United States General Accounting Office

Report to the Chairman, Subcommittee on Defense, Committee on Appropriations, House of Representatives

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BATTLEFIELD AUTOMATION

Planned Production Decision for Army Control System Is Premature

O NSIAD-92-151

GAO

United States
General Accounting Office
Washington, D.C. 20548

National Security and
International Affairs Division

B-247643

August 10, 1992

The Honorable John P. Murtha
Chairman, Subcommittee on Defense
Committee on Appropriations
House of Representatives

Dear Mr. Chairman:

This report addresses the Army's strategy for testing and procuring the Army Tactical Command and Control System.

As you requested, we plan no further distribution of this report until 10 days after its issue date, unless you publicly announce its contents earlier. At that time, we will send copies to the Secretary of Defense; the Secretaries of the Army, the Navy, and the Air Force; appropriate congressional committees; and other interested parties.

Please contact me on (202) 275-4841 if you or your staff have any questions concerning this report. The major contributors to this report are listed in appendix II.

Sincerely yours,

Louis J. Rodrigues
Director, Command, Control, Communications
and Intelligence Issues

Executive Summary

Purpose

The Chairman of the Subcommittee on Defense, House Committee on Appropriations, asked GAO to review the Army's approach to testing the over $15 billion in systems that will automate battlefield command, control, and communications. (This amount excludes the acquisition cost estimate for the intelligence electronic warfare system—All Source Analysis System—that is classified.) The Subcommittee was interested in determining if the testing would be sufficient to ensure that the Army Tactical Command and Control System (ATCCS) will meet its military mission before the Army initiates acquisition of common hardware and software for the command and control segments.

Background

The ATCCS program, initiated in fiscal year 1986, is the Army's comprehensive approach to automating its tactical command and control systems and improving its communications capabilities. This effort is designed to enhance the coordination and control of combat forces through automated management of five key battlefield functional areas: maneuver control, forward area air defense, combat service support, tactical intelligence, and field artillery. ATCCS is comprised of five command and control segments, three communications segments, and one Common Hardware and Software segment to provide computer commonality. The ATCCS objective is to provide battlefield commanders an automated means to synchronize the forces. The ability of ATCCS segments to automatically exchange data is critical to ATCCS's ability to satisfy requirements and demonstrate military effectiveness.

Results in Brief

The Army will initiate procurement of ATCCS computers based on the May 1993 operational test of one of the five segments—the Maneuver Control System (MCS). Consequently, the Army will commit to the ATCCS equipment production, which could cost $1.8 billion, before testing whether all five ATCCS segments will work together as intended. Also, the communications segments being designed and developed to exchange ATCCS data automatically will not be available for the May 1993 test.

The ATCCS acquisition strategy conflicts with congressional guidance that states ATCCS is to be tested as an integrated system of systems. In addition, Senate Committee on Armed Services guidance calls on the services to take time to develop weapon systems right the first time. By delaying operational testing, the Army could follow congressional guidance, reduce procurement risk and support costs, and correct deficiencies that GAO identified in the planned tests.

ıcipal Findings

ıned ATCCS Production ision Is Premature

The Army's current ATCCS acquisition strategy will result in a premature production decision. The Army plans to make a production decision on common hardware and software based on the May 1993 testing of one of the five ATCCS segments—MCS. However, the May 1993 test will not demonstrate the primary requirement of automated data exchange among all segments, and the communications equipment being developed to handle the volume of data generated by ATCCS will not be available for the test. The first test of automated data exchange is planned for 1994. All testing until then will require a manual interchange between control segments and the use of less capable data transmission devices. Even so, the 1993 test will be the basis for committing to the ATCCS program that includes about $1.8 billion in common hardware and related equipment production for all five control segments.

S Test Premature

GAO found that because the Army compressed the MCS test schedule, several problems will occur. For example, Army unit personnel involved in the test will have very little time to learn how to use and refine the control system's capabilities and then integrate these capabilities into their standard operating procedures. Also, the Army is planning to follow the unorthodox approach of negotiating with the contractor on how much software can be completed in time for the test.

To adhere to a tight test schedule, the Army has deferred numerous system functions from the test software. Some of them are needed to meet requirements. Also, the Army will conduct the test using interim equipment—a battalion terminal and a communications interface device—the users find unacceptable.

GAO also found the acquisition strategy results in the procurement of two versions of common computers. Once fielded, a logistical support package must be developed and maintained for each version. Army data show that fielding a single version results in reducing not only the spare parts inventory but also holding costs. Further, the data show that the initial issue spare parts costs for a single version is about 40 percent less than for multiple versions.

Delaying the Production Decision Would Reduce Program Risk and Cost

Delaying the MCS production decision until ATCCS can be tested as an automated integrated system of systems would reduce program risks. It would also allow the Army the time to revise its testing schedule to eliminate the deficiencies in its planned tests. In addition, it would reduce program costs caused by the need for interim equipment. Finally, a delay would give the Army an opportunity to meet congressional acquisition guidance. ATCCS program officials stated that a delay in MCS may be perceived as a weakness and cause the program to be a target for budget cuts.

Recommendations

GAO makes a number of recommendations in the report, including that the Secretary of Defense direct the Secretary of the Army to (1) not initiate acquisition of ATCCS equipment until the automated data exchange among the five control segments is successfully tested, (2) improve the testing of MCS, and (3) test and deploy ATCCS with the next version of common hardware and software.

Agency Comments

The Department of Defense did not agree with the report. The Department believes the evolutionary acquisition strategy it is pursuing will provide an integrated system of systems. However, the Department and the Army agree that without a fully integrated ATCCS, five autonomous battlefield segments may fail to provide a commander with the right information at the right time. They also agree that the ability of the ATCCS segments to exchange data automatically is critical to satisfying requirements and demonstrating military effectiveness. GAO is concerned with the Army plan to commit to the ATCCS program, which includes $1.8 billion in equipment, without successfully testing this critical capability.

The Department commented that GAO's findings and recommendations were not based on the most current MCS schedule. Subsequent to the draft report and the Department's comments, the Army Acquisition Executive, on June 6, 1992, changed the MCS schedule. GAO revised the report to reflect certain updated information, but the changed schedule did not resolve the problems and deficiencies GAO noted.

The Department did not agree with the recommendation to not initiate acquisition of ATCCS equipment until an operational test successfully demonstrates the automated exchange of data among the five control systems. It expressed confidence that ATCCS will culminate in an integrated system that will vastly improve battlefield command and control. GAO is not

as confident because the ATCCS segments have had continuous development problems and test failures. In addition, as GAO reported in 1991, the Army has wasted $155 million in premature MCS equipment acquisitions that the Army decided no longer met user needs. Furthermore, the urgency to field ATCCS segments was based on a threat that is now vastly diminished.

The Department also disagreed with the recommendation to test and deploy ATCCS with Common Hardware and Software II equipment. It believes that fielding different sets of common equipment will not increase the logistics burden. This position conflicts with an Army study that justified a single set of common equipment based on (1) a lower spare parts inventory, (2) reduced holding costs, and (3) a 40-percent reduction in initial issue spare parts costs.

The Department's comments and GAO's response are included in appendix I.

Contents

Abbreviations

ATCCS	Army Tactical Command and Control System
CHS	Common Hardware and Software
GAO	General Accounting Office
MCS	Maneuver Control System

Introduction

The Army is automating its command and control segments and enhancing its communications capabilities through the Army Tactical Command and Control System (ATCCS) program. This effort is integrating five formerly independent command and control segments, using common nondevelopmental computer hardware and software, and three communications segments into a "system of systems." The Army will test each segment separately against its unique requirements, then integrate each segment into the ATCCS network and measure ATCCS against defined systemwide requirements.

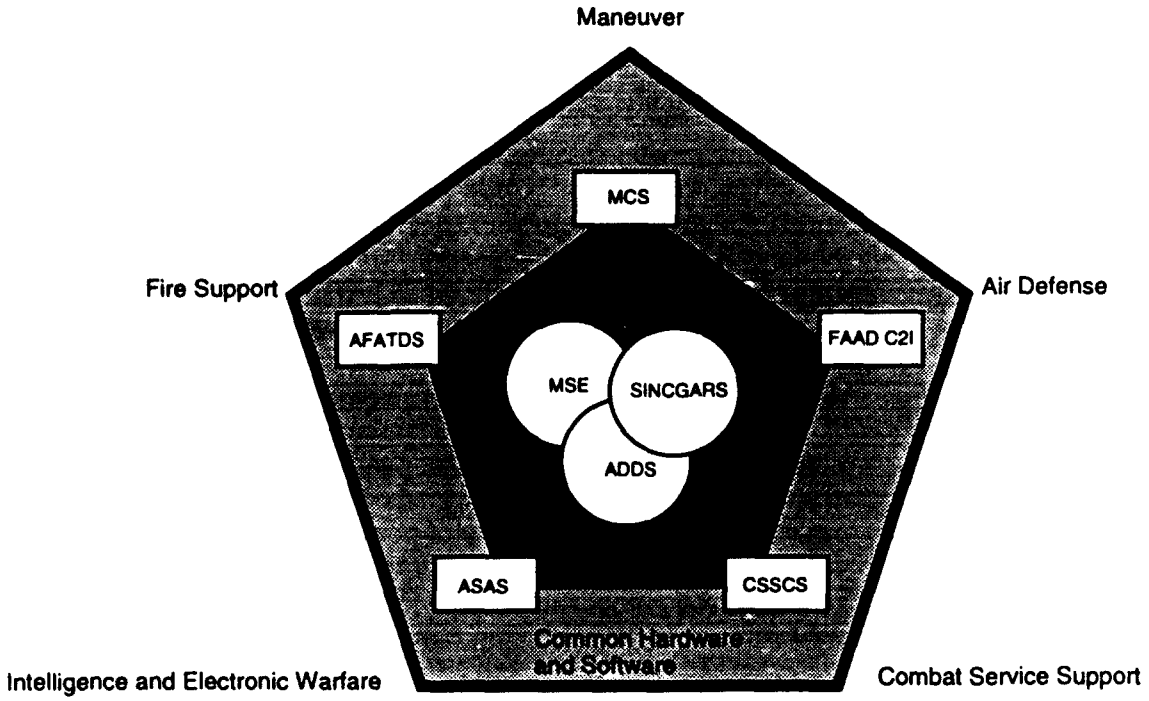
ATCCS Equipment and Functions

The ATCCS program, initiated in fiscal year 1986, will be an integrated network of computers, radios, and other equipment that is intended to help battlefield commanders, from the corps down to the battalion, manage and control their resources more effectively. In December 1991, the Army estimated ATCCS' cost at over $15 billion.[1]

ATCCS will be the means for passing and receiving information to and from weapons and sensors throughout the battlefield. When completed, the ATCCS network will be formed by automated segments at the five battlefield functional areas that will be used to command and control a battle (see fig. 1.1.). The segments and their systems are (1) status monitoring of troop movements and general battlefield conditions (Maneuver Control System); (2) controlling short range air defense weapons (Forward Area Air Defense Command, Control, and Intelligence); (3) managing supply, maintenance, transportation, medical, and personnel activities (Combat Service Support Control System); (4) receiving, analyzing, and distributing intelligence information (All Source Analysis System); and (5) planning, directing, and controlling artillery (Advanced Field Artillery Tactical Data System). The Army's Common Hardware and Software (CHS) program will provide computers for the five ATCCS command and control segments.

[1]Excludes the intelligence electronic warfare system—All Source Analysis System—acquisition cost estimate that is classified.

1.1: Army Tactical Command and Control System Architecture and Battlefield Functional Areas



Battlefield Functional Areas

DS	Army Data Distribution System
ATDS	Advanced Field Artillery Tactical Data System
AS	All Source Analysis System
SCS	Combat Service Support Control System
FAAD C2I	Forward Area Air Defense Command, Control and Intelligence System
MCS	Maneuver Control System
MSE	Mobile Subscriber Equipment
SINCGARS	Single Channel Ground and Airborne Radio System

Source: U.S. Army

The communications capabilities that will link the battlefield areas and their component systems will be provided by three communications segments: the Army's battlefield telephone system (Mobile Subscriber Equipment), the combat radio (Single Channel Ground and Airborne Radio System), and the high speed data distribution network (Army Data Distribution System), which will be comprised of the Enhanced Position Location System and the Joint Tactical Information Distribution System.

ATCCS Program Objectives

ATCCS is to provide an integrated family of five interoperable segments that will collect, process, analyze, and display timely and essential information from within each segment's functional area.

The integration of the five segments, using CHS and the three communications segments, into a system of systems is expected to provide commanders with what the Army describes as a "force multiplier," that is, producing greater fighting effectiveness through better use of battlefield resources. ATCCS is to provide common data across five battlefield functional areas to commanders from corps to battalion levels. This horizontal and vertical integration of data will be accomplished through force level control capability, which will provide for the automated exchange of data with other echelons. The initial force level control capability will be provided as part of the Maneuver Control System's (MCS) version 11 software. Commanders will use force level data to develop a "common picture" of the battle and to produce situation reports, summaries, worksheets, and map overlays. As command and control responsibility is transferred among command post sites, the data can be recreated to ensure continuity of operations. In addition, the segments must interoperate with each other to conduct operations and interoperate with joint, combined, and allied systems.

ATCCS Testing Program

Each segment is being developed to satisfy its operational requirements, as well as ATCCS requirements. Thus, each segment has its own acquisition strategy and plan, test and evaluation program, and production and fielding schedule. The plans for the individual segments are to develop, test, and field a basic capability for the segment and then upgrade a segment's software in incremental blocks. The test results will be used to support major program decisions. In addition, after completing technical and operational testing, a segment will be demonstrated with existing ATCCS segment(s) and software (interoperability testing). Interoperability testing is a critical part of the test and evaluation process.

Three ATCCS operational tests, which will also test the available segments' abilities to interoperate within the system of systems, are currently planned. An operational test, which was to begin in September 1992, will assess MCS hardware and software, limited intelligence analysis capability, and prototype combat service support software. Communications capability will be provided by the Mobile Subscriber Equipment and the Single Channel Ground and Airborne Radio System. However, on June 6, 1992, the Army Acquisition Executive agreed to change the test to

May 1993. The revised operational test will now include the Combat Service Support Control System. The first limited test of interoperability is planned for September 1993, and it will involve a fully automated interface between maneuver control and combat service support and limited automated interfaces with the air defense, intelligence analysis, and fire support segments. During the test, the Army plans to use the battlefield telephone (Mobile Subscriber Equipment), the Single Channel Ground and Airborne Radio System, and the Joint Tactical Information Distribution System to demonstrate communications capabilities. A second interoperability test having some automated data exchange for the five segments is planned for February 1994. According to Army officials, this test will evaluate the final ATCCS configuration before full fielding and will incorporate a prototype of the Enhanced Position Location Reporting System and a fully developed Advanced Field Artillery Tactical Data System.

jective, Scope, and thodology

As requested by the Chairman of the House Committee on Appropriations, Subcommittee on Defense, we examined the Army's testing and integration efforts to determine whether they will ensure that ATCCS meets its military mission before initiating acquisition of CHS for the command and control segments. In particular, we concentrated our work on the Army's preparations for the operational test originally scheduled for September 1992.

We reviewed various Department of Defense and Army documents, including acquisition management policy, system and segment requirements documents, test plans, program schedules, cost estimates, and contracts. We also reviewed test schedules prepared by the ATCCS system integration contractor. We discussed this information with officials at the following offices.

- Program Executive Office for Command, Control, and Communications, Fort Monmouth, New Jersey.
- ATCCS program offices in Fort Belvoir and McLean, Virginia, and Fort Monmouth, New Jersey.
- Joint Tactical Fusion Program Office, Fort Monmouth, New Jersey.
- Office of the Secretary of Defense for Command, Control, Communications and Intelligence; Office of the Director, Information System Command, Control, Communications and Computers; Office of the Deputy Director Defense Research and Engineering (Test and Evaluation); Office of the

Under Secretary of the Army; and Office of the Deputy Chief of Staff for Operations and Plans, Washington, D.C.

- Army Materiel Systems Analysis Activity, Aberdeen, Maryland.
- Operational Evaluation Command, Alexandria, Virginia.
- Test and Experimentation Command, Fort Hood, Texas.
- ATCCS Experimentation Site, Fort Lewis, Washington.
- Combined Arms Command, Fort Leavenworth, Kansas.
- U.S. Army III Corps and 1st Cavalry Division, Fort Hood, Texas.
- U.S. Army 4th Infantry Division, Fort Carson, Colorado.
- ATCCS software development contractor office, Leavenworth, Kansas.
- System integration contractor office, Fort Washington, Pennsylvania.

We also witnessed a portion of an October 1991 command post exercise that used ATCCS equipment.

We performed our review from May 1991 to April 1992 in accordance with generally accepted government auditing standards. We requested and received agency comments from the Department of Defense. The Department disagreed with our recommendations and findings. Its comments and our responses are provided in appendix I.

ATCCS Production Will Begin Without Adequate Integration Testing

The Army plans to initiate production of ATCCS without successfully testing the automated exchange of data among the five segments. The procurement would be based on the May 1993 operational test of MCS. This action would commmit the Army to the ATCCS program equipment that could cost $1.8 billion before automatic exchange of data among ATCCS segments has been tested and proven. Furthermore, the Army plans to approve procurement of about $1.1 billion of the $1.8 billion for three of the five segments prior to a planned limited test of automated data exchange among the five segments in 1994. The acquisitions would also be made before ATCCS is tested with the communication capabilities for transmitting data critical to ATCCS operations. This ATCCS acquisition strategy conflicts with congressional guidance because the Army would be buying equipment before successfully testing an automated and integrated system of systems.

Army Plans to Initiate Acquisitions Prior to Testing an Automated and Integrated ATCCS

The Army plans to test MCS in May 1993 and make a production decision, which includes buying CHS and related equipment[1] for the other four command and control segments, in September 1993. Initiating the MCS procurement commits the Army to start buying $1.8 billion of CHS equipment for ATCCS segments. This equipment will be used to enter data into MCS computers from the other segments and then transmit the data throughout the MCS network. The other segments must use MCS computers as data entry devices because the software for computer to computer data exchange is not available.

The Army also plans to approve production for three of the five ATCCS segments prior to demonstrating the automated exchange of data through a fully integrated system of systems test in 1994. The Army plans to approve production of MCS in September 1993 and the Combat Service Support Control System and the Forward Area Air Defense Command, Control and Intelligence System in September 1993. These three segments would represent about $1.1 billion of the $1.8 billion in planned CHS acquisitions. Thus, the Army would be approving 61 percent of the CHS acquisitions prior to conducting an integrated test of ATCCS command, control, and communications segments.

The software programs that are to automatically exchange data among the five battlefield functional area segments will not be available for the

[1]CHS related equipment includes peripheral devices, cables, shelters, and generators that are required to support the CHS equipment.

May 1993 operational test. Thus, to conduct the 1993 operational test, data to be received from, or sent to, another functional area computer will have to be manually exchanged. For example, data from the fire support computers will have to be manually entered into an MCS computer at the fire support center for automated distribution to combat elements and for further processing at the various maneuver control levels.

The Army may be unnecessarily rushing MCS testing and its production decision because it fears that the program may otherwise be viewed as weak. ATCCS program officials stated that the funding realities within the Army and the Department of Defense require that MCS maintain its May 1993 testing. They added that any slips in the MCS schedule would cause the program to be viewed as weak and as a target for budget reductions.

Available Communications Will Limit Testing

The communications segments to support the May 1993 operational test will be limited to the existing combat radios; the Single Channel Ground and Airborne Radio System, the replacement combat radio; and Mobile Subscriber Equipment, the area wide telephone-like communications to mobile and stationary users. These communications segments, however, will not allow the Army to demonstrate critical ATCCS data distribution requirements such as (1) high-volume data traffic, (2) near real-time speed of service, and (3) guaranteed delivery of messages.

The Enhanced Position Location Reporting System and the Joint Tactical Information Distribution System are being developed to transmit the data that the ATCCS computers will generate. They should be available in September 1993. The enhanced location system is an Army-led program, and it will provide a low- and medium-rate data communications capability for users at divisions and below, such as artillery and forward area air defense units. The joint information system, an Air Force-led program, is being developed for high-rate data users, such as intelligence and long-range defense units in corps and divisions.

By mid-1993 the Army plans to complete technical testing of the enhanced location system and formal operational testing of the joint information system. If these communications systems pass their tests and are incorporated in ATCCS, maneuver control reporting requirements for friendly unit identification and location updates could be met. Successful testing and incorporation could also mean that the air defense segment could be directly linked to the Forward Area Air Defense weapon computer

and that the high speed of service requirements for Advanced Field Artillery Tactical Data System fire support missions could be satisfied.

TCCS Congressional uidance

The Army initiated the ATCCS segments as individual systems subject to different levels of Army and Department of Defense oversight. Congress grew concerned over the lack of uniform oversight in developing, testing, and deploying ATCCS as an integrated system of systems. Consequently, Congress directed that each segment's test and evaluation plan be revised to include interoperability testing at development and operational testing milestones. The congressional intent was to avoid unnecessary spending on equipment that is not ready to be fielded.

Senate Committee on Armed Services guidance for the development and acquisition of systems states that as a result of the diminished threat from Eastern European nations, there is a reduced urgency to procure systems prior to successfully testing the equipment. The Committee wants the services to take the time to develop a system right the first time rather than commit to a troubled system.

onclusions

For ATCCS to be accepted as an integrated system of systems, the Army must successfully test the automated exchange of data among the five command and control segments in a realistic operational environment. The MCS procurement starts the acquisition of $1.8 billion of CHS for all the segments. The MCS operational test will demonstrate a manual interchange of data among limited ATCCS segments and not an automated data exchange among the five segments. Also, the Army plans to approve production for about $1.1 billion of the $1.8 billion of CHS equipment for three segments in September 1993 without (1) successfully conducting a system of systems test or (2) using required data transmission capabilities. However, the Army does plan to perform an integrated system of systems test in February 1994 using the required data transmission capabilities.

The ATCCS acquisition strategy is inconsistent with congressional guidance because the Army will acquire equipment before successfully demonstrating that ATCCS, as a system of systems, can exchange data among the segments. Also, the Army is not complying with Senate Committee on Armed Services guidance to ensure a system works before it is procured and fielded.

Recommendation

We recommend that the Secretary of Defense direct the Secretary of the Army to not initiate acquisition of CHS and related equipment until the automated data exchange among the five control segments is successfully tested using the communications segments developed to support ATCCS requirements.

Compressed MCS Test Schedule Leads to Premature Test

The Army has compressed the MCS test schedule in order to conduct the segment's operational test in May 1993. This schedule compression will result in both a high-risk approach to test unit training and testing unvalidated requirements and software with reduced functions. Army officials who have been involved with the test believe that the tight test schedule does not provide units with sufficient time to become familiar with MCS functions. They believe this lack of time could increase the risk of failure or lead to inconclusive test results. In addition, light division MCS functions have not been developed and validated as planned, and functions have been deferred from the software to accommodate the test schedule. Furthermore, the Army's plan to purchase two versions of computers and to field interim devices that the users find unacceptable will result in increased logistical support costs.

The Army Is Taking a High-Risk Approach to Unit Testing

Army MCS test plans had allowed 6 months for test units to train and conduct field exercises with approved test software before the operational test. The exercises would have provided the units with an opportunity to identify changes in their standard operating procedures so that MCS requirements could be fully implemented. However, due to development problems, the test software is now planned to be delivered in February and March 1993, about 2 months before the scheduled test. Training will begin in March and April 1993, and no field exercises are planned before the May 1993 operational test. As a result, unit personnel will have minimal time to learn how to operate the new software. An Army assessment of this change states that unit training is now a high risk to the program.

Officials from the designated test unit, III Corps at Fort Hood, Texas, told us that each new version of software is like a new system and requires extensive training. This training is complicated further because of the test unit's National Guard and Army Reserve commitments and because it will occur when the test unit normally has its greatest turnover in personnel. In addition, force structure reductions may result in the loss of key test unit personnel during the months before the test. Thus, replacement personnel must learn both MCS and unit procedures and they may not have the time to be adequately trained.

In October 1991, we observed a field exercise involving a unit that is to participate in the operational test. Officials from that unit were concerned that the MCS schedule provides little time for their unit to learn the software and to incorporate it into their standard operating procedures. Although MCS equipment was operating during the field exercise, personnel were not

using the equipment. Instead, personnel transferred information from the MCS data base to non-MCS computers and generated status charts on these non-MCS computers.

Another test unit we visited found MCS's word processing function cumbersome. Thus, personnel used a non-MCS computer to compose, edit, and check the spelling of text. They then typed the final version into an MCS computer. However, during the operational test, personnel will be required to use MCS to generate these outputs, and they need sufficient training and field experience to effectively use MCS capabilities.

Test unit personnel stated that the difficulties in using MCS, due to the lack of familiarity with the system, made them reluctant to rely on it. With sufficient time it may be possible to overcome these difficulties. However, by compressing the training time and field exercises, the risk of failure increases.

Test officials are concerned that personnel turnovers and reduced training will affect the testing and cause the test results to be inconclusive. They cite as examples the potential for unit personnel to be unfamiliar and/or unwilling to use the system's data base capabilities. If data bases go unused, the tester will not be able to evaluate the operational effectiveness of the system.

Light Division MCS Requirements Have Not Been Validated As Planned

The light division MCS uses a small lightweight computer as its primary processor. Because the computer has less capacity than the MCS primary processor, its software has to be reduced and some functions deleted. A series of experiments were to have validated these changes and helped refine requirements. However, according to Army officials, funding for the experiments was used instead to support Operation Desert Shield/Storm. The current schedule does not allow these experiments to take place before the May 1993 test.

In December 1991, the Army and the software developer negotiated how much of the light division software could be completed in time for the test. The MCS program manager stated that this approach was contrary to the normal practice of defining a minimum set of system requirements, completing software development, and then conducting an operational test of the system. The tight time frame for the May 1993 test is the reason the Army adopted this unorthodox approach. Not following the usual

requirements development and validation approach will result in the Army testing unvalidated requirements.

ICS Functions Are eing Deferred to Meet est Schedule

The Army deferred seven MCS functions that were to have been developed by June 1992 and included in the software version to be operationally tested. In January 1991, the Army agreed to defer development of these functions to avoid delaying the operational test, which was then scheduled for May 1992. Even though the MCS operational test was later delayed until September 1992 and then to May 1993, the Army has continued to defer these seven functions in order to have the software ready for testing. Therefore, to comply with the compressed test schedule, the MCS operational test will not include the complete software package that was originally scheduled to be tested. A plan for developing and testing these functions has not been established.

ICS Acquisition trategy Creates nnecessary Logistics upport Costs

The Army currently plans to field two versions of CHS equipment. It will begin equipping some units with CHS I in 1993, and all other units will begin receiving CHS II equipment in 1994. The CHS I contract expires in August 1993, and the CHS II contract is expected to be awarded in July 1993.

MCS's primary computer, the transportable computer unit, has a communications interface device called the adaptable programmable interface unit. The Army considers these interface devices excessively large and heavy and intends to replace them with a smaller unit, the tactical communications interface module, once software is developed that will enable it to work with the transportable computer unit. The smaller device is being developed under the lightweight computer contract awarded in May 1991.

The Army's current plan would result in establishing and maintaining logistical support for two sets of CHS equipment and for an interim communications device until it is completely withdrawn from the units. Whenever a new piece of equipment is fielded, the Army establishes minimum requirements for depot stockage and spare parts quantities. The logistical support requirements for a single set of equipment would be lower than the logistical support requirements for two sets of equipment being used to meet the same need. For example, the Army, in supporting the need for a single set of CHS, noted that use of a standard configuration would reduce the spare parts inventory and the holding costs. The Army

also noted that a standard set would result in lower initial issue spare parts costs. Its data indicate that the initial issue spare parts costs for a standard set is about 40 percent less than for multiple sets (based on hardware costs). The Army did not compute an actual dollar savings because of variables associated with the quantity of CHS that would be bought due to pending force structure reductions.

Required Equipment Not Being Tested

The MCS acquisition includes a lightweight computer for the light division system that will also be used as an interim battalion terminal. The user, however, is not satisfied with the computer as a battalion terminal. To maintain the current test schedule, the Army plans to use the computer as an interim battalion terminal and replace it with a new terminal to be purchased as part of the CHS II contract. A similar MCS acquisition strategy resulted in prematurely spending $155 million on equipment that in 1990[1] the Army decided no longer met user requirements.

MCS Strategy Inconsistent With Oversight Committee Guidance

To meet its test schedule, the Army will conduct the MCS operational test using interim equipment and equipment that does not meet user requirements. However, as discussed in chapter 2, the Senate Committee on Armed Services believes the reduction in the threat provides the services with the opportunity to take the time to develop systems right the first time. For example, the Committee report on the fiscal year 1991 Defense authorization states that, "...the development, testing, and production of weapons systems have overlapped, only to have to spend large amounts of money to make weapons work right after they are in the field." The Committee also stated that "DOD [The Department of Defense] does not have to rush to buy a weapon in order to meet an arbitrary fielding deadline. The Pentagon can now afford to take the time to get it right the first time before becoming deeply committed to troubled weapon systems."

[1] Battlefield Automation: Army Tactical Command and Control System Development Problems (GAO/NSIAD-91-172, July 31, 1991).

Conclusions

The Army's MCS testing strategy is high risk and inadequate because it is based on a testing plan that does not (1) provide sufficient time for test units to become familiar with the system, (2) include testing of validated requirements for light divisions, and (3) include all required functions. Also, the acquisition strategy will likely result in increased logistics costs. In addition, the Army's maneuver control testing strategy is inconsistent with Senate Committee on Armed Services guidance to make sure a system works before it is procured and fielded. Delaying formal MCS testing until the required equipment and software are available would provide the Army with the opportunity to correct deficiencies and allow a clearer appraisal of the segment's military effectiveness, reduce logistics support costs, and follow the Committee's acquisition guidance more closely.

Recommendations

We recommend that the Secretary of Defense direct the Secretary of the Army to take the following actions.

- Defer the formal MCS operational test until (1) unit personnel receive sufficient training to learn how to use the system and are able to incorporate the system's functions into the units' standard operating procedures, (2) the light division requirements are developed and validated, and (3) the functions deleted from MCS software are restored.
- Conserve logistics funds by testing and deploying ATCCS with CHS II equipment, the required battalion terminal, and the smaller communications interface device.

Comments From the Department of Defense

te: GAO comments
pplementing those in the
ort text appear at the
d of this appendix.

ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301-3040

COMMAND, CONTROL, COMMUNICATIONS AND INTELLIGENCE

May 29, 1992

Mr. Frank C. Conahan
Assistant Comptroller General
National Security and International
Affairs Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Conahan:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report, "BATTLEFIELD AUTOMATION: Planned Production Decision For Army Control System Is Premature," dated April 2, 1992 (GAO Code 395153) OSD Case 9025. The DoD does not agree with the GAO findings or recommendations.

e comment 1.

The most troubling item in the report is that the findings and recommendations are based on a schedule that is out of date and incorrect. If the GAO findings and recommendations were based on the correct schedule, many of the DoD comments would change.

e comment 2.

The GAO continues to insist that the DoD only allow the Army Command and Control System subordinate programs to move forward when the entire Army Tactical Command and Control System is fully integrated. The DoD has established an evolutionary acquisition strategy for the program under DoD Directive 5000.1, which provides for the incremental development, testing, and fielding of the Army Command and Control System. The DoD intends to provide the commander in the field with a fully integrated system comprised of the five functional area systems and the three communications systems, based on the use of common hardware and software. That will be done on an incremental basis, and each increment will be fully tested, to include integration testing. At the conclusion of the incremental fielding, the entire system will be tested in accordance with the DoD approved test and evaluation master plans.

The detailed DoD comments on the report findings and recommendations are provided in the enclosure. The Department appreciates the opportunity to comment on the draft report.

Sincerely,

Duane P. Andrews

Enclosures

GAO DRAFT REPORT - DATED APRIL 2, 1992
(GAO CODE 395153) OSD CASE 9025

"BATTLEFIELD AUTOMATION: PLANNED PRODUCTION DECISION FOR ARMY CONTROL SYSTEM IS PREMATURE"

DEPARTMENT OF DEFENSE COMMENTS

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FINDINGS

o FINDING A: The Army Tactical Command and Control System. The GAO reported that the Tactical Command and Control System program, initiated in FY 1986, is the comprehensive approach initiated by the Army to automate its tactical command and control systems and improve its communications capabilities. The GAO explained that the effort is designed to enhance the coordination and control of combat forces through the automated management of five key battlefield functional areas -- (1) maneuver control, (2) forward area air defense, (3) combat service support, (4) tactical intelligence, and (5) field artillery. The GAO noted that the Army Tactical Command and Control System is comprised of the following:

- five command and control segments;
- three communications segments; and
- one common hardware and software segment to provide computer commonality.

The GAO noted that the objective of the Army Tactical Command and Control System (System) is to provide battlefield commanders an automated means to synchronize the forces. The GAO observed that the ability of the System segments to exchange data automatically is critical to the ability of the Army Tactical Command and Control System to satisfy requirements and demonstrate military effectiveness. The GAO found that the December 1991 Army estimate of the System cost was over $14 billion, excluding costs for the All Source Analysis System. (pp. 2-3, pp. 9-14/ GAO Draft Report)

on pp. 2, 8-11.

DOD RESPONSE: Concur. While correctly assessing the requirement for the Army Tactical Command and Control System, the GAO missed a key element in its definition. Each of the systems under the Army Tactical Command and Control System is being developed to satisfy

See comment 2.

its own battlefield functional area requirements, as well as the requirement to interoperate with the other systems of the Army Tactical Command and Control System. It is important to understand that any of the functional area systems fielded -- without the rest of the Army Tactical Command and Control System -- still provides a significant increase in capability for the commander to control and synchronize his forces.

- **FINDING B: The Army Tactical Command and Control System Production Will Begin Without Adequate Integration Testing.** The GAO found that procurement of Army Tactical Command and Control System computers will be initiated based on the September 1992 operational test of only one of the five segments--the Maneuver Control System. The GAO concluded that means the Army will commit to procuring $1.8 billion of equipment before testing whether all five segments work together, as intended. The GAO further asserted that the Army plans to approve production for three of the five Army Tactical Command and Control System segments prior to demonstrating the automated exchange of data through a fully integrated system of systems test in FY 1994--the Maneuver Control System in January 1993, and the Combat Service Support Control System and the Forward Area Air Defense Command, Control and Intelligence System in September 1993. The GAO observed that those three segments represent about $1.1 billion of the $1.8 billion in planned common hardware and software acquisitions. The GAO also reported that the software programs required to exchange data automatically among the five battlefield functional area segments will not be available for the September 1992 operational test--thus, the data will have to be exchanged manually between segments.

  In addition, the GAO found that the communications to support the September 1992 operational test will be limited. The GAO explained that the Enhanced Position Location Reporting System and the Joint Tactical Information Distribution System (needed to transmit the data the Army Tactical Command and Control System computers will generate) still are being developed. The GAO found that, by mid-1993, the Army plans to complete technical testing of the former and the formal operational testing of the latter.

  The GAO observed the Congress had directed that each test and evaluation plan for each segment was to be revised to include interoperability testing at both the development and operational testing milestones. The GAO concluded that, for the Army Tactical Command and

Control System to be accepted as an integrated system of systems, the Army must test successfully the automated exchange of data among the five command and control segments in a realistic operational environment. The GAO also expressed concern that the Army may be rushing Maneuver Control System testing unnecessarily, as well as its production decision. The GAO reported that, according to program officials, the funding realities within the Army and the Department of Defense require that the Maneuver Control System maintain its September 1992 testing. The GAO concluded, however, that the acquisition strategy for the Army Tactical Command and Control System is inconsistent with congressional guidance--because the Army will acquire equipment before successfully demonstrating that the System, as a system of systems, can exchange data among the segments. The GAO further concluded the Army is not complying with the guidance from the Senate Committee on Armed Services to ensure that a system works before it is procured and fielded. The GAO concluded that the current Army acquisition strategy will result in a premature production decision. (p. 4, pp. 17-22/ GAO Draft Report)

on pp. 3, 13-16.

DOD RESPONSE: Nonconcur. The GAO still does not understand the concept of evolutionary acquisition. Evolutionary Acquisition allows for the development of a system by increments to meet varying degrees of the user requirements, instead of requiring the user to wait until the final objective system has been designed and tested. Evolutionary Acquisition allows the development, testing, and fielding to the soldier of usable increments of the system as the Army moves toward the final objective system. In doing so, evolutionary acquisition also allows for user feedback into the development process to improve previous segments. The only difference between this and the practices used in the commercial software manufacturing is that evolutionary acquisition is a preplanned upgrade to the software, where commercial software is upgraded based more on competition and user acceptance of the product.

comments 2 and 3.

If the GAO would re-evaluate the present Maneuver Control System schedule it would find that the Army has rescheduled the testing for Maneuver Control because of software deficiencies found during version 11 software development. In September 1992, the Army will test the system during an Early User Test and Experimentation with the software that is available at that time. From there, it will carefully continue to an Initial Operational Test and Evaluation in the May - June 1993 test window with the version 11 software.

comment 4.

See comment 5.

During that test window and prior to a full production decision for the Common Hardware/Software, the Maneuver Control System, the All Source Analysis System, the Combat Service Support System, and the Forward Area Air Defense Command and Control System will undergo separate testing. As part of the Army Operational Test and Evaluation Command test and evaluation methodology during the MCS testing, these systems will also be evaluated on their collective ability to interoperate as a system of systems through the use of force level control information. As each system completes its systems test, which does include interoperability testing with other available Army Tactical Command and Control Systems, it will also be evaluated in an Army Tactical Command and Control System follow-on evaluation, which will specifically evaluate interoperability. All Army Tactical Command and Control Systems Test and Evaluation Master Plans have an interoperability test requirement, as directed by Congress. The test strategy is documented in both the Army Tactical Command and Control System Test and Evaluation Master Plan and in each individual program's Test and Evaluation Master Plan. Each is reviewed and approved by the test and evaluation organizations in the Office of the Secretary of Defense.

See comment 6.

The draft report is misleading in its statement that the Army will commit to procuring $1.8 billion of equipment based on testing of one system. The common hardware/software contract initially will be awarded for approximately $37 million, as a basic contract -- with such items as logistics/maintenance support, warranties, and small amounts of equipment for testing and software development checkout. There will be option years on the contract, which will allow the procurement of equipment for each system only after it has been fully tested and has obtained an acquisition decision to procure the equipment for that system.

See comment 7.

The communications used in the testing of the Army Tactical Command and Control Systems initially will be Mobile Subscriber Equipment and combat net radio. The final objective versions of these command and control systems will be tested using the full range of tactical communications, which will include Mobile Subscriber Equipment, combat net radio, Enhanced Position Location Reporting System, and the Joint Tactical Information Distribution System. The tests will evaluate the effectiveness of the communications as the testing moves toward the final objective test, which tests all five command and control systems together.

o FINDING C: Compressed Maneuver Control System Testing Schedule Leads to Premature Test. The GAO asserted that the schedule compression will lead to premature testing and a high risk approach to test unit training.

- Compression of Test Schedule--The GAO reported that, because the Army compressed the Maneuver Control System test schedule, several problems have occurred. The GAO found that, due to development problems, the test software is now planned to be delivered in June and July 1992, about two months before the scheduled test. The GAO explained that, as a result, unit personnel will have minimal time to learn how to operate the new software. The GAO noted an Army assessment of the change determined that unit training is now considered a high risk to the program. The GAO also noted that test officials are concerned that personnel turnovers and reduced training will affect the testing and cause the test results to be inconclusive.

The GAO found the Army deferred seven Maneuver Control System functions that were to have been developed by June 1992, and included in the software version to be used in the operational test. The GAO also found that, in December 1991, the Army and the software developer negotiated how much of the light division software could be completed in time for the September 1992 test. The GAO asserted that failure to follow the usual requirements development and validation approach will result in the Army testing unvalidated requirements. The GAO also reported that the light division Maneuver Control System uses a small lightweight computer as its primary processor. The GAO explained that, because the lightweight computer has less capacity than the Maneuver Control System primary processor, its software has to be reduced and some functions deleted. The GAO concluded the current schedule does not allow a series of experiments to take place before the September 1992 test--experiments that were to have validated those changes and helped refine the requirements.

- Required Hardware and Software--The GAO reported that the Army currently plans to field two versions of the common hardware and software equipment. According to the GAO, the Army will begin equipping some units with the common hardware and software I equipment in 1993, and all other units will begin receiving the common hardware and software II equipment in 1994. The GAO found that the Maneuver Control System primary computer--the transportable computer unit--has a communications interface device called the adaptable programmable interface unit, which the Army considers

excessively large and heavy and intends to replace with a smaller unit. The GAO found that the smaller device is being developed under the lightweight computer contract awarded in May 1991.

The GAO concluded that the current Army plan results in establishing and maintaining logistical support for two sets of common hardware and software equipment and for an interim communications device until it is completely withdrawn from the units. The GAO also found that, once fielded, a logistical support package must be developed and maintained for each version. The GAO noted Army data shows that fielding a single version results in lower spare parts inventory and reduced holding costs. The GAO further noted that the data shows that the initial issue spare parts costs for a single version is about 40 percent less than for multiple versions.

- Delay Production Decision--The GAO concluded that delaying the production decision for the Maneuver Control System until the Army Tactical Command and Control System can be tested as an automated integrated system of systems would reduce program risks. The GAO pointed out that such a delay would also allow the Army the time necessary to revise its testing schedule to eliminate the deficiencies in its planned tests. In addition, the GAO concluded it would reduce program costs caused by the need for interim equipment, and give the Army an opportunity to meet congressional acquisition guidance.

In summary, the GAO concluded that the Army Maneuver Control System testing strategy is high risk and inadequate because it is based on a testing plan that does not (1) provide sufficient time for test units to become familiar with the system, (2) include testing of validated requirements for light division, and (3) include all required functions. The GAO also concluded that the acquisition strategy will likely result in increased logistics costs. In addition, the GAO asserted that the Army maneuver control testing strategy is inconsistent with the guidance of the Senate Committee on Armed Services to make sure a system works before it is procured and fielded. The GAO contended that delaying formal testing on the Maneuver Control System until the required equipment and software are available would provide the Army with the opportunity to correct deficiencies and allow a better appraisal of the Military effectiveness of that particular segment. (pp. 5-6, pp. 24-31/ GAO Draft Report)

Now on pp. 3 and 4, 17-21.

See comment 8.

See comment 9.

See comment 8.

See comment 10.

Now on p. 16.

DOD RESPONSE: Nonconcur. As previously stated, the Maneuver Control System schedule has been drastically changed, due to a slip in the version 11 software development. The early user test and experimentation scheduled for September 1992 will be one of many check points to evaluate contractor performance as the program moves toward an initial operational test and evaluation in the May - June 1993 timeframe. The equipment used during the early user test (September 1992) will be left with the unit that will take part in the initial operational test in May 1993. That should provide both the user and the developer with valuable training and feedback prior to entering the initial operational test.

The software that will be tested at the initial operational test will have all of the functions that are required to be tested at that point in time. The operational test community will test to the operational requirement not to the software development specifications. If the software does not meet the requirement, that becomes a part of the test outcome and reported in the operational test assessment.

The Common Hardware and Software II is a follow-on to the Common Hardware and Software I effort and procures tactical computer units to the same functional requirements as the Common Hardware and Software I. Additionally, other peripheral devices, and a high capacity computer, which will only be used by a limited number of users will be included. A major factor in proceeding with the Common Hardware and Software II contract is that the Common Hardware and Software I contract expires in 1993 and the Common Hardware and Software II will not be available until March 1994. The cost of that one year delay on the Maneuver Control System, Combat Service Support Control System, and the light division version of the Forward Area Air Defense Command and Control Systems outweighs the minor logistics cost increase of having two versions of hardware in the field.

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RECOMMENDATIONS

- RECOMMENDATION 1: The GAO recommended that the Secretary of Defense direct the Secretary of the Army to not initiate acquisition of the combined hardware and software and related equipment until an initial operational test successfully demonstrates that automated data exchange among the five control segments is successfully tested under expected battlefield conditions, using the communications segments developed to support the Army Tactical Command and Control System requirements. (p. 23/ GAO Draft Report)

See comment 11.

DOD RESPONSE: Nonconcur. Applicable DoD Directive 5000.1 allows for evolutionary acquisition and, therefore, the Secretary of the Army is authorized to use that type of acquisition strategy if it is deemed appropriate. Since each of the Army Tactical Command and Control Systems is being developed to meet its own battlefield functional area requirements, as well as a requirement to interoperate with other Army Tactical Command and Control Systems, the DoD does not agree with the GAO that all of the programs should be delayed until the last system is ready to be tested. The Army has a DoD approved Test and Evaluation Master Plan for the overall Army Tactical Command and Control System that addresses the system of systems concept, and the appropriate testing to insure the five systems operate in a system of systems mode. The DoD is confident that the Army Tactical Command and Control Systems will culminate in an integrated system that will vastly improve command and control on the modern battlefield. There is no need for specific Secretary of Defense direction to the Secretary of the Army, except for the requirements already set forth in DoD Directive 5000.1.

- RECOMMENDATION 2: The GAO recommended that the Secretary of Defense direct the Secretary of the Army to defer the formal operational test of the Maneuver Control System until (1) unit personnel receive sufficient training to learn how to use the system and are able to incorporate the system functions into the standard operating procedures of the units, (2) the light division requirements are developed and validated, and (3) the functions deleted from the Maneuver Control System software are restored. (p. 32/GAO Draft Report)

Now on p. 21.

See comments 8 and 12.

DOD RESPONSE: Partially concur. The schedule for the Maneuver Control System already has been changed due to software delays and the rescheduling has considered all of the GAO concerns in this recommendation. There is no need for specific Secretary of Defense direction to the Secretary of the Army, except for the requirements already set forth in DoD Directive 5000.1.

- RECOMMENDATION 3: The GAO recommended that the Secretary of Defense direct the Secretary of the Army to conserve logistics funds by testing and deploying the Army Tactical Command and Control System with common hardware and software II equipment, the required, battalion terminal and the smaller communications interface device. (p.32/GAO Draft Report)

Now on p. 21.

See comment 13.

DOD RESPONSE: Nonconcur. Additional logistics funds for having Common Hardware Software I and Common Hardware Software II in the field are not anticipated. It is important for the Army to field what has been developed over many years as early as possible to the Battlefield Functional Area Systems with Common Hardware Software I and Lightweight Computer Unit computers. The requirement exists now to provide an enhanced command and contol capability not only within the Army, but also to improve interoperability with the other Services and the Allies in preparation for any future conflicts. The Army Tactical Command and Control System can satisfy that requirement in the near term only by operationally testing its Battlefield Functional Area Control Systems and Army Tactical Command and Control System in FY 1993, and then initially fielding the systems on Common Hardware Software 1. Delays in fielding a standard integrated system will result in the continuing proliferation of nonstandard automated systems throughout the Army to satisfy this critical need.

See comment 14.

The second item of the recommendation suggests that the Army plans to buy one computer for the Maneuver Control System to be placed at the battalion level and then turn around and replace it with another Common Hardware and Software II computer. It is the Army's present plan to have the tactical computer unit at the battalion level and not replace it when the Common Hardware and Software II computers are procured. The smaller communications interface device will be available within six months for the lightweight computer. Software is being developed for the smaller communications interface device that will allow it to operate with the tactical computer unit which is a common hardware and software I equipment. There is no need for specific Secretary of Defense direction to the Secretary of the Army, except for the requirements already set forth in DoD Directive 5000.1.

The following are GAO's comments on the Department of Defense's letter dated May 29, 1992.

GAO Comments

1. According to Army officials, on June 6, 1992, the Army Acquisition Executive changed the MCS operational test date to May 1993. As detailed in the following GAO comments, changing the schedule does not by itself resolve problems and deficiencies noted in this report.

2. The Army consolidated the separate development programs within ATCCS because it requires a family of interoperable automated segments. Each segment must function as an integrated part of, and in support of, the total system. When the Army established ATCCS in 1986, it stated that ATCCS requirements would take precedence over the segments' requirements. In addition, the ATCCS test plan states that each segment must meet the ATCCS technical and operational requirements, which are required values, while each segment is designed to meet its own unique requirements, which are desired values. Furthermore, the Army's position as stated in the ATCCS Test and Evaluation Fact Book is:

"...for ATCCS to perform its mission, there must be an effective integration of its subsystems....Without ATCCS, five autonomous battlefield information systems may generate enormous amounts of battlefield information but fail to provide the commander with the right information at the right time."

3. Evolutionary acquisition is an adaptive, incremental approach where a fieldable "core" (an essential increment in operational capability) is acquired initially. The Department agrees that the automated exchange of data among the ATCCS segments is critical to satisfying requirements and demonstrating military effectiveness. However, the Army plans to initiate ATCCS procurement without demonstrating its stated essential requirement—the automated exchange of data to provide the commander with the right information at the right time. Further, evolutionary development does not appear to eliminate the risk that millions of dollars in equipment will be purchased before ATCCS proves its stated purpose of effective integration of its segments.

4. On June 6, 1992, the Army Acquisition Executive agreed to a revised MCS program baseline and schedule. We have changed our report accordingly.

5. Even with the delay in MCS initial operational testing, the control segments to be tested will have manual interoperability rather than the required automated exchange of data. The first interoperability test of automated data exchange among the five ATCCS segments is planned for February 1994. While this test will involve the automatic exchange of a limited set of data messages, it is the first opportunity to assess this capability for ATCCS.

6. The Army plans to initiate an ATCCS procurement that will total $1.8 billion. Once started, it is often difficult to stop acquisitions and expensive to correct deficiencies that result from premature production commitments. As discussed on page 20, the Army has already wasted $155 million in premature MCS acquisitions.

7. The Army will not know how the ATCCS segments function under stress conditions until the communications segments that are being designed to provide high-volume data traffic and near real-time speed of service are available. The Army does not plan to begin testing these communications segments until September 1993; at the same time the Army plans to make ATCCS production decisions.

8. The change in the MCS operational test date from September 1992 to May 1993 does not correct the three deficiencies cited in our report. The current test plan still does not (1) provide sufficient time for unit training, (2) include testing of validated requirements for light divisions, or (3) include all required functions. According to Army Training and Doctrine Command officials, training of test unit personnel is scheduled for March and April 1993 and there is no time to conduct a field exercise that will allow the test units to become familiar with version 11 software and incorporate changes into the units' standard operating procedures. In addition, these officials confirmed that there are no plans to validate light division MCS requirements prior to operational testing because the equipment and software will not be available. Furthermore, Army officials confirmed that there are no plans to develop the seven functions that were deferred from MCS version 11 software.

9. According to Army Training and Doctrine Command officials, the MCS equipment and software will not be left with the test units because the units' "go to war" requirement will not allow it to keep experimental equipment and software.

10. We asked officials from the Office of the Secretary of Defense and the Program Executive Office, Command and Control Systems for the cost analysis that supports this position. To date, they have not provided this analysis.

11. The Army adopted an evolutionary acquisition approach for ATCCS based on the urgency generated by the Soviet/Warsaw Pact threat. World events over the past 2 years have resulted in a diminished threat. The diminished threat and a smaller defense budget have renewed congressional interest in seeing that systems work as intended before initiating the acquisition phase. The Department of Defense and the Army agree that the ability of ATCCS segments to exchange data automatically is critical to satisfying requirements and demonstrating military effectiveness. The Army plans on initiating equipment acquisitions that could total $1.8 billion without testing this critical capability. Given ATCCS's history of program delays and failures, especially MCS and All Source Analysis System extended development processes, a 3-to-4 month delay to allow a test of the automated exchange of data among the five control segments would be prudent.

12. On June 6, 1992, the Army Acquisition Executive agreed to the revised MCS program baseline and schedule. As noted in comments 1, 5, 8, and 9, the change in schedule does not resolve our concerns.

13. This statement conflicts with an Army study used to justify the Army's decision to use a standard configuration. The Army noted that a single configuration would (1) lower the spare parts inventory, (2) reduce holding costs, and (3) reduce by about 40 percent the initial issue spare parts cost.

14. The lightweight computer is an integral part of the battalion configuration and is especially needed by light divisions and first to fight units. The lightweight computer and its smaller communications interface device, which is also needed by other control segments for fielding, may not be ready for the May 1993 operational test due to software development problems. According to the program manager, these development problems arose because the Army was unable to validate light division requirements. Officials from the Army's Training and Doctrine Command reaffirmed their position on obtaining a battalion device as part of the CHS II contract. Officials from the Office of the Secretary of Defense have stated that the user should accept what the developer provides and be satisfied with it.

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