problem 4: In many situations, a level of direct interaction with operational activities is necessary which is not achievable through established WWMCCS arrangements nor by the implementation of prepared plans. (See page 44)

(S) Problem 5: Communications are inadequate for operations in crises and may be disrupted by nonnuclear as well as nuclear weapons effects. (See page 45)

(S) Problem 6: ADP capabilities in the WWMCCS appear to be inadequate in some facilities, underutilized in others and have been developed in relative isolation with little sharing of experience. (See page 46)

Information Flow and Convergence

(U) Limitations of the WWMCCS in crisis situations are to a great extent due to (1) an ineffective and delayed flow of information from lower echelons; (2) ineffective coordination between intelligence and operational organizations at all echelons; and (3) ineffective coordination between operational and administrative organizations at all echelons. The initial problem often results from attempts at successively higher echelons to confirm and interpret early reports before forwarding them; the second problem arises when there is no information exchange between the operational and intelligence organization nor an awareness of the other's operations; and the third problem results in incomplete or inconsistent information being used for command decisions because administrative and operational systems operate independently.

(S) Problem 1: There is only limited coordination between the intelligence and operational systems, and limited but improving coordination between the JCS operational systems and the individual information systems of the Services. (See page 52)

(S) Problem 2: The responsiveness of the established intelligence and operational activities is diminished by organizational structures and arrangements. (See page 53)

(C) Problem 3: There is a great deal of uncertainty associated with the quality, timeliness, relevance and selection criteria of the information provided by the information support systems of the WWMCCS. (See page 56)

Strategic Nuclear War

(TS) An elaborate command and control structure has evolved over the last quarter century to ensure positive control of complex nuclear weapon systems and their immediate availability in

support of U.S. national policy. [

] Previous studies have identified [ ] command, control, and communications problems in this area; this study has reemphasized some of those problems and updated or augmented them, as appropriate, with additional ones that have arisen from changes in force capabilities, threats, and the world environment.

~~(TS)~~ Problem 1: [

~~(TS)~~ Problem 2:

~~(TS)~~ Problem 3:

~~(TS)~~ Problem 4:

~~(TS)~~ Problem 5:])

Operational Context of the WWMCCS

(Ø) Many of the problems identified in this study may be attributed in part to the policies and organizational environment within which the WWMCCS must operate; as such they are beyond the responsibility of the system. A resolution of these issues would not necessarily ensure solution of the related operational problems, but would undoubtedly ameliorate their effects. These problems are:

(Ø) Problem 1: The WWMCCS operates in an environment of divided responsibility and independent organizations within the Defense Department and the national security community. (See page 87)

(Ø) Problem 2: The WWMCCS does not have a definitive charter from which to operate nor has it been given active and consistent management guidance. (See page 89)

(Ø) Problem 3: Measures of performance are not applied consistently throughout the WWMCCS nor are they well designed to evaluate effectiveness of command and control in objective terms. (See page 92)

(Ø) Problem 4: Information systems operate with parallel channels and redundancy by design but there are no systematic efforts to measure the cost and utility of these arrangements. (See page 93)

(Ø) Problem 5: The interdependence between command and control performance and force effectiveness is not well known. (See page 93)

(Ø) Problem 6: At the present time no single JCS/DoD activity has assigned responsibility for the overall management of the WWMCCS. No master objectives plan exists that specifically delineates the structure, interfaces, capabilities, and standards to be achieved by elements for their activities relevant to the WWMCCS mission. Since the elements and assets of the WWMCCS are not specifically defined, it is not possible to directly relate the assets of the WWMCCS to program elements that are specified in the Five Year Defense Program (FYDP). (See page 94)

RECOMMENDED STUDY PROGRAM

(U) This section presents the recommended time-phased study program, with priority of effort, for addressing the major problems of the WWMCCS identified by this study.

(U) The study program consists of eight studies with 24 tasks that address three major aspects of the WWMCCS: (1) the management, institutional, and financial structure supporting the development and implementation of the WWMCCS; (2) the operational organizations and command structure that the WWMCCS supports; and (3) the WWMCCS itself as an information system handling intelligence, operational, and administrative information supporting operations from normal conditions through strategic nuclear war. The entire study program is estimated to require 111 man-years of effort over a minimum period of 42 months and is summarized in Fig. 2, where the studies are presented in the order of relative priority, from top to bottom.

(Ø) Some tasks address issues beyond the authority and responsibility of the study sponsor. Issues of national policy, management, the operational environment and the allocation of resources have shaped the WWMCCS and will continue to do so in the future.

security community before the WWMCCS can be configured to provide appropriate support. Therefore, some of the tasks which are recommended require the sponsorship of other agencies, particularly OSD and the NSC.

(U) The studies are designed to be relatively independent of one another to permit the selection of individual studies and/or tasks as desired. The time-phasing is set in part by the relative priority and in part by the need to complete some studies before initiating others.

(U) The ranking of the studies in priority of importance, although judgmental because the factors are not readily comparable, is based on:

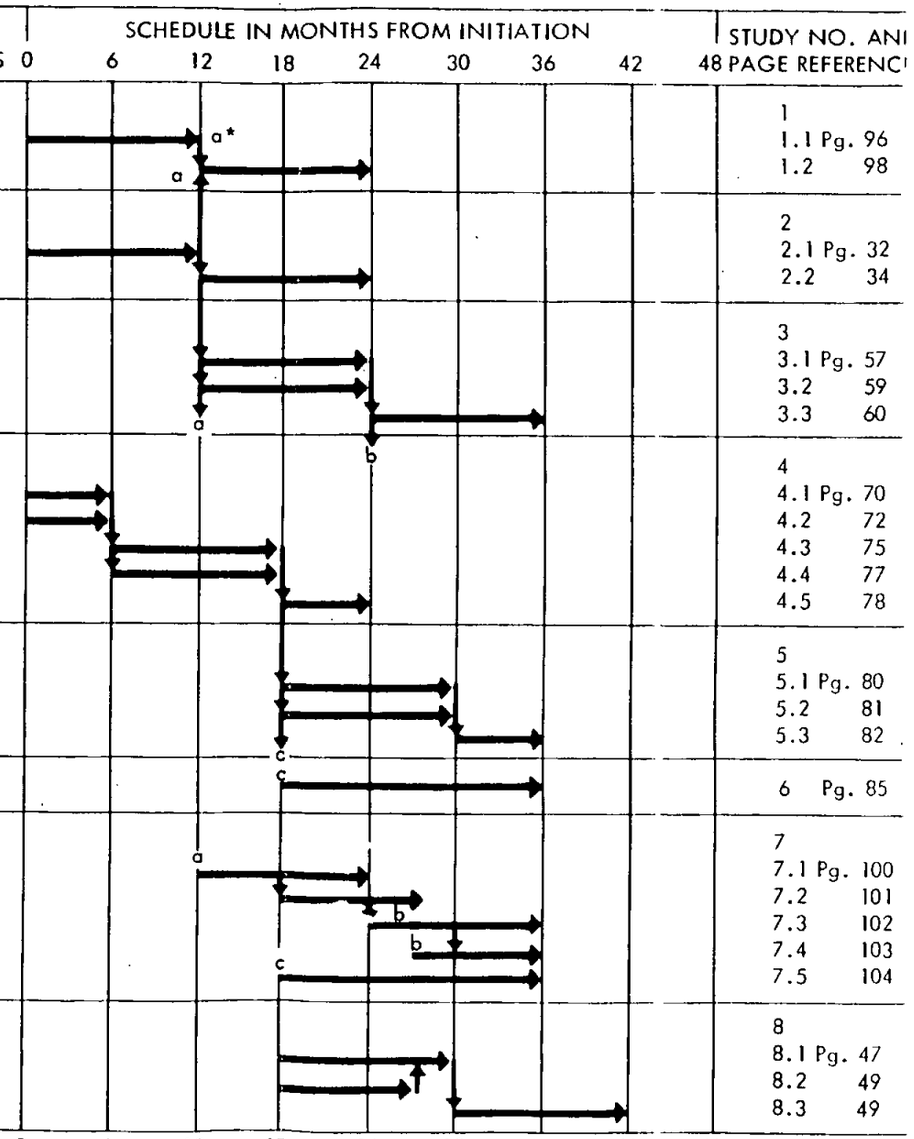
- The extent to which a successful study would improve the capability of the WWMCCS to more effectively control U.S. forces in support of national objectives;
- The adequacy of knowledge of the problem to undertake a study; and
- The probability that a study will be successful and could be implemented.

The final factor considered in assigning priorities is to give the highest priority to those tasks which could be done successfully now to seek solutions to important WWMCCS problems. The studies given the lowest priority are those of a conceptual nature that could have impact only in the long term or ones that address problems of somewhat lesser importance.

Studies

(U) Following Fig. 2 are listed the studies and tasks in their order of priority, with a brief rationale for the ordering.

STUDIES AND TASKS	RESPONSIBLE AGENCY	EFFORT IN MAN-YEARS	STUDY NO. AND PAGE REFERENCE
STUDY 1: FRAMEWORK FOR MANAGING, PLANNING, PROGRAMMING, AND BUDGETING			1
1.1 INPUTS TO OBJECTIVES PLAN	JCS	8	1.1 Pg. 96
1.2 MANAGEMENT RELATIONSHIPS AMONG DOD INFORMATION SYSTEMS	JCS/OSD	5	1.2 98
STUDY 2: COMMAND & CONTROL IN THE NATIONAL SECURITY COMMUNITY			2
2.1 REQUIREMENTS FOR WWMCCS SUPPORT OF CONTINGENCIES	JCS	5	2.1 Pg. 32
2.2 REQUIREMENTS FOR WWMCCS NON-DOD OPERATIONS/WATCH CENTERS SUPPORT **	OSD/NSC	5	2.2 34
STUDY 3: INFORMATION FLOW AND CONVERGENCE			3
3.1 OPERATIONS/INTELLIGENCE INFORMATION REQUIREMENTS AND USE	JCS	10	3.1 Pg. 57
3.2 INFORMATION FLOW THROUGH STRUCTURED REPORTS	JCS/OSD	10	3.2 59
3.3 SELECTION & REPORTING OF INTELLIGENCE AT SELECTED ECHELONS	JCS/OSD	5	3.3 60
STUDY 4: COMMAND & CONTROL FOR RETALIATION IN STRATEGIC WAR			4
4.1 SURVIVAL OF THE PRESIDENTIAL AUTHORITY AND CONTINUITY PROCEDURES **	JCS/OSD/NSC	1	4.1 Pg. 70
4.2 SURVIVAL OF COMMAND POSTS	JCS/OSD	2	4.2 72
4.3 SURVIVAL OF ESSENTIAL SIOP COMMUNICATIONS	JCS/OSD	4	4.3 75
4.4 SURVIVAL AND RESTORATION OF LANDLINES	JCS/OSD	4	4.4 77
4.5 C&C CONSTRAINTS ON SIOP DECISION PROCESS **	JCS/OSD/NSC	2	4.5 78
STUDY 5: COMMAND & CONTROL FOR CONDUCT AND TERMINATION OF STRATEGIC WAR			5
5.1 DAMAGE ASSESSMENT FOR COUNTERFORCE AND WAR TERMINATION	JCS/OSD	4	5.1 Pg. 80
5.2 SAFEGUARD-MINUTEMAN COORDINATION	JCS/OSD	1	5.2 81
5.3 SIOP & RISOP PLANNING FACTORS AND DOCTRINE	JCS/OSD	3	5.3 82
STUDY 6: INFORMATION SYSTEMS FOR DECISION SUPPORT IN STRATEGIC WAR	JCS/OSD	6	6 Pg. 85
STUDY 7: CONCEPTS, MEASURES & COST METHODOLOGY			7
7.1 COMMAND & CONTROL CONCEPTS FOR FUTURE WWMCCS	JCS	3	7.1 Pg. 100
7.2 PERFORMANCE MEASURES (PERSONNEL, EQUIPMENT & OPERATIONS)	JCS	3	7.2 101
7.3 UTILITY MEASURES FOR INFORMATION (REPORTS)	JCS	4	7.3 102
7.4 COST METHODOLOGY FOR REPORTING SYSTEMS	JCS/OSD	3	7.4 103
7.5 RELATION OF C&C TO THE EFFECTIVENESS OF STRATEGIC FORCES	JCS/OSD	10	7.5 104
STUDY 8: FLEXIBILITY OF COMMAND & CONTROL WITHIN EUCOM & PACOM			8
8.1 UNILATERAL OPERATIONS	JCS/EUCOM/PACOM	6	8.1 Pg. 47
8.2 LATERAL AND SURGE INFORMATION EXCHANGE	JCS/OSD	3	8.2 49
8.3 OPERATIONS WITH ALLIES	OSD	4	8.3 49
TOTAL MAN YEARS		111	



NOTES: *A LETTER AT THE BEGINNING OF A TASK INDICATES THAT IT DEPENDS ON ANOTHER TASK DESIGNATED BY THE SAME LETTER. ARROWS CONNECTING TASKS INDICATE SIMILAR DEPENDENCE.

** TASK REQUIRES NSC COORDINATION AND APPROVAL

(U) Study 1: Develop an Institutional Framework for Managing, Planning, Programming and Budgeting the WWMCCS.

(U) This study is considered the most important because its tasks have direct impact on clarifying the assets of the WWMCCS and how they are allocated. This information is needed to improve knowledge of the system for resource allocation decisions. A related effort is under way for revising the JSOP Annex E, and the Office of Management and Budget has recently completed a study structuring and identifying items to support more realistic costing of the command, control, and communications systems. Thus, considerable basic information should be available, along with some of the results given in this report, to use as a basis for these initial tasks.

(U) The two tasks of this study are as follows:

- Task 1: Develop inputs for an objectives plan for the WWMCCS and a plan for relating budgetary program elements to specific WWMCCS assets. (See page 96)
- Task 2: Document existing DoD information systems relevant to the WWMCCS function to determine their effectiveness and interrelationships, and identify alternative methods of improving these information systems. (See page 98)

(S) Study 2: Determine the Adequacy of Command and Control and Other Staff Support Systems in the National Security Community and Establish Their Mutually Dependent Requirements.

(S) This study should be undertaken next because it addresses a fundamental issue in the WWMCCS support to the national level during crises and, thus, is the most visible utilization of this system. Experience developed in using the new JCS Emergency Operating Procedures will be valuable in supporting

this study. The objective of this study is to document the capabilities, roles, information needs, and constraints on particular agencies and activities with which the WWMCCS interfaces. The two tasks of this study are as follows:

- Task 1: Survey and evaluate the plans and capabilities of the WWMCCS and other DoD systems to support contingency operations under the National Security Council system. (See page 32)
- Task 2: Survey the non-DoD Operations/Watch Centers and associated systems that interface with the WWMCCS. (See page 34)

(U) Study 3: Evaluate Information Flow and Convergence.

(S) This study addresses problems that, in part, affect the basic mission of the WWMCCS and its interfaces with the intelligence community which are vitally important in the proper handling of crisis situations. Important operational experience from the All-Source Information Centers in PACOM can be evaluated and used as a basis for similar developments in other Unified and Specified Commands. The second task of the study is of lower priority and addresses the Joint Reporting Structure (JRS) information system which is the basic means of specifying the flow and convergence of operational and management information within the WWMCCS. The current programs in the Services provide impetus and information to use as a basis of this study.

(U) The three tasks in this study would provide information necessary to evaluate the information system, to predict its effectiveness and timeliness, and to guide near-term improvements. These tasks are as follows:

- Task 1: Determine and quantify the requirements for and uses of operational and intelligence information at

various echelons of the WWMCCS, to provide background data on which to base improvements and further studies. (See page 57)

- Task 2: Document quantitatively the procedures and criteria used to develop and process the structured, recurring reports used in the WWMCCS, and recommend improved procedures for managing the flow of this information in crisis situations. (See page 59)

- Task 3: Document, assess, and recommend improvements in the procedures and criteria used at selected echelons of the WWMCCS for identifying, reporting and converging critical items of intelligence to other headquarters. (See page 60)

(S) Studies 4 and 5, dealing with Strategic Nuclear War Operations, address problems in the command and control of nuclear weapons, some of them outside the scope of the WWMCCS. The proposals advanced offer some hope of resolving or narrowing outstanding issues critical to the effective utilization of strategic weapons. They treat both the execution of a preplanned SIOP, and the problems of terminating hostilities on terms of relative advantage to the United States, the latter a stated JCS objective although it is not a national objective. As pointed out by the Blue Ribbon Defense Panel, this problem area can be construed as one of overwhelming national importance. Yet, it has been judged of lower importance than the previous studies because most of the issues are circumscribed by national policy and survivability of key elements of the system.

(S) Study 4: Evaluate Command and Control for Execution of U.S. Strategic Forces in Retaliation.

(S) The purpose of this study is to evaluate, under conditions of a Soviet surprise attack, the procedures and facilities which determine (1) the speed with which SLBMs and ICBMs could destroy or disable key decision makers, command centers, sensor systems, and communications facilities, (2) the speed with which a decision could be reached to execute one of the available SIOP options, and this decision transmitted to the nuclear strike forces. The five tasks in this study are as follows:

- Task 1: (TS) [ ]
- Task 2: (S) [ ]
- Task 3: (S) Estimate the [ ]
- Task 4: (S) Estimate the survivability of the leased landlines necessary to support nuclear operations. (See page 77)
- Task 5: (S) Develop command and control constraints [ ] under a variety of attack situations. (See page 78)

(S) Study 5: Evaluate Command and Control for the Conduct and Termination of Strategic Operations.

(S) The purpose of this study is to examine command and control functions necessary for the conduct and termination of a nuclear war. The three tasks in this study are as follows:

- Task 1: Determine requirements for information on [ ] (See page 80)
- Task 2: Examine the requirements and capabilities for [ ] (See page 81)
- Task 3: Develop time-sensitive planning factors and force employment doctrines significant for developing effective command and control. (See page 82)

(U) Study 6: **Determine Information Systems Requirements for Strategic War.** **(See page 85)**

(~~S~~) This study extends Studies 4 and 5 in a more conceptual manner. It considers future needs, policies and options which may be desirable in meeting the increasing range of potential Soviet and N country threats. The objective of this study is to provide information necessary to develop a system providing decision support for nuclear war. The study would address present and future information requirements in strategic nuclear war and develop techniques to provide the required information. This study is given lower priority in these recommendations because basic policy issues and objectives have not been promulgated and the results do not impact on the WWMCCS until the 1975-1980 time period.

(U) Study 7: **Define the Concepts of Command and Control, and Establish Methodology for Measuring Performance and Cost.**

(U) This study addresses some basic conceptual issues in (a) understanding, evaluating, and modifying the WWMCCS to meet future needs and (b) in measuring the effectiveness and costs of the basic structured reporting system. The purpose of the five

tasks in this study is to develop the concepts and techniques necessary for effective management of the WWMCCS. These studies have lower priority than the previous studies because, although of significant long-term impact, they are not concerned directly with operational problems.

(U) The tasks are as follows:

- Task 1: (U) Develop command and control concepts useful for the long-term development of the WWMCCS. (See page 100)
- Task 2: (U) Develop comprehensive performance measures for the WWMCCS. (See page 101)
- Task 3: (U) Develop methods to measure the utility of information processed. (See page 102)
- Task 4: (U) Develop methodologies to estimate costs of reporting. (See page 103)
- Task 5: (Ø) Determine the feasibility of relating alternative command and control concepts, procedures, and facilities to the effectiveness of strategic forces. (See page 104)

(Ø) Study 8: Develop Procedures to Provide Flexibility of Command and Control in EUCOM and PACOM.

(Ø) This study deals with some substantive operational issues in crisis and conventional war. These are problems of long standing and they are well recognized. The objectives of the study are to determine requirements on the WWMCCS, to evaluate current procedures and facilities, and to recommend improvements. The key issues in many cases, however, could be dealt with by administrative understanding, directives, or more cooperative planning and procurement of standard equipments. Some

of these issues are circumscribed by international agreements and are not resolvable without basic policy decisions. For these reasons this study was given the lowest priority.

- Task 1: Assess command and control for unilateral U.S. operations in EUCOM and PACOM. (See page 48)
- Task 2: Determine requirements for lateral and surge information exchange with U.S. nonmilitary agencies overseas. (See page 49)
- Task 3: Determine command and control requirements for military operations conducted with allies. (See page 49)

Conditions on the Study Program

(~~C~~) The time-phasing of these tasks shown in Fig. 2, is based on the assumption that all tasks in a single study will be done by one study group and under a single management, assuring the timely interchange of information indicated by the vertical arrows in Fig. 2 (e.g., within Study 7). Nevertheless, the study plan has been arranged to permit separate study groups and organizations to conduct individual studies. Studies which depend on outputs of others have been time-phased to allow for publication of reports. In particular, Study 3, Information Flow and Convergence in WWMCCS, and Study 7, Concepts, Measures, and Cost Methodology, are phased to ensure that results from Task 1.1 and Task 2.1 will be available. If Studies 1, 2, 3, and 7 are conducted within the same organization and timely information exchange can be guaranteed, Studies 3 and 7 could begin approximately six months earlier.

(~~C~~) One implication of the nature of these studies must be emphasized. Many of the tasks, and particularly those in Studies 1, 2, and 7, are the first major efforts to identify solutions in these areas, and as such may uncover further problems.

Additional studies may, therefore, be required to meet the intent of this study program. In addition, the duration and manpower levels for Tasks 3.1 and 3.2 assume the availability of a substantial amount of systematic information about existing WWMCCS reporting systems. The Joint Staff, in conjunction with the Services, is in the process of obtaining this information, although it is not now available. These tasks may have to be delayed until information is available, or the level of effort increased to allow for processing raw data.

SUPPORTING DOCUMENTS

(U) This Summary is Vol. I of ten volumes that constitute Report R-172. The other nine volumes support in greater detail the findings and study recommendations presented in this document.

(U) Volume II presents a brief history of the WWMCCS with emphasis placed on the influence that directives and the actions and decisions by the Office of the Secretary of Defense and Joint Chiefs of Staff have had on its evolution. It also summarizes projected changes to the WWMCCS.

(U) Volumes III, IV, and V relate the WWMCCS to the broad organizational structure that it supports and in which it operates. Volume III characterizes the operational and institutional environment in which the President and his principal advisors make and execute decisions on national security issues. It delineates the role of the WWMCCS in this decision-making process and identifies the relationships between the WWMCCS and similar systems in the Washington national security community. Volume IV examines selected aspects of the organizational and operational environment in which the WWMCCS must function in Europe that have

a significant impact on the command and control process. Volume V outlines the organizational and operational framework in which the WWMCCS operates in the Pacific theater.

(U) The WWMCCS systems for intelligence and operational reporting are described in Vols. VI and VII. Volume VI emphasizes intelligence support for the WWMCCS, particularly the transition from normal operations to operations under various conditions of tension and conflict. Volume VII examines military operational reporting of the JCS and the related CINC and Service systems.

(U) Volume VIII presents a baseline description of the WWMCCS to support the National Command Authorities and as such presents a transition between the volume dealing with the WWMCCS background and evolution and the two volumes dealing with intelligence and operational reporting.

(U) A description of the WWMCCS information support of Presidential decision making in a strategic nuclear war is presented in Vol. IX. That volume also addresses three specific areas of command and control operations during a strategic nuclear war.

(U) Volume X reviews the existing means for measuring performance within the WWMCCS and examines the feasibility of developing a more comprehensive evaluation system.

I. INTRODUCTION

(U) This section presents a listing of the studies that are recommended to be undertaken to evaluate specific aspects of the WWMCCS in detail and to propose solutions to problem areas. Each study is preceded by a discussion of the problems that it is designed to overcome, and the volume of this report that provides the supporting research is cited after each problem statement.

(U) The recommended studies have been categorized into five areas of the WWMCCS as follows:

A. The National Security Community - Studies involving the WWMCCS relationship to similar systems in other organizations of the Washington national security community.

B. Operational Organization, Command Structure, and Resources - Studies arising from changes (in time and conditions) in the operational and command environment.

C. Information Flow and Convergence - Studies arising from problems involving the general upward flow of information through the WWMCCS.

D. Strategic Nuclear War - Studies dealing with the WWMCCS capabilities to support national decision making during all aspects of a general nuclear war.

E. Operational Context of the WWMCCS - Studies to solve problems that, while affecting the WWMCCS in some cases seriously, are outside its area of responsibility.

(U) In each of these areas, at least one study has been recommended, often with multiple tasks. The objectives, scope, and administrative details (e.g., level of effort, duration of study, etc.) are presented for each task or study.

II. THE NATIONAL SECURITY COMMUNITY

A. BACKGROUND DISCUSSION

(~~S~~) A major purpose of the WWMCCS is to [dent with information required for command and control of mili-] Although the WWMCCS is the primary means for employing military resources in operations, other government organizations, such as the [ ] to cite a few, also support the [ ] Each of these organizations manages its own Operations/Watch centers (similar to the WWMCCS); conceptually, at least, work of the several staffs should be coordinated to satisfy Presidential needs. However, mutual cooperation in planning of center operations and exchanging critical information has not been very effective.

(~~S~~) The arrangement adopted by the Executive Office of the President to utilize the resources of the national security community has varied with administrations. A hierarchy of interdepartmental groups, which evolved under the general guidance of the National Security Council (NSC), has achieved some coordination. Many independent support staffs were developed, and although elaborate interchange arrangements exist, the mutually supporting roles and responsibilities of the information nodes remain ill-defined. Still, it is questionable whether the substantial capabilities of this community can be utilized effectively within the time constraints frequently associated with periods of tension and conflict.

(S) The operational environment at the national level affects the development and operation of each staff support system within the national security community. Even though many of the problems encountered are a natural consequence of this environment, several difficult situations could be ameliorated through appropriate action on the part of those involved in the operation of the individual support staffs. Two problems, in particular, are readily identifiable and should be addressed in studies.

(S) Problem 1: [ ] because of ineffective coordination and cooperation at the staff level within the national security community. (Vol. III)

(S) As are other members of the national security community, the WWMCCS is limited to certain sources of information. The WWMCCS depends on other staffs in this community for analytic support and for the production of information within their areas of competence. It is particularly necessary for the WWMCCS to depend on such other capabilities as sensors, access, and evaluation in many situations which may call for military involvement. Conversely, the WWMCCS must provide information where its capabilities augment or complement those of the associated staffs in their primary missions.

(S) Despite the need for a joint effort to meet Presidential needs there has been a tendency to develop capabilities in line more with departmental concerns than with national requirements. This is reflected explicitly in the allocation of individual resources to the development of command and control capabilities and the implementation of information systems by each member agency of the national security community. In general, the emphasis to date has been to develop a system to meet

the needs of each individual staff, with arrangements to facilitate the exchange of information being established later. Some progress has been made in information exchange through the establishment of communications links and procedures for their use. However, there is little indication that substantial progress has been made in achieving a coherent and efficient total effort by coordinating and integrating the data collection and processing efforts.

(S) This environment, in which each staff recognizes the existence of the others but does not coordinate the development of capabilities, is in part the result of a lack in definition of the responsibility of each in terms of specific functions. Consequently, there is no basis on which each can plan to complement the others' capabilities at various staff levels. Since it is not likely that these responsibilities will be clearly defined by the community, the responsibility falls on the individual members to clarify their mutually supporting capabilities and roles to increase their individual efficiency and effectiveness in support of the President.

(S) Problem 2: The role of the WWMCCS in supporting crisis operations under the NSC system is not defined precisely and, on occasion, the WWMCCS has not been prepared to provide information in predictable areas of Presidential interest related to policy planning studies. (Vol. III)

(S) The present JCS concepts for supporting crisis operations under the NSC system call for elaborate interdepartmental coordination. The new emergency coordination groups alone, for example, involve the participation of 23 different departments and agencies. These and similar procedural arrangements for coordination, however, probably will be counterproductive unless a much more systematic effort is made to establish their precise

role, the issues and decisions they will address, and the specific information support they will require.

(S) Further, while the NMCC or the WWMCCS cannot fully anticipate Presidential interest in policy planning studies, it is possible to anticipate some areas in which the President will require information by examining such items as threats to the national security, current Presidential interests as exhibited in policy statements, and the issues being studied by the Presidential office. Using this implicit guidance as a basis for planning and developing information sources, data bases, and analytic capabilities, the WWMCCS can be in a position to be more responsive to the Presidential needs. For example, on occasion, the Executive Office has requested information through the WWMCCS which the WWMCCS could not provide. As a result, the WWMCCS did not receive further queries on the subject from the President even though it eventually developed a capability to provide the information. The solution to this problem may require OSD or NSC level guidance; but those involved in developing and operating the system share in the responsibility of ensuring that the WWMCCS is responsive to Presidential needs.

B. SPECIFIC STUDY

Study: **Determine the adequacy of command and control and other staff support systems in the national security community and establish their mutually dependent requirements. (Vol. III)**

Task 1: Survey and evaluate the plans and capabilities of the WWMCCS and other DoD systems to support contingency operations under the National Security Council system.

a. Objectives. (S) The specific objectives of this task will be:

(1) To inventory the plans and procedures of the DoD components that are responsible for supporting crisis operations under the National Security Council system.

(2) To document the capabilities and configurations of the major WWMCCS subsystems and associated DoD operations centers and staff support systems in the Washington area on which that support depends.

(3) To determine the precise role of the decision makers and staffs in each major DoD component, the issues and decisions they will address, and the interdepartmental groups, particularly those of an ad hoc character, with whom they must coordinate and interface.

(4) Determine the precise nature of the support that the WWMCCS requires from DoD and other support systems in the national security community to perform its functions.

(5) Determine the precise nature of the support that the WWMCCS will be required to provide to the NCA, the NSC, other support systems and interdepartmental groups in the national security community.

(6) Investigate the practices, processes, and institutional constraints that most seriously affect the timeliness and reliability with which support is provided by the WWMCCS to others.

(7) Make recommendations to improve procedures and operations within the WWMCCS and DoD operations centers. Insofar as it is possible, recommend

changes to the WWMCCS that would mitigate interface problems.

b. Scope. (C) The task will focus on the WWMCCS and associated DoD operations centers and systems but will include their interfaces with the larger Washington community with which the WWMCCS shares responsibility for supporting Presidential decision making. Crisis operations under the NSC system will be emphasized as an exemplary class of problems. Attention will be given to the interface with the centers and systems in the [ ]

c. Task Detail. (U)

Level of Effort: 5 man-years.

Duration: 12 months.

Starting Date: M-day.*

Responsible Organization: JCS.

Task 2: Survey of Non-DoD Operations/Watch Centers and Associated Systems that Interface with the WWMCCS.

a. Objectives. (C) The specific objectives of this task will be:

(1) To inventory the plans and procedures of the non-DoD centers and systems that are responsible for supporting crisis operations under both standard emergency organizational arrangements and the National Security Council system. The inventory of DoD plans and procedures would be concurrently extended to any crisis operations under standard

*Starting date for initial studies.

emergency organizational arrangements that may not have been fully explored under Task 1.

(2) To document the capabilities and configurations of Operations/Watch centers and associated staff support systems in the Washington area with which the WWMCCS interfaces.

(3) To determine the precise role of the decision makers and staffs of each of the major components of the national security community, the issues and decisions they will address, and the inter-departmental groups, particularly those of an ad hoc nature, in which they must coordinate and interface with their counterparts in DoD.

(4) Determine the precise nature of the support tha the non-DoD centers and systems require from the WWMCCS.

(5) Determine the precise nature of the support that the non-DoD centers and systems provide to the NCA, the NSC, and the WWMCCS.

(6) Investigate the practices, processes, and institutional constraints that most seriously affect the timeliness and reliability with which support is provided to the WWMCCS by these associated non-DoD centers and systems.

(7) Based on information from this study and on the results of Task 1, make recommendations for solving interface problems between the WWMCCS and the other staff support systems with which it shares responsibility and for improving their relationships.

b. Scope. (~~C~~) The task will focus primarily on operations centers and systems in the larger Washington community with which the WWMCCS shares responsibility in supporting Presidential decision making, particularly in crises. Attention will be given to the centers and systems in the Department of State, the White House, the Central Intelligence Agency, and the Office of Emergency Preparedness.

(U) Depending upon the results of Task 1, this task may include analyses of operational and functional relationships between the WWMCCS and selected system(s) with a view toward developing specific recommendations for solving major interface problems. This phase will address the question as to whether the very substantial capabilities of the military, diplomatic, and intelligence communities can be effectively brought to bear throughout the entire spectrum from peace to strategic nuclear war under the time constraints frequently associated with periods of tension and conflict.

c. Task Detail. (U)

Level of Effort: 5 man-years.

Duration: 12 months.

Starting Date: M-day + 12 months.

Responsible Organization: OSD/NSC.

III. OPERATIONAL ORGANIZATION, COMMAND STRUCTURE, AND RESOURCES

A. BACKGROUND DISCUSSION

(U) The structure of the WWMCCS has been evolving since the amendment to the Military Reorganization Act in 1958, even before it was defined formally by DoD Directive S-5100.30 in 1962. The amendments to the basic Act, subsequent actions by the Defense Department, and technological advances in ADP and communications have influenced the development of this system so that its current organizational and operational structure is the result of an evolutionary process.

(U) Development of the WWMCCS is described in Vol. II, Worldwide Military Command and Control System: Background and Evolution (U), and its current organization is described in Vol. VIII, WWMCCS Facilities and Subsystems. In general, the WWMCCS consists of the command, control, and communication resources of the commanders of the Unified, Specified, and Component Commands, the Services, DoD Agencies, and the National Military Command System (NMCS). The primary means of operating is through the Unified and Specified Command chain down to Component Headquarters.

(U) The functions of the WWMCCS are defined independently of the organizational and operational structure of the military system that is controlled through the WWMCCS. Consequently, as the operational environment changes through time in response to pressures external to the WWMCCS, the operating procedures or even the operational structure of the WWMCCS can and has become inappropriate for the performance of some functions. Operational

problems of this type have been recognized and resolved in varying degrees, while others can be anticipated and handled through preplanning. The following problems fall into one or both of these categories and, while amenable to analysis, total resolution of fundamental issues may be beyond the scope of the WWMCCS. In particular, several of these problems result from inadequate interface structures within the DoD and the national security community.

(~~S~~) Problem 1: The WWMCCS is required to function in operational situations involving joint and combined activities of the U.S. military, U.S. nonmilitary, and U.S. allies to an extent that it often cannot be supported by the existing organizational and command arrangements through which it normally operates. (Vols. IV and V)

(~~S~~) In the developing stages of any conflict, the military typically act in concert with allies and nonmilitary agencies. This requires coordination in the collection, processing, and dissemination of information. However, the established information systems of the WWMCCS operate primarily with military inputs and serve military needs. Consequently, the WWMCCS is not in a position to provide rapidly a basis for coordinating operations with other activities. In Southeast Asia, the organization, communications, and procedures to effect necessary relationships among allied forces, civilian activities, and civilian agencies in military operations have usually had to be improvised as requirements arose, but this improvisation has commonly come about after slow and laborious coordination with and between Washington principals. In this particular area the WWMCCS might provide a means for more rapidly mediating differences and for developing appropriate operational arrangements to circumvent them.

(~~S~~) In the PACOM area the United States has sought to avoid the complication of multinational command structures and

integrated multinational staffs such as those that were created in Europe. The United States has sought instead to keep its forces under its unilateral command and to have allied forces operate under U.S. operational control during hostilities. However, in some instances, as in the Vietnam war, political sensitivities and other factors have precluded this relation, and the local U.S. command center has been coordinating, cooperating, and collaborating with allied forces rather than in command of them. Such a situation raises questions as to the arrangements for arriving at agreed allied strategic and tactical decisions. The interoperability of U.S. and allied command and control systems and the procedures for obtaining intelligence and operational information from allied sources have placed unexpected and unusual requirements on U.S. command and control systems. This special load is particularly apparent in Europe, where acknowledged gaps in the command and control plans for operations have not been resolved, in part, because of political factors.

(~~TS~~) For example, in spite of the recent NATO Guidelines, which recognize that a decision on nuclear weapons might have to come very early in the land battle, there is no assurance that tactical nuclear weapons could be available to the Supreme Allied Commander in time to be used effectively. [ ] It is ponderous and slow. Yet in view of the political and military considerations which must inevitably be involved in such a procedure, improvement has perforce been very gradual. On the other hand, the entire selective release process may be political window-dressing which would disappear in war.

(S) A different aspect of this problem arises in the difficulties that have been experienced and can be anticipated in supporting a sizeable deployment or augmentation of forces. Through recent years, the U.S. military and non-military resources in Vietnam have been significantly augmented. Several problems were encountered in accommodating the buildup and in developing sufficient command and control capability to effectively utilize resources immediately upon their arrival. For example, because of the disparity in reporting systems, U.S. units have been unidentifiable in the field for some time after their arrival in Vietnamese operational areas. In view of the draw-down on forces in Europe and the development of plans for the rapid augmentation of forces if hostilities occur, there is a need to develop command and control procedures for rapidly identifying and absorbing new arrivals and utilizing them in a joint environment. However, this requires extensive preplanning and the development of new procedures in the WWMCCS to remove or solve the problems.

(S) Problem 2: Even within the U.S. military community, the division of responsibility among several command chains can make current operational information unavailable in the WWMCCS for a significant period of time. (Vols. IV and V)

(S) This problem is pronounced in Europe and the Pacific where U.S. command and control capabilities developed originally along Service lines. The three principal commands within the European Command (EUCOM) became well established after World War II, and through the last 25 years they have developed methods of operations through Service channels that have proven difficult to alter. This is due in part to CINCEUR's dual role in NATO and EUCOM and the comparatively few occasions for unilateral operations in which the Components operated primarily through the Unified chain of command. This problem has been especially

manifest in the joint utilization of resources such as communications and ADP which were configured initially in response to Component command needs. As a consequence of this unresolved problem, there are command and control redundancies in the theater yet inadequacies at particular commands.

(S) A related command and control problem exists in the Pacific Command (PACOM), with more facets because of the even more varied command relationships that exist there. In particular, there are occasions in which contingency commanders operate together with adjacent or collateral commanders and do not control all forces, communications, or information systems in the combat area. The contingency commanders provide for the voluminous exchange of information required for lateral coordination with other commanders, although their own supporting command and control systems are not immediately prepared for such an exchange. This requires a shakedown period of some length, after a crisis or conflict starts, to resolve procedural and technical difficulties. In the meantime, operations are impeded. The problem is compounded when attempts are made to operate in a systematic manner through diverse and structurally incompatible command arrangements, such as when the chain of command being utilized does not normally control the forces.

(S) The Mediterranean and Middle East is another area in which problems of recent origin are attributable to indefinably shared responsibility for operations. Specifically, ambiguously divided responsibilities for contingencies in that area leave both EUCOM and STRICOM uncertain as to their respective roles when a crisis develops. The possibility of sudden command changes during unilateral U.S. operations imposes additional strain on both EUCOM and STRICOM and complicates command, control, and communications problems that are already made difficult

by the lack of U.S. facilities in the region. It has become necessary for each command to deploy support units and prepare contingency plans which, in the end, are inapplicable because unplanned joint or unilateral arrangements are ultimately made.

(S) Problem 3: Command chains are more flexible than the WWMCCS in operational situations, adding to the difficulty of maintaining current operational information in the WWMCCS. (Vols. IV and V)

(S) Out of a necessity to accommodate variations in the operational environment, command arrangements exhibit wide flexibility. Typically, this flexibility is achieved through grafting new operational structures upon already existing ones without significant modifications to the existing ones. The multitude of command arrangements testifies to this process. Support systems such as the WWMCCS generally lag in accommodating to change. Consequently, when operational pressure brings about a command modification, the physical and procedural changes required make the WWMCCS less responsive to the situation.

(S) [ ] This is partly due to the fact that current C^3 systems have been designed to operate essentially in a simple information up-or-down manner within a unified command structure that classically is not expected to change radically as a conflict progresses. These systems are geared primarily to deal with clear-cut threats, precisely defined states of alert, simple go/no-go decisions, and planned operations, as indicated by the emphasis on formatted and prepositioned message and emergency procedures. When situations require very flexible planning (such as a Berlin crisis) or when patterns of information flow

and interactions undergo the rapid changes that actually occur in most operations (such as the buildup in forces in the Mediterranean), has been required for developing new ones adequate to the changed situation.

(S) Even in NATO operational exercises, WWMCCS interface problems have not been solved so as to ensure an operational capability. When hostilities occur, operational control of national forces shifts to the NATO command structure, and the EUCOM component commands will provide administrative and resource support to operational units. This move effectively disconnects the WWMCCS from the established operational command chain, and, to perform its basic mission, the WWMCCS would then be required to operate through the Service systems or establish ad hoc arrangements at those facilities common to the U.S. and NATO commands. The Service facilities are currently inadequate to support the WWMCCS because of the disparity between JCS and Service procedures for obtaining and disseminating information. The common U.S./NATO facilities are also inadequate, since the only shared command facility is the ground mobile command center. To augment this limited capability, EUCOM is attempting to establish joint U.S./NATO command facilities in the EUCOM airborne command center also.

(TS) Another major C^3 problem faced by EUCOM lies in the scope of effort involved in the distribution, planning for, security, and control of theater nuclear weapons within the Allied Command Europe (ACE) area, including not only weapons assigned to U.S. forces under the direct command of CINCEUR, but also weapons stored in special sites, under U.S. control, for the potential use of allied forces. [ ]

[ ]

(~~TS~~) Permissive Action Links/Permissive Arming Protection Systems (PAL/PAPS) are essentially security devices rather than command and control mechanisms, but their impact on command and control is major. While their need is recognized, there are fears that they may be too tightly engineered to work in wartime, even with the redundancy built into them. Present communications remain [ ] especially under postulated wartime conditions.

(~~S~~) In Southeast Asia, reporting systems and channels have undergone extensive changes as existing procedures have been found insufficient to support the NCA and field requirements. Considering the variety of command relationships that exist and anticipating variations in each as complex situations develop, the number of variations to which the WWMCCS would have to adapt appears to be beyond the capacity of the current system.

(~~S~~) **Problem 4: In many situations, a level of direct interaction with operational activities is necessary which is not achievable through established WWMCCS arrangements nor by the implementation of prepared plans. (Vols. IV and V)**

(~~S~~) The command chain through which the WWMCCS routinely operates can be characterized in general as terminating at the component command level. However, some routine operations and many crisis situations require that the command and control resources of lower level commands be included in the WWMCCS or at least that a capability to act rapidly through them shall exist. For an example of one such deeper penetration which has been accomplished, the OPREP reporting system, which is essential to the WWMCCS operations in the PACOM area, extends below the component command level, allowing active WWMCCS participation beyond

its official limits. An example from the EUCOM area of a situation, on the other hand, in which such arrangements have not yet been made is USNAVEUR, where there is delegation of most operational responsibility for Mediterranean activities to the commander of the 6th Fleet without provision for participation by the WWMCCS.

(S) The lower command echelons of the WWMCCS can often, but not always, provide informally the coordination required for actual operations. Typically, ad hoc arrangements develop to suit the situation. Without preplanning, it takes time to develop an ad hoc arrangement. Reporting procedures cannot be easily modified, and the resources utilized normally for collecting and processing information may not be available. Moreover, the preplanning that is performed for contingency plans frequently does not adequately consider command and control requirements. This is especially apparent in the adaptation of intelligence activities which, in many situations, depends on operating through and with activities not routinely utilized.

(S) A basic difficulty exists in implementing [ ] For strategic nuclear operations, an extensive system of procedures and preformatted messages exists and is regularly tested. However, a similar preparedness does not exist for nonnuclear operations nor is it totally feasible due to their unpredictable nature. Only recently have means been established for the rapid dissemination of decision or policy information to widely spread operational units through the RED ROCKET message system. However, this system can transmit only a limited volume of information and would be incapable of supporting ad hoc operational planning.

(S) Problem 5: Communications are inadequate for operations in crises and may be disrupted by nonnuclear as well as nuclear weapons effects. (Vols. IV and V)

(S) The communications capability in Europe is not systematically developed to support a unified command effort. Communications in this theater are vulnerable because of their dependence on host country resources and because of the isolated and concentrated location of U.S.-controlled facilities. Consequently, chaotic conditions in a host country could result in a reduction or denial of the WWMCCS communications in that count . In the PACOM area, communication capacity varies greatly from area to area. In general, it suffers from the underdeveloped nature of the Asian world and the size and the spread of the area to be covered. The principal U.S. facilities are concentrated at a few communications hubs, such as Oahu and Guam, and some are in countries of uncertain reliability, such as the Philippines and Japan. Also, the military equipment of some allies is obsolete and is almost completely inoperable.

(S) With few exceptions, provisions for secure communications with allied governments and U.S. diplomatic posts are [ ] For both groups, the capacity of the communications systems to meet large-volume demands [ ] e.g., Vietnam in 1965. In spite of emergency actions to expand or upgrade them, [ ]

(S) **Problem 6: ADP capabilities in the WWMCCS appear to be inadequate in some facilities, underutilized in others and have been developed in relative isolation with little sharing of experience.***

*Although this problem is not covered specifically by any of the supporting volumes, the subject was raised on every visit to operational commands and appears to be a real problem.

(S) Each command element has extensive computer facilities, which are mostly underutilized. The problem is compounded by the procurement of separate equipment for intelligence and operations to preserve security. The feasibility of joint intelligence/operational usage of a single machine with security precautions incorporated into the software has been demonstrated at a few commands such as CINCLANT, and it might be adopted at many other locations. Not only might this reduce expenditures and better utilize resources, but it also might assist in removing professional staff barriers between the intelligence and operational communities by compelling them to cooperate in support activities. This problem, however, is deep-rooted and not necessarily resolvable simply because the solution seems obvious.

(S) ADP hardware and software often have been developed to meet local requirements of restricted command and Service functions. Such development often occurs in relative isolation with limited sharing of professional knowledge. Consequently, efforts expended at different commands to satisfy common requirements are often redundant and sometimes result in incompatible systems. Within each Service there has been some attempt to provide ADP technical support through a central activity such as the Naval Command System Support Activity (NAVCOSSACT). However, success has been limited and typically inapplicable to operations of a unified and specified nature.

(S) There are problems also arising from the adequacy for WWMCCS needs of existing support equipment. These problems result from improper configurations or a failure to take advantage of the current state of the art. The process of a coordinated acquisition of ADP systems is being applied to the WWMCCS and so several commands have been delayed in updating their ADP support in anticipation of a procurement through the Worldwide Computer

Update. Consequently, some activities such as USAFE are having problems meeting their stated requirements.

B. SPECIFIC STUDY

Study: Develop Procedures to Provide for Flexibility of Command and Control within EUCOM and PACOM. (Vols. IV and V)

Task 1: Assess command and control for unilateral U.S. operations in EUCOM and PACOM.

a. Objectives. (~~C~~) The objectives of this task are:

(1) To evaluate the adequacy of existing command and control procedures for the WWMCCS and suggest possible improvements.

(2) To determine the relationship of the WWMCCS requirements to potential force postures.

(3) To determine the adequacy of command and control assets to handle augmentation, under a variety of scenarios, and to recommend improvements.

b. Scope. (~~C~~) This task should include:

(1) Consideration of procedures under a variety of possible circumstances in the Mediterranean, the Middle East, Europe, and the Pacific for (a) planned shifts from peacetime to wartime command arrangements in contingencies, (b) abrupt departures from planned arrangements, (c) support of split arrangements, (d) force augmentations, and (e) force reductions.

(2) Examination of the requirements for flexibility of the WWMCCS to support the NCA and military commanders in a variety of circumstances and a

variety of command modes. Attention should be given to the required facilities and procedures.

c. Task Detail. (U)

Level of Effort: 6 man-years.

Duration: 12 months.

Starting Date: M + 18 months.

Responsible Organization: JCS/EUCOM/PACOM

Task 2: Determine requirements for lateral and surge information exchange with U.S. nonmilitary agencies overseas.

a. Objectives. (U) The objective of this task is to evaluate the adequacy of present C&C concepts, procedures, and facilities for meeting both normal and surge requirements for military/nonmilitary information exchanges at operational levels.

b. Scope. (U) This task should cover operational commanders' requirements for information from nonmilitary agencies, liaison and other organizational arrangements, and coordination procedures, in normal, crisis, and wartime situations in the Mediterranean, the Middle East, Europe, and the Pacific.

c. Task Detail. (U)

Level of Effort: 3 man-years.

Duration: 9 months.

Starting Date: M + 18 months.

Responsible Organization: JCS/OSD.

Task 3: Determine command and control requirements for military operations conducted with allies.

a. Objectives. (~~C~~) The objectives of this task are:

(1) In the Pacific, to identify the WWMCCS requirements arising from interallied relationships and indicate the preferred U.S. command interface arrangements in interallied operations.

(2) In the Pacific, to examine interface relationships between U.S. and potential allied forces in combined military operations.

(3) In Europe, to identify the WWMCCS requirements for handling force augmentations and any implications of possible major U.S. force reductions.

b. Scope. (~~C~~) In the Pacific, this task should include a study of methods of achieving operational control and/or coordination, pros and cons of combined headquarters arrangements, interoperability of U.S. and allied C&C systems and procedures for exchanging intelligence and operational information with allied sources. The study may or may not have to deal with allies on a case-by-case basis. In Europe, this task should include consideration of the relationship among political warning, tactical warning and augmentation decisions, the relationship between the overall U.S. and NATO command and control structure, the implications of major force reductions and receiving, absorbing and controlling major increases in force strength on command and control.

c. Task Detail. (U)

Level of Effort: 4 man-years.

Duration: 12 months.

Starting Date: M + 30 months.

Responsible Organization: OSD.

IV. INFORMATION FLOW AND CONVERGENCE

A. BACKGROUND DISCUSSION

(U) The principal activities of the WWMCCS in routine operations are the collection, processing, and dissemination of data. Much of the information is for internal use in support of military activities; some is for direct support of the NCA; and a significant amount provides support to study and planning agencies, such as the Assistant Secretary of Defense for Systems Analysis. Several aspects of the data production and exchange process have been considered in this study. Issues associated with the upward flow of information through the WWMCCS are discussed here.

(U) There are three categories for the information collecting and processing systems of the Department of Defense: intelligence systems, operational systems, or administrative systems. The information obtainable from the intelligence and operational systems has seemed to be of primary interest and concern to the WWMCCS. Consequently, this study has concentrated on those systems. However, there is an increasing realization that the administrative information contained in the individual Service-operated systems has operational value and some of it could be incorporated with operational information into a single reporting scheme. This subject deserves further attention than given here. The present situation of separate information systems to serve specialized needs of intelligence, operations, and administration is due primarily to their historical development, but it has been accepted by DoD. The following identifies the main problems with these systems.

(Ø) Problem 1: There is only limited coordination between the intelligence and operational systems, and limited but improving coordination between the JCS operational systems and the individual information systems of the Services. (Vols. VI, VII and VIII)

(Ø) Because intelligence information is sensitive, it cannot be extensively integrated with the two other systems in routine operations; integration is eventually necessary, however, to present a complete picture to a command. Traditionally, the operational and intelligence data are so separated that command centers contain physically separate facilities and equipment. This separation has resulted in sequestered information in crises and may have caused a redundant expenditure of resources. Currently, PACOM is establishing All-Source Information Centers to overcome the separation. If the WWMCCS is to integrate information for the NCA, the problem of sequestered information at the staff level needs to be resolved as completely as possible in all command areas.

(Ø) The separation between administrative and operational information systems is related in part to the separate roles of the Services and of the JCS. Also, in the recent past, it has been easier to justify additional expenditures in the name of command and control and NCA requirements than to use the facilities of the comptroller to gather information.

(Ø) The clearest manifestation of the disadvantages of compartmentalization is the generally poor capability to converge information rapidly from diverse sources which may impact on the same situation. In the intelligence system, a number of channels exist, some formal and some informal, several of which may be used to carry related information or even identical information with different urgencies and time scales. As a result, there is no guarantee that different echelons, or even

neighboring headquarters at the same echelon, will be sufficiently well informed at any given moment. These different echelons tend to operate independently, so that only in Washington is there any hope of converging all the relevant information rapidly. Since the Washington community tends not to support the field headquarters on its own initiative, the entire convergence process tends to worsen during a crisis as message traffic builds up and field headquarters, not alerted to a coming crisis, must judge for themselves the importance of events.

(S) Each headquarters that passes information forward usually maintains a data base of its own containing at least some of the information. Although these bases may be similar in format (e.g., FORSTAT data base) they are often maintained under different procedures and are updated at different times. In some cases, definition of categories may be different, either explicitly (e.g., combat readiness) or implicitly, because of an error or lack of understanding. As a result, the separate data bases may not be in agreement at any particular point in time. Whenever it is necessary to coordinate two headquarters operating with different bases (for example, the JCS and the Army in connection with the evacuation of U.S. nationals from Jordan in 1970), inconsistent assessments are possible.

(S) **Problem 2: The responsiveness of the established intelligence and operational activities is diminished by organizational structures and arrangements. (Vols. VI and VII)**

(S) Partly because of the sensitive nature of intelligence sources, partly because of the need for technical evaluation, and partly because of tradition, intelligence information is normally processed through a lengthy command chain. The major impact is in the cumulative delays which occur in the screening and selection of information to be forwarded. One of the principal mechanisms for accelerating this evaluation process under

crisis conditions is to reduce the number of echelons involved; however, procedures do not seem to be adequate for this purpose. In particular, there are discontinuities in the procedures for triggering the transition from routine to crisis operations and so the shift remains essentially an ad hoc process. In part, the difficulty arises from the fact that the intelligence requirements of the WWMCCS frequently are not specified in terms sufficiently concrete to establish a guide for systematic planning to mobilize intelligence support under the full range of contingencies that might arise.

(S) Operational reporting systems, on the other hand, tend to be scheduled, recurring, and highly formatted, with inputs developed by or taken from Service or CINC systems. These systems are usually difficult to modify to meet new information demands. Although procedures exist for developing new reports in a crisis situation, basic sources for the information must be identified. These sources may be Service reporting systems or they may involve field personnel outside the scope of the WWMCCS (e.g., below the component command level), so that coordination of requirements and development of accurate sources may be a lengthy process.

(S) A further source of difficulty with the operational system is that reports are required on fixed schedules and there is no necessary correlation between the reporting schedule and the rate of change of the basic data. Limiting a regular report to changes from the previous one provides an incomplete solution since it is conceivable that situations could change several times within a reporting period. Further, there are no known measures of the effects on operations of errors or delays in much of the data reported (e.g., name of a ship's captain). Since the basic time-sensitivity of the operational data is not known, it is not possible to determine whether the delays in the

systems are significant. Current systems operate with delays on the order of one to two days for force status information and 6 to 24 hours for operations status information. The range and magnitude of decisions that depend on this information are not known and the rate of change of the information is not known, so the importance of these delays is not clear.

(~~C~~) One characteristic of the above problem is an ever-present tendency to bypass existing systems, both intelligence and operational, particularly when specific information is required in a crisis. The systems may be bypassed because the criteria used in collecting the basic inputs do not accurately reflect higher level requirements, because the system has not been able to effectively converge information from separated channels, or because the user does not know or cannot find out what the system can provide. In any case, bypassing takes the form of a direct query to a headquarters closer to the scene. This can be an unreliable procedure because there is no guarantee that the headquarters queried is well informed since intelligence systems may bypass it. Moreover, operational systems tend to be so complex that an inaccurate response from an uninformed individual is not unusual. Even when an accurate response is obtained, it may be at the expense of excessive duplication of effort; a query from a higher headquarters, particularly Washington, always produces a feeling of crisis.

(~~S~~) The reasons for bypassing an established system are understandable, particularly when many echelons are involved. The difficulty is in knowing when, if, and how to do it. The WWMCCS, with a multiplicity of independent and undocumented systems, invites the bypassing which has occurred in crises.

(Ø) Problem 3: There is a great deal of uncertainty associated with the quality, timeliness, relevance and selection criteria of the information provided by the information support systems of the WWMCCS. (Vols. VI and VII)

(Ø) In many intelligence reporting systems, the criteria for identifying, reporting, and subsequently processing early indications that a situation is no longer normal are intrinsically implicit. The basic criterion is that an occurrence deviates from some preconceived norm. Such a norm is based on assumptions that are known and understood only by the personnel at the echelon where the judgment is made, and intelligence data that may be available in the same or other systems is not always taken into account. Further, there is little systematic feedback in the system on a short term basis (e.g., in the early phases of a crisis) to assist elements in the field in determining the criticalness of selected issues.

(Ø) The general uncertainty about thresholds for reporting appears to contribute to the persistence of routine practices in the early transitional stages of crisis or conflict situations. This problem has serious implications for the capability of the WWMCCS to meet the requirements of the NCA, since the system in effect operates on the basis of criteria which they do not set and of which they may not be aware.

(Ø) The operational systems share this problem with the intelligence reporting systems although the manifestations are different. The JCS share with the CINCs and the Services the capability to set requirements, to define terms, and to control the quality of the information. As a result, the reporting systems represent a compromise that do not always represent the requirements of JCS. Definitions actually used in developing inputs or processing data may be implicit (e.g., OPREP-4 or OPREP-3 reports) or may be inconsistent between two systems (e.g., SAC and JCS definitions of a launched missile).

(~~C~~) Quality control over inputs and processing is a persistent problem. The Services tend to have greater control over their reporting if only because there is a clearer conceptual connection between reporting from the field and orders from the headquarters. This is also true, for example, in SAC where a single system is used for reporting and for control. In addition, since the WWMCCS terminates at the component command level so does its quality control over data. The existence of errors in the reporting systems has been documented often enough to raise serious questions of the accuracy of the data in some systems.

(~~S~~) Many of the uncertainties in and about these systems can be related to lack of documentation. This problem exists with intelligence systems, in which sensitive sources and channels must be protected. It also exists with the operational systems which mainly consist of formatted, scheduled reports processed entirely or in part by computer. Although such systems are the easiest to document they are very complex and tend to change frequently, which requires additional documentation. Attempts to improve these systems are complicated by the lack of documentation. In particular, efforts under way to develop integrated systems will require that documentation be provided on data sources, definitions, processing steps, and similar matters not now available in detail.

B. SPECIFIC STUDY

Study: Evaluate Information Flow and Convergence. (Vols. VI and VII)

Task 1: Determine and quantify the requirements for and uses of operational and intelligence information at various echelons of the WWMCCS, to provide background data on which to base improvements and further studies.

a. Objectives. (~~C~~) The specific objectives of this task are:

(1) To develop techniques and establish arrangements for systematically studying the problem of converging information in order to support WWMCCS functions.

(2) To identify more precisely the nature of the decisions for which information support will be required at various echelons of the WWMCCS.

(3) To identify the uses at each headquarters of each information element which enters the reporting systems.

(4) To trace the uses of elements of information which are integrated with others to produce information unique within the system.

(5) To establish a basis for providing more precise guidance for the development and collection of information to support the major functions of WWMCCS.

(6) To assess the timeliness, comprehensiveness, and reliability of both the field and finished information which the commands receive and explore the degree to which the Washington community takes the initiative in ascertaining and satisfying the requirements of the commands under various conditions.

b. Scope. (~~C~~) The scope of this task includes a study of the information processes at the following echelons: the NCA and their immediate staffs, Chairmen of Interdepartmental Groups, and others responsible for managing crisis operations under the

NSC System, such as Joint and Service staffs, CINC, and Component Commanders and their immediate staffs.

c. Task Detail. (U)

Level of Effort: 10 man-years.

Duration: 12 months.

Starting Date: M + 12 months.

Responsible Organization: JCS.

Task 2: Document quantitatively the procedures and criteria used to develop and process the structured, recurring reports used in the WWMCCS, and recommend improved procedures for managing the flow of this information in crisis situations.*

a. Objectives. (C) The objectives of this task will be to:

(1) Identify the information elements in recurring structured reports which enter the WWMCCS, including those developed internally by processing.

(2) Develop a systematic and basic understanding of the formal and informal processes that determine how rapidly and reliably information reaches the WWMCCS.

(3) Explore the procedures and criteria used to identify items of information of more than routine significance.

(4) Identify all major data bases associated with these reports now in use and describe their content and interactions.

(5) Prepare detailed flow diagrams, identifying links (with data elements, e.g., length, frequency of

*See Vol. VII.

reporting) and nodes (with input-storage-output matrices).

(6) Recommend improved procedures for managing the flow of information to support the WWMCCS operations under conditions of crisis and conflict.

b. Scope. (Ø) This task will be limited to structured operational reports, such as JRS and parts of IDHS that support the WWMCCS, and to Service operational and administrative reports in order to identify overlapping sources and parallel processing of the same or similar information. The emphasis will be to describe the data flow and data bases in quantitative terms so that it will be possible to specify the magnitude of generic WWMCCS operations. Loads imposed both on the links (communications) and on the nodes (the headquarters which are the functional elements of the system) will be quantified. These loads fall into two areas: computer processing and storage and staff requirements.

c. Task Detail. (U)

Level of Effort: 10 man-years.

Duration: 12 months.

Starting Date: M + 12 months.

Responsible Organization: JCS/OSD.

Task 3: Document, assess, and recommend improvements in the procedures and criteria used at selected echelons of the WWMCCS for identifying, reporting, and converging critical items of intelligence to other headquarters.*

a. Objectives. (Ø) The specific objectives of this task are:

*See Vol. VI.

(1) To explore systematically the degree to which different echelons of the WWMCCS are informed on selected issues at specific points in time. Systematically reconstruct the flow of information on selected key items of intelligence through the intelligence community to selected WWMCCS echelons in Washington and the field.

(2) To determine the criteria that are used at various levels to identify that an event is important.

(3) To assess the significance of discrepancies that are found between the intelligence holdings of the various echelons of the WWMCCS.

(4) To recommend changes in procedures and organizations to eliminate significant discrepancies and to improve overall data flow and convergence.

b. Scope. (Ø) This task would focus on information convergence at key WWMCCS echelons in Washington and in the European and Pacific Theaters. Particular emphasis would be placed on areas such as the Mediterranean and Southeast Asia, where ongoing crises subject the WWMCCS to a variety of stresses. This effort would undertake to sample on a systematic basis the timeliness and reliability with which key items of information converge at various echelons of the WWMCCS.

(U) Initially, the emphasis would be on developing methods and arrangements to study information convergence and on testing them under normal conditions.

(Ø) Then the emphasis would shift to a study of information convergence under crisis conditions, with particular emphasis on exploring the degree to which timely and reliable

convergence is achieved and the real significance for the WWMCCS, if timely and reliable information is not achieved at all major echelons.

c. Task Detail. (U)

Level of Effort: 5 man-years.

Duration: 12 months.

Starting Date: M + 24 months.

Responsible Organization: JCS/OSD.

V. STRATEGIC NUCLEAR WAR

A. BACKGROUND DISCUSSION

(TS) An elaborate command and control structure has evolved over the last quarter century to ensure positive control of complex nuclear weapons systems and their immediate availability in support of U.S. national policy. The WWMCCS [ ] provide an assured capability to support and implement [ ] Previous studies have identified significant command, control, and communications problems in this area; this study has reemphasized some of those problems and updated or augmented them, as appropriate, with additional ones that have arisen from changes in force capabilities, threats, and the world environment.

(TS) Problem 1: [ ]

(TS) This well-documented problem has become more critical with the deployment of Soviet [ ] that can impact on Washington within [ ] of launch. The White House cannot survive nuclear attacks and it takes about [ ] to get the President to Andrews AFB and airborne as planned in one of the procedures intended to increase Presidential survivability. In a retaliatory mode, it is estimated that at least [ ] is required to alert the President of an attack, obtain a decision on a response, and prepare to transmit it from the Washington area. The loss of Presidential command authority

or its shift to a successor prior to a decision [ ] in initiating a response.

[ ] It is important also to point out that measures which are taken to ensure survival of Presidential command authority can have a significant impact on the design and organization of the C&C system, e.g., with improved capabilities in such areas as attack and damage assessment, transattack control of forces, and war termination.

(TS) [ ]

(TS) Problem 2: [ ]

(TS) [ ]

(~~TS~~)

(~~TS~~)

[

(~~TS~~) [ ]

(~~TS~~) [ ]

[ ]

~~(TS)~~ [ ]

~~(TS)~~ Problem 3: [ ]

~~(TS)~~ [ ]

~~(TS)~~ Problem 4: [

]

~~(S)~~ The WWMCCS facilities equipped and staffed to carry out the data collection, data processing, and evaluation functions necessary to provide assessment information to the NCA are fixed, relatively soft, and vulnerable to destruction. Moreover, the backup system that provides more survivability does not possess the resources required to adequately support the information handling.

~~(S)~~ Providing this capability in a backup system is complicated by the lack of specification of information requirements. In particular, the extent to which the President is dependent on warning assessment and attack assessment information in reaching a decision to execute strategic nuclear forces is not known.

~~(TS)~~ Problem 5: [

]

~~(TS)~~ [

]

[ ] At present, the SIOP [

]

(TS) Were the SIOP executed, [

] (The time of automatic termination is dependent upon all tasks having been ordered executed against all targets in the countries programmed for attack. [

]

(TS) [

]

[

]

3. SPECIFIC STUDIES

(U) Three specific C^3 studies have been recommended in the area of strategic nuclear warfare.

Study: **Evaluate Command and Control for Execution of U.S. Strategic Forces in Retaliation.***

Task 1: [

]

a. Objectives. (~~TS~~) The objectives of this task are:

(1) Evaluate the likelihood that preparations for a surprise attack would not be detected by the strategic warning indicators [

] or that missile impacts on the U.S. would occur before the establishment of a higher-than-normal Defense Readiness Condition, [

]

*Details are found in Annex 1, Appendix K of Volume IX.

(2) To estimate the survivability as a function of time of the President and his legal successors to attacks by existing and projected Soviet and Communist Chinese deployments of strategic forces and by clandestine means.

(3) Determine the instructions available to Presidential successors concerning their possible [ ] responsibilities, and the minimum instructions required if they had to fulfill the [ ] responsibilities which might devolve on them.

(4) Develop guidance and recommend criteria as to when the President and some, or all, of his successors should disperse from the Washington area.

(5) To recommend criteria and procedures to determine the succession of Presidential authority [ ] in the event that communications with the President, the Vice President, and their immediate successors were disrupted and there were reason to suppose them dead or incapacitated.

(6) To examine clandestine means by which a potential enemy could adequately track and attack the President and his legal successors.

(7) [ ]

b. Scope. (~~TS~~) This task should consider the [ ] It requires as inputs expected levels of attack and performance characteristics for existing and projected deployments of Soviet and Communist Chinese strategic forces and assumed performance characteristics of U.S. defensive systems, warning systems and C^3, deployed and under development. The task should include consideration of the possible impact of a SALT agreement on restricting the areas in which SLBM submarines could be deployed. [ ]

c. Task Detail. (U)

Level of Effort: 1 man-year.

Duration: 6 months.

Starting Date: M-day.

Responsible Organization: JCS/OSD/NSC.

Task 2: [ ]

a. Objectives. (~~S~~) The objectives of this task are:

(1) [ ]

(2) To determine as a function of [ ]

(3) Determine the effect on command post survival and/or survival time that implementation of the SAFEGUARD system would provide.

(4) Estimate the threat to [ ] aircraft, and to their communications and operating capabilities, from the collateral effects of weapons [ ] and other targets, and from direct attack on their basing.

(5) Calculate, for a variety of aircraft tactics and countermeasures, the [ ]

(6) Estimate the accuracy and how close to real time anticipated [ ]

(7) Estimate the flight times, [ ]

(8) In the event uncontrolled radio and radar emissions from command and control aircraft are judged to constitute a threat to their survivability, recommend (1) limitations or modifications to the present unrestrained electromagnetic emissions which would constitute the best [ ] which afford the best compromise between survivability of [ ] and other command and control aircraft and their operational capabilities, and (3) indicate conditions under which [ ] control may be put into effect by aircraft serving as national and CINC command posts.

(9) Estimate the [ ] in executing each component of the U.S. strategic forces in the event [ ] and if there were a doctrine which would permit [ ]

b. Scope. (S) This task would examine [and] The task would be sufficiently detailed to estimate survivability as a function of time and attack size. It would consider enemy capability to identify and track airborne command posts and to attack them selectively as well as by [ ]

c. Task Detail. (U)

Level of Effort: 2 man-years.

Duration: 6 months.

Starting Date: M-day.

Responsible Organization: JCS/OSD.

Task 3: Estimate the [ ]

a. Objective. (S) The objectives of this task are:

(1) To investigate the roles of the individual communications links and of combinations of such links in the maintenance of reliable, timely [ ]

(2) To determine the procedures that would be required, the attendant risks to [ ]

[ ]

(3) To determine the present and [ ]

(4) To design and recommend communications tests from the [ ] launch facilities.

(5) To recommend means of [ ] its recovery time.

b. Scope. (S) This task would [ ]

(S) [ ]

[ ]

[ ]

c. Task Detail. (U)

Level of Effort: 4 man-years.

Duration: 12 months.

Starting Date: M + 6 months.

Responsible Organization: JCS/OSD.

Task 4: Estimate the survivability of the leased landlines necessary to support nuclear operations

a. Objective. (~~S~~) The objectives of this task are:

(1) To establish levels of damage, including degrees of partitioning and isolation, that can be inflicted on the U.S. landline communications grid as a function of [ ]

(2) To determine enemy attack price to produce landline communications isolation of key geographic areas, [ ]

(3) To investigate landline communication restoral procedures, techniques, and capabilities, with emphasis on establishing time delays required to repair or to bypass large-scale outages [ ]

(4) To document the extent to which CINC and worldwide strategic nuclear C&C systems have been exercised realistically under simulated conditions of landline communication failure ranging from local to widespread outages.

b. Scope. (~~C~~) This task should consider all leased lines programmed for use for C&C of strategic forces and for connecting among the CINCs and NCA.

c. Task Detail. (U)

Level of Effort: 4 man-years.

Duration: 12 months.

Starting Date: M + 6 months.

Responsible Organization: JCS/OSD.

Task 5: Develop command and control constraints [ ] under a variety of attack situations

a. Objective. (~~TS~~) The objectives of this task are:

(1) To determine, if possible, objective criteria with respect to the collective output of programmed warning and which might be used with other available information to:

- Indicate that a [ ]
- Distinguish between a [ ]
- [ ]

(2) To develop planning guidance, for submission to the [ ] s to the information that could be used as a basis for deciding to [

] The guidance would be applicable to a wide range of conditions, including: (a) [

]

(3) To determine the possible effects on information provided to the [

]

b. Scope. (TS) Inputs to this task would include results of other tasks in this study, the results of exercises, and information on the thresholds [

] The recommendations resulting from this task would be more specific and quantitative and would cover questions of [

].

c. Task Detail. (U)

Level of Effort: 2 man-years.

Duration: 6 months.

Starting Date: M + 18 months.

Responsible Organization: JCS/OSD/NSC.

Study: Evaluate Command and Control for the [ ]

Task 1: Determine requirements for information on [ ]

a. Objective. (~~TS~~) The objectives of this task are:

(1) To determine the command and control requirements for information necessary to [ ]

(2) To determine the capabilities of proposed and programmed command and control systems to obtain and process information from [ ] As a preliminary to this objective, it would be necessary to perform work with the following specific objectives:

(a) To compare the capabilities and roles of potential [ ]

(b) To study options for U.S. capabilities for [ ]

---

* Details are found in Annex 2, Appendix K of Volume IX.

(3) To determine information available [ ], to use such information and recommend improvements in procedures and facilities.

b. Scope. (TS) This task should consider all of the national command posts that are [ ]. It should use as inputs known capabilities of planned [ ]. It should use also as inputs the results of studies of the expected damage as a function of time following [ ] to facilities used for command and control and on which it depends for information.

c. Task Detail. (U)

Level of Effort: 4 man-years.

Duration: 12 months.

Starting Date: M + 18 months.

Responsible Organization: JCS/OSD.

Task 2: Examine the requirements and capabilities for [ ]

a. Objective. (TS) The objective of this task is:

(1) To examine the proposed [ ]

[

]

b. Scope. (~~S~~) This task would use as inputs previous studies of [ ] coordination.

c. Task Detail. (U)

Level of Effort: 1 man-year.

Duration: 12 months.

Starting Date: M + 18 months.

Responsible Organization: JCS/OSD.

Task 3: Develop time-sensitive planning factors and force employment doctrines significant for developing effective command and control

a. Objective: (~~TS~~) The objectives of this task are:

(1) To develop more comprehensive planning factors, analytic procedures, force employment doctrines, and time dependent force interaction models than are currently available for the [

]

(2) To develop an explicit statement of the rules, principles, and numerical factors which are presently used to determine [ ] This task should examine the factors taken into account or ignored, and the uncertainties these choices introduce in interpreting the outcome of the [ ] Consider whether present methods and procedures give any reliable indication of how long hostilities would last, what factors are critical for determining war termination and who wins (if it is possible to reach any conclusion on this point), and the [ ]

(3) To propose, where possible, improvements to the planning factors considered in Objective (2). Particular attention should be given to:

- The [ ] assigned to U.S. and Soviet hard ICBM sites.
- The development of a point value for [ ]
- The order-of-magnitude difference between the [ ]
- The possible future use and significance of damage assessment, [ ]

- The effect of varying delays in execution of a [ ]
- The effects of [ ]
- Planning factors for the length of time of active hostilities.
- The effect of catastrophic failure of [ ].
- The adequacy and accuracy of pre-war intelligence.
- Parameters and criteria for [ ]

(4) To develop, if possible, a description of the essential elements of the strategy upon which the U.S. would have to rely, [ ]

b. Scope. (TS) This task depends on successful completion of the previous [ ](pg. 70). It would further depend on the results of weapons studies that give [

]

c. Task Detail. (U)

Level of Effort: 3 man-years.

Duration: 6 months.

Starting Date: M + 30 months.

Responsible Organization: JCS/OSD.

Study: **Determine Information Systems Requirements for Strategic War**

a. Objective. (S) The objectives of this study are:

(1) To determine the types and characteristics of data required by DoD elements in order to provide guidance in support of existing procedures for [

]

(2) To evaluate likely changes in DoD nuclear warfare information system needs resulting from a changing strategic nuclear environment, e.g., as caused by possible changes in National policy, [

]

(3) To determine strategic [

]

(4) To identify, evaluate, and recommend techniques to improve information available to the DoD strategic nuclear C&C system.

b. Scope. (U) The task should consider the existing and planned information systems for the support of strategic C&C.

c. Task Detail. (U)

Level of Effort: 6 man-years.

Duration: 18 months.

Starting Date: M + 18 months.

Responsible Organization: JCS/OSD.

VI. OPERATIONAL CONTEXT OF THE WWMCCS

A. BACKGROUND DISCUSSION

(U) Many of the operational problems identified in this study may be attributed in part to a set of conditions and circumstances that form the operational context of the WWMCCS; as such they raise issues outside the responsibility of the system.

(U) A resolution of these issues would not necessarily ensure solutions of the related operational problems, but it would undoubtedly assist in ameliorating their effects. On the other hand, the existence of this set of issues does not imply that the symptomatic operational problems are insoluble in the current environment and should not be studied further. A total solution of each operational problem will in most cases require consideration of the perceived difficulties and their root causes.

(Ø) **Problem 1: The WWMCCS operates in an environment of divided responsibility and independent organizations within the Defense Department and the national security community. (All Volumes)**

(U) For the last quarter century there has been a basic functional division in the military community between (1) the operational command structure of the JCS and unified commands, and (2) the administrative or support structure of the Services and the DoD agencies. By design, the WWMCCS is a confederation of elements of the command and control structure which includes operational and administrative activities. Consequently, it

operates in and through this environment of divided responsibility without the capability to unilaterally resolve basic differences.

(U) The effect of the divided responsibility is particularly pronounced in the collection and processing of information. Fundamental differences in the data requirements of the operational and administrative activities require a multitude of reporting systems. As a result, redundant requirements are placed on the sources of information and on the information processors, which include the WWMCCS. Also, inconsistencies exist in the WWMCCS data handling procedures and in the information produced. All of these conditions are in part due to the lack of standardization within the WWMCCS.

(S) A similar situation exists in the national security community in which responsibilities for support to [ ] are shared by several entities. Even within the DoD this situation is reflected in the fact that information support associated with the WWMCCS is isolated from operational channels to the extent that dual reporting facilities, informational and operational, have been created at each major WWMCCS location.

(S) Further impediments to the WWMCCS operations arise from the [ ] in which each echelon has a command and control system not originally designed to be compatible with other components of the WWMCCS. This is especially marked in the case of [ ] where the Service components long preceded the establishment of a unified command headquarters and had designed their command, control, and communications systems primarily to support their own needs. Multiple command-chains have inevitably tended to create a corresponding number of command and control channels that, in turn, impose multiple sets of information requirements on the operational

forces and result in information of divergent quality, quantity, and accuracy at critical nodes in the WWMCCS.

(Ø) Problem 2: The WWMCCS does not have a definitive charter from which to operate nor has it been given active and consistent management guidance. (All Volumes)

(U) DoD Directive S-5100.30, which established the WWMCCS, is largely permissive in nature. While some specific responsibilities are assigned, most are couched in general terms. Further, the Directive does not contain an implementation paragraph such as is usually found in DoD Directives, requiring all organizations affected to publish and submit appropriate implementing instructions within a fixed period of time. Without a positive assignment of specific responsibilities or a requirement for a series of commitments from subordinate units in the form of implementing instructions, the general nature of the Directive permits a strong judgmental factor to be applied in deciding what is to be done.

(Ø) The definitions given in the Directive are sufficiently broad and encompassing to include implicitly almost all the specific missions, functions, and characteristics conceivable for the WWMCCS. Consequently, it is irrelevant to find fault with the system's functional concepts as being explicitly too restrictive. However, the lack of specification in the enunciation of these concepts has had a restrictive effect and creates problems. Many of the problems identified in this study exist because certain missions, functions, and characteristics are de facto included, excluded, or under- or overemphasized under such permissive guidance. In particular, [

]

- The WWMCCS is not the routine recipient of all information affecting [ ] and, in fact, must compete with and coordinate with several independent organizations for information essential to its functions of [ ] This situation is most aggravated in the field of [ ]

- The WWMCCS has evolved through command and management arrangements that are incompatible with the effective and efficient achievement of the WWMCCS mission. The system depends, in part, on a diversity of command chains (the Services) and support agencies [ ] For example, much of the basic equipment and many of the facilities employed by the WWMCCS have been obtained for support activities other than that of the WWMCCS. On occasion, the WWMCCS must compete with other systems for the use of equipment and facilities. Communications, computer support, and Service headquarters command centers are areas in which such competition occurs.

- In most situations, the WWMCCS is forced to improvise to meet operational requirements instead of anticipating them and making timely preparations for them.

(S) Action and operational direction of the WWMCCS development by a single activity or individual might compensate somewhat for the absence of a defining document. In the case of the WWMCCS, however, there is no single agency to supply direction nor one individual who directly acts as the commander. The [ ]

but many other commanders as well. The JCS, who are the de facto managers of the WWMCCS, have two separate sets of requirements they must meet, one arising from joint operational matters and the other from Service administrative matters. The WWMCCS primarily supports only the first of these roles. Consequently, the JCS have not given complete support to the WWMCCS if it had to be given at the expense of other systems on which they also depend. No single agency has been given authority over the WWMCCS; on the contrary, operational control of the diverse WWMCCS components is divided among the various elements of the military community.

(S) As a result, some very fundamental decisions have never been made. For example, an overall command, control, and communications master plan has not been developed, so independent and uncoordinated C^3 systems have developed throughout the DoD which are less specifically responsive to the NCA requirements than to their own specific needs. The resulting relationship between command and control and the support equipment, such as communications and computers, has not been delineated nor has provision been made for their complementary development. Standards for the interfacing and interoperability of the WWMCCS components have been established either slowly or, in some cases, not at all.

(S) Further, there has been little or no evaluation of the effectiveness of some basic operational concepts nor of the efficiency of the related operations. For example, the preferability of centralized over decentralized storage of vast amounts of data has not been established. Directive S-5100.30 points the systems towards decentralization but technical and operational factors have been influences toward centralization.

although this property was a basic

design objective and much effort and expense is still expended in an effort to achieve it. Complementary procedures for operating in degraded modes have not been established, in part because the WWMCCS requirements in these situations are not well defined.

(~~C~~) **Problem 3: Measures of performance are not applied consistently throughout the WWMCCS nor are they well designed to evaluate effectiveness of command and control in objective terms.** (Vol. X)

(U) Although there are a significant number of activities, including exercises, tests, and studies, which evaluate various aspects of the WWMCCS performance, each of these activities is primarily designed to test selected and narrow aspects of the system. Most of these efforts are expended in measuring efficiency without regard for effectiveness. Consequently, although there are data available on the performance of selected tasks such as message transmission or reduction of preformatted data, there are no data from which the overall responsiveness or the predictability of the system can be evaluated.

(~~S~~) The reasons for this mode of evaluation are twofold. First, no single coordinator or overseer measures and evaluates the performance of all the WWMCCS functions. Consequently, there is little standardization among measuring techniques or results, and the data available are not given a common review to identify problems beyond the scope of any single measure of performance. For example, the consistency of operations with prescribed procedures can be checked at several nodes, but unless the results are reviewed on a common basis the cumulative effect of individually insignificant problems will not be noted. Second, the basic effect of command, control, and communications on essential force operations has not been sufficiently analyzed to relate efficiency measures to system effectiveness. For example,

strategic force effectiveness models fail to incorporate command, control, and communications operations even though [ ]

(C) **Problem 4: Information systems operate with parallel channels and redundancy by design but there are no systematic efforts to measure the cost and utility of these arrangements. (Vol. VII)**

(C) The existence of parallel channels carrying similar or identical information has already been noted. Even within individual major systems there are known overlaps, particularly in the operational channels, although the introduction of the Joint Reporting Structure (JRS) has done much to improve the situation. The JRS is supposed to represent the consolidated information requirements of the JCS, but some reports are not contained in the JRS, e.g., the back-channel reports. Even within the JRS there are reports which overlap each other (e.g., the CAO-SOP and parts of the FORSTAT and OPREP reporting systems).

(C) A specific class of documentation concerning the workload, the performance, the cost, and the uses of the operational systems is needed. This information is required to manage these systems, either individually or as an entity. Without this information, it is not possible to allocate effort (money) in proportion to demand on the system.*

(C) **Problem 5: The interdependence between command and control performance and force effectiveness is not well known. (Vols. IX and X)**

(C) This statement is applicable equally to nuclear and to conventional force operations. In particular there are no known comprehensive analyses which have specifically demonstrated the

*New procedures to be implemented in 1971 and specified in JCS Pub 17 may help alleviate this situation.

value of possible C&C system improvements by examining the interaction between C&C and force structuring, force targeting, and force employment. Future analyses which relate C&C capabilities to force effectiveness could provide a quantitative basis for judging the overall importance of C&C problems and such analyses would help to establish the comparative utility of levels of investment in support of C&C system improvements. It appears, therefore, that future work in this area would be of great value to Defense management, especially with regard to strategic nuclear operations where force utilization and command and control interactions are highly structured.

(~~C~~) Problem 6: At the present time no single JCS/DoD activity has assigned responsibility for the overall management of the WWMCCS. No master objectives plan exists that specifically delineates the structure, interfaces, capabilities, and standards to be achieved by elements for their activities relevant to the WWMCCS mission. Since the elements and assets of the WWMCCS are not specifically defined, it is not possible to directly relate the assets of the WWMCCS to program elements that are specified in the Five Year Defense Program (FYDP). (Vol. VIII)

(U) Direction and management over development, structuring, and operation of the WWMCCS is divided among JCS and DoD authorities. At the DoD level the management is divided among the Director of Defense Research and Engineering (DDR&E), the Office of the Comptroller, the Assistant to the Secretary of Defense for Telecommunications, and other OSD offices which participate during the PPBS process. At the JCS level, J-3 coordinates, promulgates, and monitors all information reporting requirements to subordinate commands and the Services. It approves the composition and the operational requirements of the C&C systems of the Unified and Specified Commands. It does not, however,

approve the C&C systems of the Services or component commands, other Defense agencies, or Service operating commands. It does not have management authority over the use of computer support by other OJCS directorates or the programming authority for support of the system. It does not plan for or have direct control over the communications to support the WWMCCS. Although the NMCSSC (which supports the NMCS) and JTSA (which is being established to support the WWMCCS) are responsive to J-3 requirements, they are not directly under J-3 control.

(U) In S-5100.30, the Joint Command and Control Requirements Group (JCCRG) was given the charter to manage the WWMCCS. While JCCRG exercised control over worldwide technical computer standards for command and control systems, the NMCS Division in J-3 coordinated, promulgated, and monitored the implementation of directives pertaining to the NMCS. No one effectively exercised overall direction over the WWMCCS as a system (to include communications, equipment, personnel, etc.) or promulgated the necessary master development plan. With the recent reorganization of the OJCS, JCCRG has been merged under J-3. Thus, for the first time, the responsibility for all OJCS information support appears to reside in one organization. Whether the present organization is adequate to carry out the required mission or whether one organization at the JCS level has the authority and wherewithal to exercise control over development, operation, and maintenance of information systems to support the OJCS is a moot question.

(U) The WWMCCS depends for its resources on a diversity of Service commands whose primary missions are distinct from that of the WWMCCS and compete for resources on favorable terms. Much of the basic WWMCCS equipment and many of its facilities have been obtained for support activities other than the WWMCCS. It is difficult to delineate in any detail for planning and costing

purposes those facilities, personnel, and equipment which are attributable to WWMCCS and those which are not. Some facilities and installations designated as belonging to WWMCCS by directives may well serve other functions in addition to the WWMCCS one. Other facilities, not designated as belonging to the WWMCCS, may in fact be used primarily for that function. In the absence of a clearly defined organizational structure, it is infeasible to define the financial structure to meet the needs of the DoD resource management system. Without this institutional framework, decision makers cannot adequately deal with the complex problems of coordinating, implementing, evaluating, assessing risks, and credibly supporting the needs for necessary resources for the WWMCCS as required for the PPBS cycle.

(S) The Joint Chiefs of Staff and the Services have indicated a concern about interfaces and interoperability between strategic and tactical command and control systems and the Service management information systems. The Unified, Specified, and Component Commands are concerned with the interfaces between the [ ] and the WWMCCS and the interoperability of U.S. and allied systems. These interfaces and this interoperability do now, although not necessarily, impede the flow of information from the lowest level to the [ ] A study to identify the elements of this difficulty will assist in dissipating it.

B. SPECIFIC STUDIES

Study: Develop an Institutional Framework for Managing, Planning, Programming, and Budgeting the WWMCCS. (Vol. VIII)

Task 1. Develop inputs for an objectives plan for the WWMCCS and a plan for relating budgetary program elements to specific WWMCCS assets.

a. Objectives. (U) The objectives of this task are:

(1) To determine the elements of the WWMCCS and to analyze the composition of these elements in terms of communications, computers, other equipment, facilities, personnel, and procedures.

(2) To determine the organizational interrelationships among the elements of the WWMCCS, between the WWMCCS and the organizations it supports, and the responsibilities and contribution of each organization that allocates, expends, or approves resources which support the elements of the WWMCCS.

(3) To identify the FYDP program elements that contain resources in support of the WWMCCS.

(4) To define the nature (R&D, investment, operating costs, and manpower), origin (by appropriation), and distribution of resources among program elements.

(5) To develop an input/output flow chart originating with WWMCCS requirements and ending with outputs of the system intended to satisfy those requirements. Specifically it will identify

(a) The WWMCCS requirements that generate workload or activity

(b) The Congressional appropriations that provide funding to support the WWMCCS

(c) The relationships between appropriated funds and program elements

(d) The relationships between organizations/functions and program elements

(e) The association of WWMCCS-supporting organizations/functions and outputs intended to satisfy the requirements of the WWMCCS

b. Scope. (U) This task will consider the appropriate directives of DoD, the Services, and other applicable departments and agencies and current plans and memoranda related to Planning, Programming, and Budgeting System (PPBS). The survey will encompass all DoD, Joint and Service commands, headquarters, and resources contained within or supporting the WWMCCS, including such support agencies as the Joint Technical Support Agency (JTSA), National Military Command System Support Center (NMCSSC), and the U.S. Army Strategic Communications Command (STRATCOM). This task will provide primary inputs for the development of an objectives plan for the WWMCCS and a basis for the development of a management and organizational structure for the WWMCCS.

c. Task Detail. (U)

Level of Effort: 8 man-years.

Duration: 12 months.

Starting Date: M-day.

Responsible Organization: JCS.

Task 2. Document existing DoD information systems relevant to the WWMCCS function to determine their effectiveness and interrelationships, and identify alternative methods of improving these information systems.

a. Objectives. (~~C~~) The objectives of this task include:

(1) To document the modus operandi of existing and proposed DoD information systems, the interrelationships among them, and those between them and the WWMCCS.

(2) To document new C^3 and computer concepts and determine the interrelationships between them and their potential applicability to the WWMCCS organization and operations.

(3) To document the interrelationships among tactical command and control, strategic command and control, and management information systems, the Intelligence Data Handling System, and the WWMCCS.

b. Scope. (U) This task will study the relationships between new communications concepts, computer concepts and C&C concepts, such as the relationship among LDMX, AMPS, MEECN, WWMCCS, DCS, and NCS. It will specify communications, computers, and other facilities and equipment available in each area now and in the time-phased future to include physical location and routing, channels, vulnerability, flexibility, reliability, redundancy, and surge capacity. It will state requirements for the above now and in the time-phased future, taking into account the effect of new communications techniques, reporting systems, and requirements for All-Source Information Centers. It will study the interrelationships and interfaces among Tactical Command and Control Systems (TCCS), Strategic Command and Control Systems (SCCS), and management information systems of all Services and Unified Commands and the Intelligence Data Handling System (IDHS). Requirements for the establishment of essential elements of operational information, adequacy of data elements reported to support these requirements, redundancy, and types of information which flow in each system will be addressed. Efforts at standardization will be compiled and documented, and the status, sufficiency, and relevancy of such efforts will be analyzed.

c. Task Detail. (U)

Level of Effort: 5 man-years.

Duration: 12 months.

Starting Date: M + 12 months.

Responsible Organization: JCS/OSD.

Study: Define Concepts of Command and Control, and Establish Methodology for Measuring Performance and Cost. (Vols. VII, IX and X)

Task 1. Develop command and control concepts useful for the long-term development of the WWMCCS.*

a. Objective. (U) The objectives of this task are:

(1) To define the concept of C&C which has evolved within the WWMCCS and explore other conceptual approaches to C&C that might be employed.

(2) To review results of other studies on the management, organization, structure, data flow, equipment, and operational procedures relevant to the WWMCCS.

(3) To review the theory and models of management that have been used in business operations analogous to those within the WWMCCS, such as traffic management, data flow, etc.

(4) To develop detailed models and flow diagrams of the operational processes that appear within the WWMCCS.

(5) To explore models other than those which represent the WWMCCS and propose models of alternative arrangements that could satisfy the WWMCCS requirements and objectives.

*This task is not supported by any individual volume but rather is a conclusion of the full report.

b. Scope. (U) Concepts and models that are now used and others which have applications to the WWMCCS would be detailed sufficiently to be used in the subsequent tasks of this study.

c. Task Detail. (U)

Level of Effort: 3 man-years.

Duration: 12 months.

Starting Date: M + 12 months.

Responsible Organization: JCS.

Task 2. Develop comprehensive performance measures for the WWMCCS.*

a. Objectives. (U) The objectives of this task are:

(1) To develop measures of performance and means for implementing them in the WWMCCS according to the C&C concepts developed in Task 1 of this study.

(2) To review present measures of performance that are employed in the WWMCCS with the objective of improving the tools and the scientific tests, exercises, and other means of implementation that are used.

(3) To employ the model flow charts that are developed in Task 1 of this study for developing appropriate measures of performance that can be implemented in the WWMCCS. These measures should be selected to be applicable over the spectrum from normal conditions to limited war operations, which have been ignored in the past.

(4) To develop tools of measurement for the particular selected measures. In particular, explore tools that can be used to measure factors and characteristics of the WWMCCS that are now not measured,

*See Vol. X.

including, e.g., the use of surveys to determine the understanding of rules of engagement at the lower levels of C&C.

(5) To develop proposals for the implementation of the selected measures for nonstrategic nuclear war including specific disciplines of and procedures for tests and experiments with which to implement the measures.

b. Scope. (U) This task will be concerned with developing selected measures and tools to be used in measuring quality and efficiency of performance of personnel, equipment, and procedures used by the WWMCCS. Insofar as possible, there will be explored measures of the effectiveness that relate internal operations of the WWMCCS to its outputs: support for commanders' decision making and control of forces.

c. Task Detail. (U)

Level of Effort: 3 man-years.

Duration: 9 months.

Starting Date: M + 18 months.

Responsible Organization: JCS.

Task 3. Determine methods to measure the utility of information processed*

a. Objectives. (U) The objectives of this task are:

(1) To develop measures of the utility of information elements based on the uses made of the information and the degree to which the processing of that information maintains the relationship between use for command and control and events in the external world.

*See Vol. VII.

(2) To develop measures of potential value, that is, to define new command and control uses for the information (e.g., through the use of scenarios) and develop value measures, e.g., by comparing the reported information with "ground truth."

b. Scope. (U) This task will address both present and potential uses of information elements in the structured reporting systems. Insofar as possible this task will consider all reporting systems, including the WWMCCS systems such as JRS and those of other DoD agencies and the Services.

c. Task Detail. (U)

Level of Effort: 4 man-years.

Duration: 12 months.

Starting Date: M + 24 months.

Responsible Organization: JCS.

Task 4. Develop methodology to estimate costs of reporting.*

a. Objectives. (U) The objectives of this task are:

(1) To develop a practical method for costing an existing reporting system (to include the cost of a data element and of a report) and determining its value to defense purposes.

(2) To provide a technique to estimate the cost of new reporting systems and the costs of modifications to present systems as against their utility.

b. Scope. (U) This task should be concerned with developing methodology as well as with applying that methodology to existing reports. It will address the overall cost of reporting systems and of a single report and the incremental costs of a

*See Vol. VII.

data element. It will also consider the distributed nature of the costs and the fact that the capacity of the system tends to increase in large jumps. The costs of developing the reporting system, its promulgation, its operation, its maintenance, and its modifications will be included. Costs considered will include those of administration, communications, equipment (such as computers), facilities, and personnel.

c. Task Detail. (U)

Level of Effort: 3 man-years.

Duration: 9 months.

Starting Date: M + 27 months.

Responsible Organization: JCS/OSD.

Task 5. Determine the feasibility of relating alternative command and control concepts, procedures, and facilities to the effectiveness of strategic forces.*

a. Objectives. (S) The objectives of this task are:

(1) To evaluate the feasibility of modeling or otherwise quantitatively relating the effectiveness of C&C to strategic nuclear warfare operations and national policy objectives.

(2) To investigate the comparative utility of levels of investment in support of improvements in C&C for strategic nuclear applications.

(3) To develop analytical tools that would provide a basis for examining possible denial of SIOP options resulting from C&C system deterioration in a nuclear environment.

b. Scope. (S) Analytical methods to be studied shall be those that attempt to be sensitive to the following factors:

*See Vol. IX.

- [ ] of the existing or programmed U.S. strategic weapon systems
- [ ]
- Effects of a heavily degraded U.S. C&C system, e.g., loss of connectivity, message delay, uncertain status, etc.
- [ ]

c. Task Detail. (U)

Level of Effort: 10 man-years.

Duration: 18 months.

Starting Date: M + 18 months.

Responsible Organization: JCS/OSD.

APPENDIX

WSEG TASK ORDER

OFFICE OF THE DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING
WEAPONS SYSTEMS EVALUATION GROUP
WASHINGTON, D C 20305

Log No 145 014

8 DEC 1969

TASK ORDER
No. DAHC15 67 C 0012-T-156

1. (U) In accordance with Article IV of Defense Contract No. DAHC 15 67 C0012, this Task Order is for work to be performed by the Institute for Defense Analyses under WSEG Study Contract.

2. (C) REFERENCES

a. By CM-2019-66, dated 23 December 1966, subject: WSEG Support of Joint Chiefs of Staff for Command and Control (U), WSEG was tasked with a continuing study effort to assist the Joint Chiefs of Staff (JCS) in improving the capabilities and performance of the National Military Command System (NMCS) in support of the requirements of the National Command Authorities (NCA).

b. By DJSM-1812-69 dated 29 November 1969, subject: WSEG Support of the Joint Chiefs of Staff for Worldwide Military Command and Control System (WWMCCS), WSEG was directed to expand the study task to assist the JCS in insuring improvements in the performance and capabilities of the entire World-wide Military Command and Control System (WWMCCS), to support requirements of the chain of command from the NCA down, to include component commanders of the Unified and Specified Commands, and such contingency commands as may be established.

3. (C) STUDY TASK. Under this task order, IDA will undertake a study to assist WSEG in meeting the objectives of the directive cited in paragraph 2b above.

a. Objective I: Identify the major problem areas within the WWMCCS including, but not limited to, functional concepts, organization, procedures, quantity and quality of data flow, and technical adequacy of supporting equipment and systems.

b. Objective II: Recommend a time-phased study program designed to assist in solving these major problem areas, including recommendations for priority of effort.

4. (U) STUDY SCHEDULE. As the first step in processing this study, it is requested that a study plan, and possible alternatives, to accomplish Objectives I and II be prepared and submitted to WSEG by 16 February 1970.

a. Study of the organization, mission, and functions of the WWMCCS, and preliminary exploration of potential problem areas, may be pertinent during this initial period. However, substantive work on Objectives I and II will only be undertaken after one of the required alternative study plans has been selected.

b. Each alternative study plan should include time and cost estimates as well as other resource requirements; e.g., whether the study will be done in-house by IDA or whether other contractors or agencies will be involved. Study plans could range in scope from a STRAT-X type effort, requiring input and/or assistance from numerous activities external to IDA, to a simple two-man in-house effort involving basically research of available documentation. All study plans, however, must provide for consideration of the entire WWMCCS.

5. (U) COORDINATION

Close coordination with the Joint Staff, JCS and other agencies of the Department of Defense will be necessary throughout the period of this study. As requested by IDA, WSEG personnel assigned to the study will make arrangements for access to Defense information, agencies and personnel needed for the efficient prosecution of the study. Changes in the task, such as changes in the scope or thrust of effort will be made only after written approval of the Director, WSEG.

6. (U) LEVEL OF EFFORT

A level of effort of 10 man-months is authorized for the initial period to develop a study plan and alternates. Additional manpower and resources required to complete the study will be determined by the study plan selected from among the alternates submitted.

7. (U) MILITARY PARTICIPATION

Colonel Blaine O. Vogt, USA, is assigned to the study and is the WSEG military point of contact. The Director, WSEG, may assign other military participants as the needs of the project dictate.

8. (U) SPECIFIC ADMINISTRATIVE INSTRUCTIONS AND LIMITATIONS

a. IDA will submit alternative study plans 16 February 1970 and be prepared to brief WSEG and the Joint Staff.

b. If at any time during the course of the study, IDA identifies the need for additional resources for completion, a report will be furnished the Director, WSEG, in accordance with the terms of the existing IDA/WSEG Memorandum of Understanding dated 15 July 1969.

c. This study will be conducted under Industrial Security Procedures in the IDA area. However, certain portions of the study may require the use of sensitive information which must be controlled under military security in the WSEG area.

d. The Director, WSEG, in conjunction with IDA, will designate those sensitive study areas which must be controlled under military security.

9. (U) STUDY TITLE

The title of this study is Command, Control, and Communications Problems. Short Title: C^3 Problems.

ARTHUR W. OBERBECK
Lieutenant General, USA
Director

ACCEPTED
ALEXANDER H. FLAX
President, Institute for Defense Analyses

DATE December 8, 1969

GROUP-4
Downgraded at 3 year intervals; declassified after 12 years

OFFICE OF THE DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING
WEAPONS SYSTEMS EVALUATION GROUP
WASHINGTON, D C 20305

23 FEB 1970

MEMORANDUM FOR PRESIDENT, INSTITUTE FOR DEFENSE ANALYSES

SUBJECT: Continuation of "C^3 Problems" Study

References:
a. Task Order DAHC15 67 C 0012-T-156, 8 December 1969
b. IDA Study S-362, Study Plans for Command, Control and Communications Problems (U), February 1970

Except for a briefing to be presented to the Joint Staff, IDA has completed the study plan phase of Reference a. The purpose of this letter is to authorize continuation of the study.

The "Suggested Study Approach" described in Section IV of Reference b. has been selected as the most reasonable of the alternatives offered. Accordingly, paragraph 6 of Reference a. is amended to authorize an additional 97 man-months of professional effort to complete the study tasks under this approach. IDA will submit a final report by 1 February 1971, and be prepared to brief WSEG and the Joint Staff on the study results.

ARTHUR W. OBERBECK
Lieutenant General, USA
Director