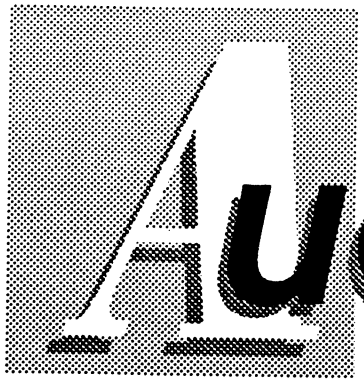

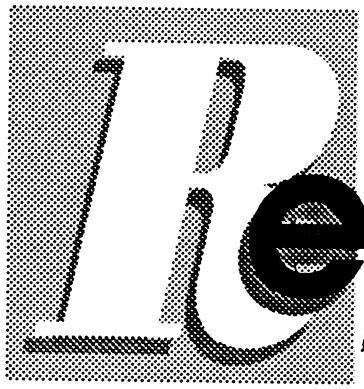

OFFICE OF THE INSPECTOR GENERAL

MANAGEMENT OF THE GLOBAL COMMAND AND CONTROL SYSTEM

Report No. 95-201

May 24, 1995

Department of Defense

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Acronyms

ADP	Automated Data Processing
ASD(C^3I)	Assistant Secretary of Defense (Command, Control, Communications, and Intelligence)
C^4I	Command, Control, Communications, Computers, and Intelligence
DISA	Defense Information Systems Agency
GCCS	Global Command and Control System
WAM	World Wide Military Command and Control System Automated Data Processing Modernization
WWMCCS	World Wide Military Command and Control System

INSPECTOR GENERAL
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Report No. 95-201

May 24, 1995

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

SUBJECT: Audit Report on Management of the Global Command and Control System (Project No. 5RD-0002)

This report is provided for your information and use. It consolidates audit results issued in a draft report under Project No. 5RD-0002 and a supplemental draft quick-reaction report, "Acquisition of Computer Equipment for the Global Command and Control System," Project No. 4RE-0071.01.

Comments on this consolidated report conformed to the requirements of DoD Directive 7650.3 and left no unresolved issues. Therefore, no additional comments are required.

We appreciate the courtesies extended to the audit staff. Questions on the audit should be directed to Mr. Robert Murrell, Audit Program Director, at (703) 604-9507 (DSN 664-9507). See Appendix D for the report distribution. The audit team members are listed inside the back cover.

Robert J. Lieberman
Assistant Inspector General
for Auditing

Office of the Inspector General, DoD

Report No. 95-201
(Project No. 5RD-0002)

May 24, 1995

Management of the Global Command and Control System

Executive Summary

Introduction. Global Command and Control System (GCCS) software version 2.0 was planned for installation in March 1995 without adequate testing to verify that it was operational. The GCCS is an integral part of the implementation of the Command, Control, Communications, Computers, and Intelligence (C^4I) for the Warrior.* The GCCS is the planned DoD-wide system for the command and control function for the unified commands and the Army, Navy, Air Force, and Marine Corps, and will replace the World Wide Military Command and Control System.

Objectives. The announced audit objective was to evaluate the effectiveness of the C^4I for the Warrior concept in achieving joint interoperability. Specifically, we evaluated the GCCS program because it implements the command and control segment of the C^4I for the Warrior concept. We also evaluated the effectiveness of management controls for the GCCS program.

Audit Results. The Assistant Secretary of Defense (Command, Control, Communications and Intelligence) and the Director, Joint Staff, need to strengthen controls over the GCCS program to decrease the high-level risk associated with an evolutionary acquisition strategy. Because of the lack of effective controls, the Defense Information Systems Agency installed GCCS software versions 1.0 and 1.1 that were not fully functional. In addition, the unified commands had limited assurance that future GCCS software will meet user requirements, will effectively replace the critical functions of the World Wide Military Command and Control System within reasonable resource and time constraints, or will be adequately supported when fully operational. See the finding in Part II for details.

The lack of GCCS program controls to effectively plan for or manage the GCCS program constituted material management control weaknesses. All recommendations, if implemented, will result in better management of the GCCS program and the ability to plan for the future installation, operation, and sustainment of the GCCS (see Appendix B). Part I describes the management controls reviewed, and the finding in Part II discusses the weaknesses in detail.

Summary of Recommendations. We recommend the following actions for the GCCS: designating it a formal acquisition program with centralized management, performing a Major Automated Information Systems Review Council review, validating the Mission Needs Statement, identifying baseline user requirements and obtaining their approval, establishing a process to define and refine functionalities common to the unified commands, preparing an acquisition strategy and plan, limiting computer equipment procurements to needed initial operational capability, establishing

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*The C4I for the Warrior will be an integrated network of existing command and control systems that will provide complete tactical information to the warfighter.

program baselines, preparing an Integrated Logistical Support Plan, completing architectural plans, and preparing and obtaining approval for a Test and Evaluation Master Plan.

Management Comments. The Assistant Secretary of Defense (Command, Control, Communications and Intelligence) concurred with the finding and the revised recommendations. The consolidated response reflects comments from the Director, Defense Information Systems Agency, and the Director, Joint Staff. The Assistant Secretary of Defense (Command, Control, Communications and Intelligence) stated that efforts to implement the recommended management controls continue as GCCS evolves past its initial operational capability. A complete discussion of management comments and audit responses is in Part II, and the complete text of the comments is in Part IV.

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Part I - Introduction

Background

The Concept of the Command, Control, Communications, Computers and Intelligence for the Warrior. The Command, Control, Communications, Computers, and Intelligence (C^4I) for the Warrior will be an integrated network of existing command and control systems that will provide complete tactical information to the warfighter. The Joint Staff; the Assistant Secretary of Defense (Command, Control, Communications and Intelligence) (ASD[C^3I]); and the Defense Information Systems Agency (DISA) developed the Global Command and Control System (GCCS) as the DoD system for command and control to initiate implementation of the C^4I for the Warrior concept and to replace some functionalities of the World Wide Military Command and Control System (WWMCCS).

World Wide Military Command and Control System. The WWMCCS was established as a global command and control system and has been in existence since the 1960's. The WWMCCS provides secure communications to transmit tactical warning and intelligence information to the President and the Secretary of Defense and to provide direction from them to the U.S. combatant commanders. WWMCCS also supports the automated data processing (ADP) portion of the Joint Operational Planning and Execution System. The Joint Operational Planning and Execution System provides policies and procedures for both deliberate and crisis planning that supports the Joint Staff, Military Departments, supported and supporting commanders, their components, and appropriate Defense agencies. The WWMCCS ADP capability is based on proprietary mainframe technology and, therefore, lacks the flexibility available in more modern ADP systems.

WWMCCS ADP Modernization Program. The DoD made many efforts to improve WWMCCS operations. From FY 1982 through FY 1991, the DoD spent about $1 billion to modernize and improve the WWMCCS. The most recent effort was the WWMCCS ADP Modernization Program (WAM). The WAM program was terminated in September 1992 because of problems, including high costs, schedule slippage, and obsolete hardware. In addition, the WAM system failed to meet user requirements. On December 5, 1992, Program Budget Decision No. 255 redirected WAM funding to the Joint Staff for development of a WWMCCS follow-on system. The GCCS is being developed as that follow-on system. The GCCS differs in one respect from WWMCCS in that the GCCS uses a commercially-based, open-system,[1] client-server environment instead of a proprietary mainframe environment. The DISA will use client-server equipment to attain initial operational capability of the GCCS, scheduled for September 30, 1995, at 37 sites.

[1]A system that conforms to standards for commercial hardware and software.

DoD-Wide Command and Control System. In December 1993, the Office of the ASD(C^3I) designated the GCCS as the migration system[2] for command and control functions for all the unified commands and DoD Components. The GCCS program goals and objectives are to provide the warfighter:

o real-time information for a range of functions to plan, execute, and manage military operations;

o the ability to respond to and coordinate with the DoD Components and within a DoD Component and from the National Command Authority to the tactical commander in successfully completing a mission;

o accurate, up-to-date, operational data and a consistent, complete, realistic, and graphical representation of the warfighter's area of responsibility; and

o a replacement for some functionalities of WWMCCS that has updated technology and added functionality.

Management Structure of the GCCS. The Chairman, Joint Chiefs of Staff, and the ASD(C^3I) provide policy guidance and oversight of the GCCS. The Director for Operations, Joint Staff, exercises operational control over the GCCS. The Director for Command, Control, Communications, and Computers, Joint Staff, provides technical control for the GCCS. The DISA manages the GCCS and implements the GCCS program for the Joint Staff.

Guidance on Software Development and Acquisition. DoD Directive 8120.1 "Life-Cycle Management of Automated Information Systems," January 14, 1993, and DoD Instruction 8120.2, "Automated Information System Life-Cycle Management Process, Review, and Milestone Approval Procedures," January 14, 1993, establish policy, guidance, and responsibilities for DoD software development and acquisition. DoD Directive 8120.1 requires that the acquisition of all automated information systems be managed as consistently as possible with DoD Directive 5000.1, "Defense Acquisition," February 23, 1991, and DoD Instruction 5000.2, "Defense Acquisition Policies and Procedures," February 23, 1991. DoD Directive 5000.1 establishes policy for the acquisition of systems and materiel that satisfy the operational user's needs. DoD Instruction 5000.2 provides policies and procedures for the management of acquisition programs.

[2]An existing automated information system, or planned and approved system, officially designated as the single system to support functional processes on a DoD-wide basis.

Objective

The announced audit objective was to evaluate the effectiveness of the C^4I for the Warrior concept in achieving joint interoperability. Specifically, we evaluated the GCCS program because it implements the command and control segment of the C^4I for the Warrior concept. We also evaluated the effectiveness of management controls for the GCCS program.

Scope and Methodology

Audit Scope and Methodology. We reviewed draft planning documentation, dated from May 1992 to February 1995, for the development, acquisition, and sustainment[3] of the GCCS program. We interviewed personnel in the offices of the ASD(C^3I), the Joint Staff, the U.S. European Command and its subordinate commands, the U.S. Pacific Command and its subordinate commands, the headquarters of the Military Departments, and the DISA to determine program management responsibilities for the GCCS program. A software engineer from the Technical Assessment Division, Inspector General, DoD, assisted the audit team in evaluating GCCS program documentation. We did not use computer-processed data or statistical sampling procedures to perform this audit.

Auditing Period and Standards. We performed this program results audit from October 1994 through April 1995. The audit was performed in accordance with auditing standards issued by the Comptroller General of the United States as implemented by the Inspector General, DoD. A list of organizations visited or contacted is in Appendix C.

Management Control Program

DoD Directive 5010.38, "Internal Management Control Program," April 14, 1987, requires DoD organizations to implement a comprehensive system of management controls that provides reasonable assurance that programs are operating as intended and to evaluate the adequacy of the controls.

Scope of Review of Management Control Program. We evaluated management controls over the planning for the development, acquisition, and sustainment of the GCCS program. DoD Directive 8120.1 and DoD

[3]The provision of personnel, logistics, and other support required to maintain and prolong operations until successful accomplishment or revision of the mission.

Instruction 8120.2 specify the controls and procedures applicable to the planning for the development, acquisition, and sustainment of an automated information system.

Adequacy of Management Controls. We identified previously unreported material management control weaknesses, in that the ASD(C^3I), Joint Staff and DISA did not establish adequate management controls to:

o manage the cost, schedule, and performance of the GCCS program;

o successfully install the GCCS software in the open-system environment at the unified commands; and

o provide for the sustainment of the GCCS program once the GCCS software was operational.

Part II of this report discusses the material management control weaknesses in detail.

Adequacy of Management's Self-Evaluation. We did not evaluate management's self-evaluation of applicable management controls.

Recommendations Relating to Management Controls. All recommendations in this report, if implemented, will correct the material weaknesses. Implementation of the recommendations will provide more effective and efficient management of the GCCS program and the ability to plan for the future operation and sustainment of the GCCS (see Appendix B). We could not determine the potential monetary benefits to be realized from implementing the recommendations. A copy of this report will be provided to the senior official responsible for management controls in the Office of the Secretary of Defense.

Prior Audits and Other Reviews

In the past 5 years, neither the Inspector General, DoD, nor the General Accounting Office performed audits that directly relate to the implementation of the GCCS program.

Part II - Finding and Recommendations

Program Management of the Global Command and Control System

The Assistant Secretary of Defense (Command, Control, Communications, and Intelligence), and the Director, Joint Staff, need to strengthen controls over the GCCS program to decrease the high level of risk associated with an evolutionary acquisition strategy. The ASD(C^3I) has not designated the GCCS as a formal acquisition program with a central manager with overall responsibility, the Joint Staff has not finalized operational requirements, and DISA has not developed an acquisition strategy for the GCCS program. As a result, DISA installed GCCS software versions 1.0 and 1.1 (see Appendix A), which were not fully functional. In addition, the unified commands have no assurance that future GCCS software will meet user requirements, will effectively replace the critical functions of the WWMCCS, or will be adequately supported when fully operational.

Background

A December 1993 memorandum to the DoD Comptroller, (now the Under Secretary of Defense [Comptroller]) from the ASD(C^3I) states "it is imperative to legitimize GCCS in the budget process, even though GCCS is still evolving and specific funding requirements are being developed." In January 1994, the Principal Deputy, Under Secretary of Defense (Comptroller), retitled the WWMCCS budget program element to "WWMCCS/GCCS." In August 1994, the GCCS program was designated a major automated information system with oversight to be provided by the Major Automated Information Systems Review Council. Further, the ASD(C^3I) directed that the functions of the GCCS Joint Operational Planning and Execution System be operational by September 30, 1995, and that the WWMCCS program be terminated on September 30, 1995. The September date was based on the expiration of the WWMCCS support contract, which costs about $78.6 million annually.

The Joint Staff issued a policy statement, stating WWMCCS will not be terminated until all user requirements can be satisfied by the GCCS. A 90-day operational user test will take place for GCCS software version 2.X. (beta) in order to work out flaws and to ensure that all user requirements are met so that the WWMCCS can be terminated. If the GCCS software fails to meet the criteria of the operational user test, a contingency plan is in place to continue using WWMCCS until the GCCS is operational.

Management and Oversight

Current GCCS Program Management Structure. Various working groups and boards manage the GCCS program. The Chairman, Joint Chiefs of Staff, Instruction 6721.01, "Global Command and Control Management Structure," February 1995, outlines the GCCS management structure as a "bottom up" approach. The bottom layer consists of 10 functional working groups and a systems integration working group that develop functional area requirements and transition plans and identify applications from existing command and control systems to satisfy those requirements. The working groups submit recommendations and proposals to the GCCS Review Board for approval.

The GCCS Review Board. The GCCS Review Board consolidates, validates, and directs the implementation of GCCS requirements, including review of DISA funding expenditures, implementation plans, and applications from existing command and control systems. The Review Board also provides direction to and oversight for the functional area and systems integration working groups.

The General Officer Flag Officer Advisory Board. Approval authority over the GCCS Review Board is vested in the GCCS General Officer Flag Officer Advisory Board (Advisory Board), which has final approval over the functional area and systems integration working groups. The Advisory Board advises the Director for Operations, Joint Staff, on priority and execution of GCCS requirements, policy, and development and implementation plans.

Joint Staff as the Office of Primary Responsibility. The Director for Operations, Joint Staff, has primary responsibility for development of the GCCS concept of operations, policy, and functional requirements. The Director for Command, Control, Communications, and Computer Systems, Joint Staff, provides technical oversight for command, control, communications, and computer systems.

DISA as the Manager for the GCCS. The DISA is the project manager for the GCCS and will implement the GCCS program. The DISA Migration Director is responsible for managing the development, integration, configuration management, installation, and coordination of the integration of hardware, software, and communications equipment for the GCCS.

Program Management for GCCS. DoD Directive 8120.1 requires streamlining of the automated information systems life-cycle process by minimizing a layered management structure to include a chain of authority and accountability for program management. Program direction and control provided by the chain of authority include all matters pertaining to cost, schedule, performance, and program funds. Boards, councils, or committees have no authority and thus cannot issue program direction, but could impede the orderly progression of programs through the acquisition process. Although DISA is the project manager for the GCCS, DISA is responsible only for implementation of the GCCS program. Implementation authority at DISA does not meet the criteria in DoD Directive 8120.1 for a program office to plan,

direct, and manage the GCCS program. Not designating centralized management to provide overall direction, authority, and control for the planning, development, and sustainment of the GCCS program contravenes DoD Directive 8120.1 requirements.

Policy and Oversight for the GCCS. The Chairman, Joint Chiefs of Staff, has the overall responsibility for policy guidance and oversight. The ASD(C^3I) also shares in that responsibility as the Milestone Decision Authority for all major automated information systems that are subject to oversight by the Major Automated Information Systems Review Council. The GCCS was designated a major automated information system in August 1994 and a Major Automated Information Systems Review Council in-process review was held at that time.

Evolutionary Acquisition of the GCCS

Guidance for Evolutionary Acquisitions. In March 1987, the Defense Systems Management College published guidelines entitled, "Joint Logistics Commanders Guidance for the Use of An Evolutionary Acquisition Strategy in Acquiring Command and Control Systems" (Guidance for Evolutionary Acquisition), on using an evolutionary acquisition approach to acquire command and control systems. That guidance was replaced in December 1993 by the Defense Systems Management College document, "Joint Logistics Commanders Guidance for Use of Evolutionary Acquisition Strategy to Acquire Weapons Systems." The December 1993 guidance defines an evolutionary acquisition as "a strategy for use when it is anticipated that achieving the desired overall capability will require the system to evolve during development, manufacture, or deployment." An evolutionary acquisition strategy incorporates all the latest technologies in the final production configuration and can be a high-risk approach if proper management controls are not implemented.

GCCS as an Evolutionary Acquisition Program. The draft GCCS Migration Strategy states that the Joint Staff and DISA will pursue an evolutionary acquisition approach for the GCCS. Officials in the Office of the ASD(C^3I) stated that because the GCCS program was designated an evolutionary acquisition program, the program was exempt from requirements in DoD Directive 8120.1 and DoD Instruction 8120.2. Nonetheless, the ASD(C^3I) designated the GCCS program a Major Automated Information Systems Review Council program in August 1994, subject to DoD Directive 8120.1 and DoD Instruction 8120.2. Estimated GCCS program costs totaled about $119 million in procurement funds and about $1.2 billion in operation and maintenance funds as stated in the Program Objective Memorandum for FY 1995 through FY 2001.

Evolutionary Acquisition-Requirements Definition

The underlying factor in an evolutionary acquisition is to quickly provide a well-defined core capability in response to a validated requirement. Once the core capability is installed, upgrades and changes are made as user requirements are refined. Designating an acquisition effort as an evolutionary acquisition program does not exempt that program from planning the development, acquisition, testing, and logistics needed to support the program.

Determining Requirements for the GCCS. The Joint Staff prepared a Mission Needs Statement, but the Joint Staff and unified commands had not validated it. As of February 28, 1995, the Joint Staff had not prepared an Operational Requirements Document,[4] specifying the GCCS operational baseline requirement. An Operational Requirements Document contains system performance criteria and minimum requirements that are derived from the Mission Needs Statement. As an alternative to an Operational Requirements Document, the Joint Staff drafted a GCCS Concept of Operations document. The GCCS Concept of Operations document lacked specific user's requirements and did not specify the operational baseline requirement; instead, the GCCS Concept of Operations discussed broad, GCCS requirements that mirrored current WWMCCS capabilities.

Requirements Analysis. A requirements analysis involves defining and specifying a complete set of baseline requirements. Establishing baseline requirements during a requirements analysis is a technique for controlling the development of a system through a formal management process for each function that satisfies user and interface requirements. Baseline requirements should also identify the completion of major milestone activities.

Command and Control Core Data Model. As an initial step in analyzing command and control requirements, the Joint Staff provided a command and control modeling document, "Command and Control Core Data Model," July 1, 1994. The modeling document discusses the minimum data required across all command and control lower-level functional areas and provides a common approach to describing tactical command and control informational needs. However, the data model did not specify unique user requirements at the unified command level and was never incorporated into a baseline requirement for the GCCS.

Evolutionary Acquisition-Acquisition Strategy

Planning the Development, Acquisition, and Sustainment of GCCS. The Joint Logistics Commanders Guidance for Use of Evolutionary Acquisition

[4]A formally agreed-to, written specification that serves for further development of a system.

Strategy to Acquire Weapons Systems requires that an acquisition strategy be developed and tailored to meet the unique circumstances of a program. Any exemptions from requirements in DoD Directive 8120.1 and DoD Instruction 8120.2 are to be identified in the acquisition strategy. Although DoD Directive 8120.1 allows for tailoring of the procurement procedures to fit the selected program strategy for the automated information system, the Directive requires that automated information systems be managed as consistently as possible in accordance with policies outlined in DoD Directive 5000.1 and DoD Instruction 5000.2.

Acquisition Strategy for GCCS. An overall acquisition strategy serves as the basis for formulating functional plans, such as the Acquisition Plan, Integrated Logistical Support Plan, and Test and Evaluation Master Plan for a program. As of February 28, 1995, an acquisition strategy was not developed and approved for the GCCS program even though hardware was in the process of being procured to support attaining GCCS initial operational capability. An acquisition strategy is the overall plan that a program manager follows for program execution from its initiation through postproduction support. The program manager is required to develop an acquisition strategy and to submit the strategy for approval. The program acquisition strategy identifies the program's entire life cycle and, once approved, the acquisition strategy serves as the contract between the program manager and higher management on how the program will be executed and what resources will be used for proper execution. The acquisition strategy also serves as the contract between the program manager and subordinate or supporting organizations on what is needed and expected from those organizations to execute the approved program. Officials from the Defense Acquisition Board confirmed that an acquisition strategy should have been developed for the GCCS as soon as the Joint Staff decided on an alternative solution to the WAM program. Without an acquisition strategy, the program manager cannot direct and control all elements of the GCCS acquisition, including functional plans to verify that specific goals and objectives of the program are satisfied.

Need for a Competitive Acquisition Strategy. GCCS program objectives and regulatory requirements necessitate a competitive acquisition strategy for computer equipment. A key GCCS program objective is to attain an open system architecture and environment that will operate across multiple computer equipment platforms. The GCCS will support mission-area software applications through a client-server environment that uses the UNIX[5] operating system. Also, as referenced by DoD Directive 8120.1; United States Code, title 10, section 2304; and the Federal Acquisition Regulation, the contracting officer is required to provide for full and open competition in soliciting offers and awarding Government contracts. However, the GCCS program does not have a competitive acquisition strategy that is needed to achieve an open system environment as the program evolves and to comply with regulatory requirements.

[5]A trademark of Bell Laboratories used for a general purpose, multiuser, interactive computer operating system written in the C programming language.

Evolutionary Acquisition-Acquisition Plan

An acquisition plan should be prepared by the program office to identify the technical, cost, and schedule risks as well as solutions to those risks so that program goals can be met. Additionally, the acquisition plan establishes the testing program for each of the major phases of the program and the logistical support required for the program over the life of the acquisition. As of February 28, 1995, an acquisition plan was not developed for the GCCS program. The Defense Federal Acquisition Regulation Supplement, part 207, "Acquisition Planning," requires that an acquisition plan be prepared when total costs of all contracts for a program are estimated at $15 million annually or at $30 million throughout the life of the program. The GCCS program meets the Defense Federal Acquisition Regulation Supplement criteria. Without an acquisition plan, program risks cannot be adequately assessed. Thus, unplanned risks could result in schedule slippages and additional costs to the program.

Evolutionary Acquisition-Program Baseline

The Joint Logistics Commanders Guidance for Use of Evolutionary Acquisition Strategy to Acquire Weapons Systems states that, unlike conventional acquisitions that are reviewed only a few times, an evolutionary acquisition is reviewed continuously throughout the program's development. Those reviews are to verify that the program remains within designated performance and dollar thresholds.

Establishing a Baseline for the GCCS Program. The DISA did not establish a program baseline for the GCCS program because the Joint Staff had not approved the GCCS operational requirement. DoD Instruction 7920.4, "Baselining of Automated Information Systems," March 21, 1988, requires that the program office develop program baselines for all major automated information systems. The Instruction states that program baselines should be used as a management technique in managing and controlling cost growth and schedule slippages. The program baseline document should include:

- a statement of prioritized functional needs;
- a statement of the program's capabilities and products to be provided, including required technical and operational characteristics, within the approved funding;
- an established schedule for completion and delivery of important program products, to include a schedule of completion of important events, such as milestone decisions and initial operating capabilities; and
- a stable funding profile of approved resources to satisfy the program's objectives within the established schedule.

Using the Program Baseline to Establish An Agreement with Executive Management. In accordance with DoD Instruction 7920.4, the program baseline establishes a formal agreement between the program participants and executive management. The program baseline agreement establishes a management control mechanism to verify that the program meets user requirements within resource constraints. Once that agreement has been signed by the program manager and, at a minimum, by the designated technical, fiscal, and functional executives, the program baseline agreement becomes the mechanism for managing the program's stability. When approved, the program baseline indicates an organizational commitment to support the program within specified resources and constraints. Because DISA had not established the program baseline, the DoD has no assurance that major program events will be met. Further, the risk of exceeding specified resource and funding constraints is increased, and the stability of the program is threatened.

Evolutionary Acquisition-Logistic Support

Integrated Logistics Support Plan. An Integrated Logistical Support Plan should be developed for each logistics support element. Those elements are maintenance, supply, support equipment, personnel, technical data, training and training support, computer resources support, facilities, transportation, and design parameters. As of February 28, 1995, DISA had not completed development of an Integrated Logistical Support Plan. Software must be maintained, or supported, until the GCCS program is terminated. DoD Directive 8120.1 and DoD Instruction 8120.2, by reference to DoD Directive 5000.1 and DoD Instruction 5000.2, require the development of an Integrated Logistical Support Plan during the early stages of development of a system.

Logistical Support for the GCCS. DISA had not finalized architectural plans to show the hardware, software, and connectivity needed for the GCCS. Consequently, the unified commands were unable to:

o determine what hardware should be in place upon initial installation of the GCCS;

o budget for the procurement of hardware and software licenses and maintenance of the GCCS;

o determine personnel staffing requirements for the GCCS;

o identify suitable training for user and technical personnel; and

o identify requirements for the GCCS maintenance contracts, hardware, and software.

The unified commands voiced significant concern over the lack of logistical support planning for the GCCS. Further, the unified commands were unable to

plan for supporting the GCCS after the expiration of the WWMCCS contract in September 1995.

Evolutionary Acquisition-Testing

Risks Associated with Terminating WWMCCS ADP. The goal of replacing some functionalities of WWMCCS with the GCCS as soon as possible may have significant associated risks. That goal must be weighed against the risk of errors in installed GCCS software. According to Air Force Software Guidelines, such errors often result when programs become schedule driven and quality is sacrificed for short-term gains. Events such as developmental[6] and operational[7] testing may be downsized or canceled to meet the schedule. There is substantial risk that DoD will be spending significant sums of money to correct or modify coding errors that could occur.

Test and Evaluation Master Plan. The Test and Evaluation Master Plan establishes the criteria for testing a system to verify that users' requirements are met. The Test and Evaluation Master Plan clearly outlines the planned developmental and operational tests and evaluation processes to include how test objectives are to be met and how the physical tests are to be conducted. The plan relates program schedule, test management strategy and structure, and required resources to:

- critical operational issues,
- critical technical parameters,
- minimum operational performance requirements,
- evaluation criteria, and
- milestone decision points.

In November 1994, DISA established a quality assurance group at the Joint Interoperability and Engineering Organization to develop a Test and Evaluation Master Plan, designate a developmental test facility, and perform developmental testing for the GCCS. However, as of February 28, 1995, DISA had not completed the Test and Evaluation Master Plan or designated a developmental test facility to perform developmental tests on the GCCS software. DoD Directive 8120.1 requires that developmental and operational testing be conducted in accordance with DoD Instruction 5000.2. DoD Instruction 5000.2

[6]Testing conducted to assist the engineering design and development process and to verify attainment of technical performance specifications and objectives.

[7]Testing conducted to estimate a system's operational effectiveness and suitability and to identify needed modifications and requirements.

requires that a Test and Evaluation Master Plan be prepared to outline the developmental and operational testing to be performed on the acquisition programs. DoD Instruction 8120.2 designates the Director, Operational Test and Evaluation, as the responsible official for approving the Test and Evaluation Master Plans and operational test plans. The Director, Operational Test and Evaluation, was briefed on the GCCS program by the Joint Interoperability Test Center in February 1995 and by the GCCS program manager in March 1995.

GCCS Developmental and Operational Testing. Although developmental and operational testing is required by DoD Instruction 8120.2, GCCS software versions 1.0 and 1.1 were installed at the unified commands without formal operational testing and evaluation. The Joint Logistics Commanders Guidance for Use of Evolutionary Acquisition Strategy to Acquire Weapons Systems requires that the developing organization perform developmental testing and that each of the Military Department independent operational test and evaluation organizations, in conjunction with the user, perform operational testing. The DISA, as the developing organization, did not perform adequate developmental testing on GCCS software versions 1.0 and 1.1 before the software was installed at the unified commands. DISA assisted the contractor in the installation of GCCS software versions 1.0 and 1.1; however, when DISA and the contractors left the unified commands, some of the software was no longer operational. As a result, some unified commands were unable to access the GCCS software and could not perform user assessments to verify that the system met their requirements.

Operating GCCS Software Versions 1.0 and 1.1 at the Unified Commands. Officials from the ASD(C^3I) confirmed that GCCS software versions 1.0 and 1.1 installed at the unified commands was not fully functional. Among the problems the unified commands encountered in accessing the GCCS software were the lack of installation instructions; GCCS software applications that conflicted with operating systems on the hardware; new GCCS hardware that was incompatible with preexisting hardware; unavailable required functions; and servers, workstations, and communications circuits that were insufficient to handle operational requirements. As a result, some unified commands were unable to perform user assessments on the GCCS in a real-world environment.

Testing for Each GCCS Increment. DoD Instruction 8120.2 states that regardless of the program strategy used, each automated information system will establish critical operational test criteria for use in evaluating the operational effectiveness and suitability of the automated information system. Further, a test plan is required for each automated information system program or increment. The GCCS is using an incremental development strategy which calls for a new software release, called blocks, each 6 months. Each block includes the mission area applications, the GCCS common operating environment, and accompanying computer equipment. Therefore, each block constitutes an increment towards the GCCS objective capability. The GCCS program manager should establish successful operational testing as exit criteria for each block.

Conclusion

Effective controls over a software-intensive program are critical to the program's success. The ASD(C^3I), Joint Staff, and DISA have made commendable efforts in developing the GCCS as the DoD-wide command and control system and in terminating the WWMCCS ADP. Although those efforts have greatly mitigated the risk of continued DoD use of antiquated hardware and software, several issues in the long-term planning for the GCCS need to be resolved. The long-term success of the GCCS program is contingent on defining overall and core requirements; identifying measurable means to track and evaluate milestones, costs, and schedules; developing an acquisition strategy to verify that all program goals are met; performing developmental and operational testing; and identifying logistical support requirements. Until those issues are clearly resolved, the GCCS program may fail to meet its ultimate objective of being the DoD migration system for command and control. In addition, maintaining the WWMCCS as a parallel command and control system until the GCCS is functional is a possibility.

Recommendations, Management Comments, and Audit Response

1. We recommend that the Assistant Secretary of Defense (Command, Control, Communications, and Intelligence):

a. Designate the Global Command and Control System as a formal acquisition program with centralized management in accordance with provisions of DoD Directive 8120.1, "Life-Cycle Management of Automated Information Systems," January 14, 1993.

b. Perform a Major Automated Information Systems Review Council review of the Global Command and Control System after documentation prescribed in Recommendations 2. and 3. (Mission Needs Statement, Operational Requirements Document, Acquisition Strategy and Plan, Program Baselines, Test and Evaluation Master Plan, and Integrated Logistical Support Plan) is completed.

2. We recommend that the Director, Joint Staff:

a. Validate the Mission Needs Statement for the Global Command and Control System.

b. Develop and obtain Chairman, Joint Chiefs of Staff, approval for a document that specifies baseline requirements for the Global Command and Control System.

c. Establish a long-term process for defining and continually refining the Global Command and Control System functionalities common to the unified commands.

3. We recommend that the Director, Defense Information Systems Agency;

a. Prepare and submit for approval to the Assistant Secretary of Defense (Command, Control, Communications and Intelligence) an acquisition strategy that includes a competitive acquisition strategy for the procurement of computer equipment subsequent to the initial operating capability date of the Global Command and Control System.

b. Limit the procurement of computer equipment to requirements needed to attain the initial operating capability of the Global Command and Control System at 37 World Wide Military Command and Control System sites to include World Wide Military Command and Control System ADP Modernization Program subordinate remote sites.

c. Prepare and submit for approval to the Senior Procurement Executive an acquisition plan that assesses technical, cost, and schedule risks of the Global Command and Control System.

d. Establish a program baseline for the Global Command and Control System to verify that it meets user requirements within designated performance and dollar thresholds.

e. Prepare an Integrated Logistical Support Plan for the unified commands to use in planning for the sustainment of the Global Command and Control System.

f. Complete architectural plans identifying all hardware, software, and connectivity required by the unified commands for the Global Command and Control System.

g. Prepare a Test and Evaluation Master Plan for the Global Command and Control System and submit the Test and Evaluation Master Plan to the Director, Operational Test and Evaluation, for approval.

ASD(C^3I) Comments. The ASD(C^3I) consolidated comments provided his response and the responses from the Director, DISA, and the Director, Joint Staff. The ASD(C^3I) concurred with the finding and the recommendations, described the actions to implement the recommended management controls, and provided completion dates for the recommended actions (see Part IV).

Part III - Additional Information

Appendix A. Expected Functions of GCCS Software

GCCS Software Version Number	Installation Date	GCCS Expected Function
Prototype	June 1993	The prototype demonstrated applications by producing the data from the Status of Resources and Training Systems and produced standard Defense Mapping Agency maps and charts using commercial-off-the-shelf hardware, software, and operating systems.
1.0	May 1994	Expected to perform all prototype functions and produce the tactical map, air tasking order, unit readiness report, sustainment plan, mobilization plan, and transportation plan.
1.1	September 1994	Expected to perform all version 1.0 functions, show the geographical locations of all organizations involved in the warfighting effort, and use the administration capabilities from the U.S. European Command Center System.
2.0	March 1995	Expected to perform all version 1.1 functions and provide the client server interface for the Joint Deployable Intelligence Support System, Theater-Level Analysis Replanning Graphical Execution Toolkit, Scheduling and Movement System, Automated Message Handling System, and selected Service-unique systems.
2.X. beta	July 1995	Expected to perform all version 2.0 functions, provide access to the integrated Joint Operational Planning and Execution System data bases, and provide required remaining WWMCCS functions and Service-unique applications.

GCCS Software Version Number	Installation Date	GCCS Expected Function
2.X. final	September 1995	Expected to perform all version 2.X. beta functions and perform required Joint Operational Planning and Execution System functions so that WWMCCS can be terminated.

Appendix B. Summary of Potential Benefits Resulting from Audit

Recommendation Reference	Description of Benefit	Type of Benefit
1.a.	Program Results, Compliance, and Management Controls. Improves effectiveness and efficiency by verifying that the GCCS program is managed in accordance with policies in DoD Directive 5000.1.	Undeterminable. The monetary benefits are undeterminable because the extent of program efficiencies that may result from designating a program executive officer have not yet been determined.
1.b.	Program Results and Management Controls. Improves effectiveness and efficiency by ensuring that the GCCS program has controls in place with management oversight.	Nonmonetary.
2.a.	Program Results and Management Controls. Increases effectiveness and efficiency by validating the requirements of the GCCS.	Undeterminable. The monetary benefits cannot be determined until the mission needs of the GCCS have been validated.
2.b.	Program Results and Management Controls. Increases effectiveness and efficiency by baselining the requirements for the GCCS.	Undeterminable. The monetary benefits cannot be determined until baseline operational requirements for the program are determined.
2.c.	Program Results and Management Controls. Increases effectiveness and efficiency by identifying and controlling future requirements for the GCCS.	Undeterminable. The monetary benefits cannot be determined until future requirements for the program are determined.

Recommendation Reference	Description of Benefit	Type of Benefit
3.a.	Program Results, and Management Controls. Improves effectiveness and efficiency of the GCCS program by planning the life cycle of the GCCS.	Undeterminable. The monetary benefits cannot be determined until an acquisition strategy for GCCS is developed to identify the program's life cycle.
3.b.	Program Results and Management Controls. Increases effectiveness and efficiency by ensuring that only needed computer equipment is procured.	Undeterminable. The monetary benefits are undeterminable because the amount of computer equipment needed is not known.
3.c.	Program Results and Management Controls. Increases effectiveness and efficiency by planning that operational requirements are met in the most effective, economical, and timely manner.	Undeterminable. The monetary benefits cannot be determined until an acquisition plan is developed to identify solutions to program risk.
3.d.	Program Results and Management Controls. Increases effectiveness and efficiency by providing milestones and funding limitations.	Nonmonetary.
3.e.	Program Results and Management Controls. Improves effectiveness and efficiency by providing information for logistical planning for the GCCS.	Undeterminable. The monetary benefits cannot be determined until an Integrated Logistics Support Plan is developed.
3.f.	Program Results and Management Controls. Improves effectiveness and efficiency of the GCCS by ensuring that all required equipment is on hand at installations.	Undeterminable. The monetary benefits are undeterminable because DISA had not yet determined the hardware, software, and connectivity required to support the GCCS.

Appendix B. Summary of Potential Benefits Resulting from Audit

Recommendation Reference	Description of Benefit	Type of Benefit
3.g.	Program Results and Management Controls. Increases effectiveness and efficiency by defining the criteria the GCCS must meet before being installed.	Nonmonetary.

Appendix C. Organizations Visited or Contacted

Office of the Secretary of Defense

Office of the Under Secretary of Defense for Acquisition and Technology, Washington, DC
Defense Science Board, Washington, DC
Office of the Under Secretary of Defense (Comptroller), Washington, DC
Investment Directorate, Washington, DC
Program and Financial Control Directorate, Washington, DC
Office of the Assistant Secretary of Defense (Command, Control, Communications, and Intelligence), Washington, DC

Joint Staff

Office of the Director, Operations (J-3), Washington, DC
Office of the Director, Logistics (J-4), Washington, DC
Office of the Director, Command, Control, and Communications (J-6), Washington, DC

Department of the Army

Director of Information Systems for Command, Control, Communications, and Computers, Washington, DC
U.S. Army, Europe, and Seventh Army, Campbell Barracks, Germany
U.S. Army, Pacific, Fort Shafter, HI
Eighth Army, Yongsan Garrison, Korea
1st Signal Brigade, U.S. Army Information Systems Command, Yongsan Garrison, Korea
307th Signal Battalion, Camp Carroll, Korea

Department of the Navy

Space and Naval Warfare Systems Command, Arlington, VA
U.S. Navy Europe, London, England
U.S. Pacific Fleet, Pearl Harbor, HI
Headquarters, U.S. Marine Corps, Arlington, VA
Marine Forces Pacific, Camp H.M. Smith, HI
1st Radio Battalion, Camp Kaneohe, HI

Department of the Air Force

Directorate of Architectures, Technology, and Interoperability, Office of the Deputy Chief of Staff for Command, Control, Communications, and Computers, Washington, DC
U.S. Air Forces, Europe, Ramstein Air Base, Germany
U.S. Pacific Air Forces, Hickam Air Force Base, HI
U.S. Air Forces, Korea, Osan Air Base, Korea
7th Air Operations Group, Osan Air Base, Korea
619th Air Control Squadron, Osan Air Base, Korea

Unified Commands

U.S. European Command, Patch Barracks, Germany
U.S. Pacific Command, Camp H.M. Smith, HI
U.S. Forces Korea, Yongsan Garrison, Korea
U.S. Special Operations Command
Special Operations Command, Pacific, Camp H.M. Smith, HI
Special Operations Command, Korea, Yongsan Garrison, Korea

Defense Agencies

Defense Information Systems Agency, Arlington, VA
Global Command and Control System Migration Center, Sterling, VA
Joint Interoperability and Engineering Organization, Sterling, VA
Center for Installation and Implementation, Sterling, VA
Defense Information Systems Agency, Europe, Patch Barracks, Germany
Defense Information Systems Agency, Pacific, Honolulu, HI
Defense Information Systems Agency, Korea, Yongsan Garrison, Korea
Defense Systems Management College, Fort Belvior, VA

Appendix D. Report Distribution

Office of the Secretary of Defense

Under Secretary of Defense for Acquisition and Technology
Under Secretary of Defense (Comptroller)
  Deputy Under Secretary of Defense (Comptroller/Management)
  Deputy Under Secretary of Defense (Comptroller/Program/Budget)
Assistant Secretary of Defense (Command, Control, Communications and Intelligence)
Assistant to the Secretary of Defense (Public Affairs)
Director, Joint Staff
Director, Defense Logistics Studies Information Exchange

Department of the Army

Auditor General, Department of the Army

Department of the Navy

Assistant Secretary of the Navy (Financial Management and Comptroller)
Auditor General, Department of the Navy

Department of the Air Force

Assistant Secretary of the Air Force (Financial Management and Comptroller)
Auditor General, Department of the Air Force

Unified Commands

Commander in Chief, U.S. European Command
Commander in Chief, U.S. Pacific Command
Commander in Chief, U.S. Atlantic Command
Commander in Chief, U.S. Southern Command
Commander in Chief, U.S. Central Command
Commander in Chief, U.S. Space Command
Commander in Chief, U.S. Special Operations Command
Commander in Chief, U.S. Transportation Command
Commander in Chief, U.S. Strategic Command

Defense Agencies

Director, Defense Contract Audit Agency
Director, Defense Information Systems Agency

Defense Agencies (cont'd)

Director, Defense Logistics Agency
Director, National Security Agency
Inspector General, National Security Agency
Inspector General, Central Imagery Office

Non-Defense Federal Organizations

Office of Management and Budget
Technical Information Center, National Security and International Affairs Division, General Accounting Office

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

Senate Committee on Appropriations
Senate Subcommittee on Defense, Committee on Appropriations
Senate Committee on Armed Services
Senate Committee on Commerce, Science, and Transportation
Senate Subcommittee on Communications, Committee on Commerce, Science, and Transportation
Senate Committee on Governmental Affairs
House Committee on Appropriations
House Subcommittee on National Security, Committee on Appropriations
House Committee on Commerce
House Subcommittee on Telecommunications and Finance, Committee on Commerce
House Committee on Government Reform and Oversight
House Subcommittee on National Security, International Affairs, and Criminal Justice, Committee on Government Reform and Oversight
House Committee on National Security

Part IV - Management Comments

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

ASSISTANT SECRETARY OF DEFENSE

6000 DEFENSE PENTAGON
WASHINGTON, DC 20301-6000

May 2, 1995

MEMORANDUM FOR INSPECTOR GENERAL OF THE DEPARTMENT OF DEFENSE

SUBJECT: Quick-Reaction Audit Report on the Management of the Global Command and Control System (Project No. 5RD-0002)

I have reviewed the subject report and concur with the recommendations contained in the report. We are continuing efforts to implement the management controls recommended in your report as we evolve GCCS past its initial operational capability (IOC). GCCS has been designated a program requiring oversight by the Major Automated Information System Review Council (MAISRC) under the auspices of DoD Directive 8120.1 and DoD Instruction 8120.2.

This memorandum reflects the comments of the Director, Defense Information Systems Agency, and the Director, Joint Staff, as well as my own. Specific actions which address the recommendations in the quick reaction are as follows:

- Recommendation 1a. Concur. I will designate a Central Management Authority/Senior Procurement Executive for GCCS in writing by May 31, 1995.

- Recommendation 1b. Concur. An action officer review of the available documentation for GCCS is scheduled for May 2, 1995, in preparation for an appropriate milestone level MAISRC review to be held in the first quarter of FY 1996.

- Recommendation 2a. Concur. The Joint Staff has developed a Mission Need Statement for GCCS and estimates that it will be validated by May 12, 1995.

- Recommendation 2b. Concur. The Joint Staff is working on a concept of operations (CONOPS) for GCCS and estimates that it will be approved by July 31, 1995. The CONOPS will include more specific baseline requirements.

- Recommendation 2c. Concur. The Joint Staff has established a process for defining the GCCS functionalities. Currently, various working groups and data modeling efforts identify functionality. Additional modeling at various CINCs is taking place under the direction of my staff. The Joint Staff will review the OSD directed business models to determine if GCCS functionality can be improved through their application.

- Recommendation 3a. Concur. DISA will prepare and submit for approval an acquisition strategy that includes a competitive acquisition strategy for the procurement of computer equipment subsequent to the initial operating capability date of the Global Command and Control System within 60 days of receiving an approved Mission Need Statement and Concept of Operations.

- Recommendation 3b. Concur. DISA will limit the procurement of computer equipment to requirements needed to attain the initial operating capability of the GCCS at 37 Worldwide Military Command and Control System (WWMCCS) sites to include WWMCCS Automated Data Processing Modernization Program subordinate/remote sites.

- Recommendation 3c. Concur. DISA will prepare and submit for approval to the Senior Procurement Executive an acquisition plan that assesses technical, cost and schedule risks of the GCCS within 30 days of receiving approval for the Acquisition Strategy.

- Recommendation 3d. Concur. DISA will establish a program baseline for the GCCS to verify that it meets user requirements within designated performance and dollar thresholds within 90 days of receiving an approved Mission Need Statement and CONOPS.

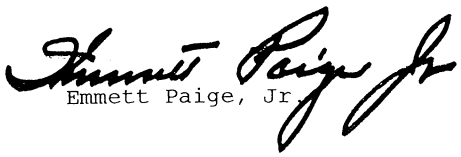
- Recommendation 3e. Concur. DISA will prepare an Integrated Logistical Support Plan for the unified commands to use in planning for the sustainment of the GCCS by August 31, 1995.

- Recommendation 3f. Concur. DISA will complete architectural plans identifying all hardware, software, and connectivity required by the unified

commands for the GCCS prior to the commencement of the Joint Staff sponsored 90 day user assessment.

- Recommendation 3g. Concur. DISA and the Director, Operational Test and Evaluation, have agreed that the appropriate document to describe operational and development testing for GCCS is an Operational Evaluation Master Plan (OEMP) in lieu of the Test and Evaluation Master Plan. DISA will prepare the OEMP for GCCS and submit it for approval to the Director, Operational Test and Evaluation, prior to commencement of the Operational Test and Evaluation which will run concurrently with the Joint Staff sponsored 90 day user assessment.

I appreciate the efforts of your staff to review the GCCS program and work cooperatively toward strengthening the implementation of the Department's objective command and control system. My point of contact for this action is Colonel Dave Dick who is assigned to the office of the Deputy Assistant Secretary of Defense for Command, Control and Communications, telephone 697-7270.



Emmett Paige, Jr.

cc:
Director, DISA
Director, Joint Staff

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This report was produced by the Readiness and Operational Support Directorate, Office of the Assistant Inspector General for Auditing, DoD.

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