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Report to Congressional Committees

February 1994

BATTLEFIELD AUTOMATION

Premature Acquisition of the Army's Combat Service Support Control System

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Washington, D.C. 20548

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National Security and
International Affairs Division

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February 4, 1994

The Honorable Sam Nunn
Chairman, Committee on Armed Services
United States Senate

The Honorable Daniel K. Inouye
Chairman, Subcommittee on Defense
Committee on Appropriations
United States Senate

The Honorable Ronald V. Dellums
Chairman, Committee on Armed Services
House of Representatives

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

We have evaluated the Army's development and acquisition strategy for the Combat Service Support Control System (CSSCS) to determine whether it will ensure that the CSSCS program is ready to initiate acquisition of Common Hardware and Software (CHS) computers and related equipment. Specifically, we focused on the rationale for program changes made by the Army to justify initiating equipment acquisitions prior to conducting an operational test of the system.

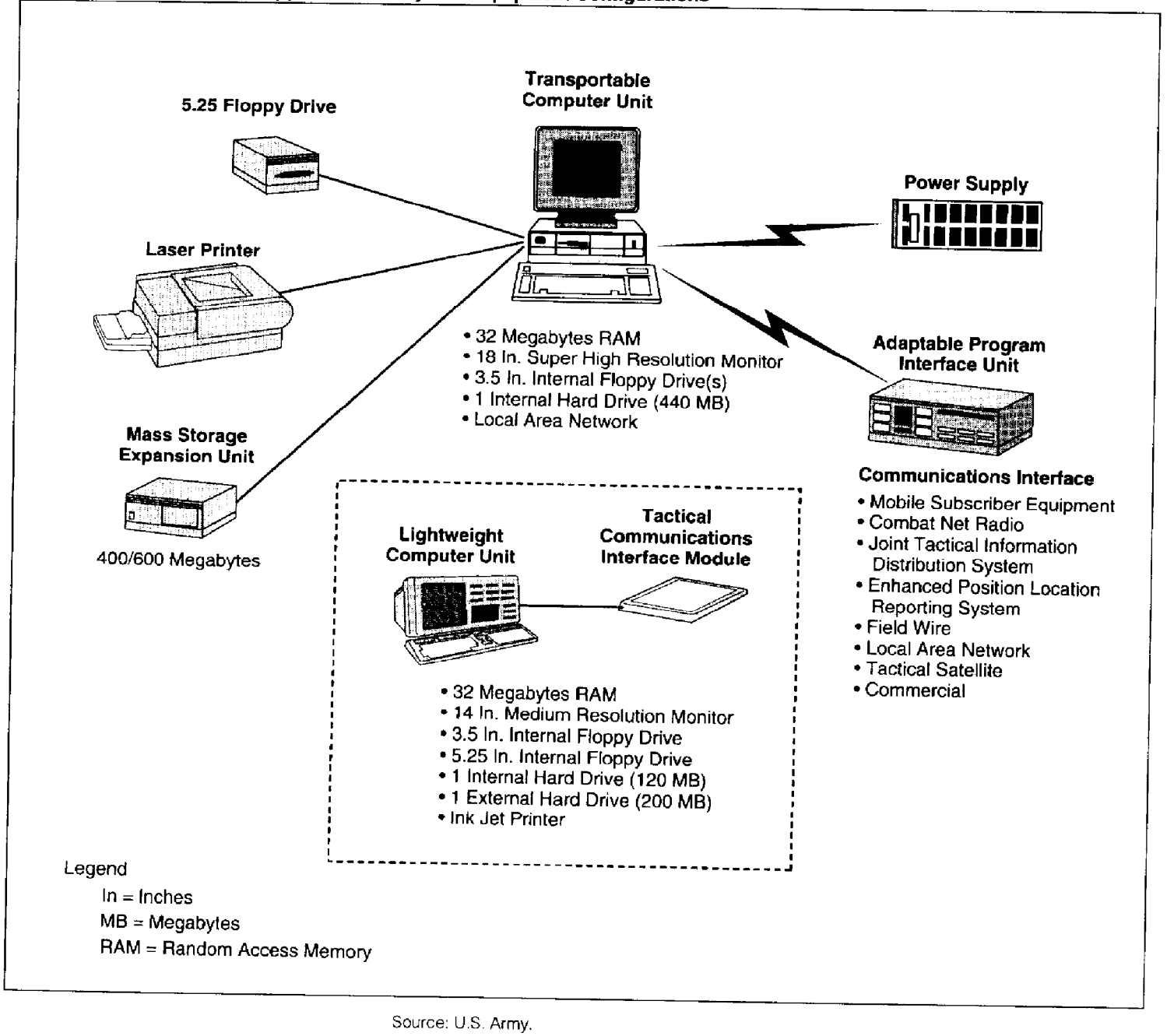
Background

The Army Tactical Command and Control System (ATCCS) is comprised of five command and control segments, three communications segments, and one CHS segment to provide computer commonality. The ability of the ATCCS segments to automatically exchange data is critical to ATCCS's ability to satisfy requirements and demonstrate military effectiveness. The Maneuver Control System segment is the focal point for data exchange between the ATCCS segments.

The CSSCS segment is to automate the collection, analysis, and dissemination of logistical, medical, financial, and personnel information to theater, force level, and combat services support commanders. When fully fielded in 2003, the Army estimates that it will have spent $408.4 million on CSSCS. The service support information furnished to ATCCS

is used by commanders, along with other information, to assess a unit's readiness and evaluate its ability to deploy. Also, it will share selected information with the other four ATCCS segments. The system architecture is comprised of two computers—the transportable and the lightweight. The lightweight computer is to be used at locations with lower processing requirements. Because of the delay in development of the lightweight computer, this report focuses on the acquisition of the transportable computer. Figure 1 shows the CSSCS configurations.

Figure 1: Combat Service Support Control System Equipment Configurations



Source: U.S. Army.

Results in Brief

The Army had planned to initiate a $12.8 million procurement of CHS computers and related equipment for CSSCS before operational testing. The Army's strategy was to use the results of a 1-week demonstration in November 1993 to initiate low-rate initial production of CSSCS hardware. The Army completed the 1-week demonstration, but no longer plans to use the demonstration to justify CSSCS procurement.

Due to delays in software development and technical testing, and the need to correct critical software deficiencies, the Army twice postponed CSSCS operational testing. This rescheduling caused the Army to change its acquisition strategy in name only, from a full-rate production decision to a low-rate initial production decision for the same number of CSSCS computers as previously planned. However, initiation of low-rate initial production was not justified because the purposes served by such production were not in evidence. Specifically, there is no need to establish a production line since one already exists, and the Army already has more than a sufficient number of computers to complete CSSCS operational testing. In addition, there is no formal urgent requirement for the system. CSSCS operational testing is now scheduled for July 1994 to support full-rate production approval in fiscal year 1995.

The Army's CSSCS acquisition strategy would have continued an approach that has resulted in prematurely buying hardware that becomes outmoded while the Army waits for software to be developed. In addition, the Army could employ some of the equipment from other ATCCS programs to meet CSSCS equipment requirements for operational testing and initial fielding.

The CSSCS acquisition strategy to initiate low-rate initial production was in conflict with Army and congressional guidance to take time to develop weapon systems right the first time. It also ignored congressional guidance to test the ATCCS segments as an integrated system of systems.

The Senate and House reports on the fiscal year 1994 Department of Defense (DOD) appropriation denied funding for this acquisition. The Army's most recent proposal is to spend $4 million for computers for testing and to conduct operational testing before seeking full-rate production approval. However, changes to the acquisition strategy have yet to be finalized.

Delays Cause Changes to CSSCS Development and Acquisition Strategy

The 1992 CSSCS program strategy included conducting an operational test in May 1993, along with the Maneuver Control System operational test. The software version used during the May test was to be corrected, enhanced, and retested before fielding in 1994. Equipment acquisition was to have begun after successful completion of the operational testing and favorable review by the Office of the Secretary of Defense. Also, the program was dependent on the Maneuver Control System version-11 software, especially its communications, interoperability, and mapping software modules.

Delays in the maneuver program and CSSCS software development problems led to a January 1993 decision to delay CSSCS operational testing from May to September 1993. An Army test readiness review in April 1993 concluded that delays in conducting technical tests and the need to correct critical software deficiencies would require further slippage in operational testing. This testing will begin in July and last through September 1994. In response, the Army then scheduled a 6-week limited user test to begin in September and last to November 1993, which was subsequently reduced to a 1-week demonstration due to limited testing funds. The Army plans to demonstrate automated interoperability between ATCCS control segments during the 1994 operational testing. However, no automated exchange of data was planned for the November 1993 demonstration.

These delays have resulted in planned enhancements being deferred until after operational testing. The deferred planned enhancements include (1) replacing the transportable computer's adaptable program interface unit with the smaller and lighter tactical communications interface module and (2) improving mapping and other software capabilities. As a result, the software must be enhanced before it can be fielded.

The Army requested $12.8 million for fiscal year 1994 to buy 108 computers, initiating the full-rate production of CSSCS. However, as a result of delays in the operational testing required to support the full-rate production decision, the Army changed its acquisition strategy. Prior to the congressional committees' recent denial of fiscal year 1994 funding and the conferees' denial of authorization, the Army planned to buy the same 108 computers under a low-rate initial production contract. In effect, under this strategy, the Army would have bought the initial full-rate production quantities of these computers as planned, despite the inadequacies of the 1-week demonstration, the inability to complete timely

operational testing, and without regard for capable equipment already available for test purposes.

The Army's Basis for CSSCS Acquisition Was Flawed

The Army cited the need to equip the remaining units of III Corps (two divisions, a separate brigade, and round out units) and provide equipment for Army-wide training as reasons for its low-rate initial production strategy. However, this acquisition strategy ignores the purposes served by low-rate initial production, including (1) establishing a production line and (2) acquiring equipment for operational testing. There is no need to establish a production line because the CSSCS program acquires its equipment through the already existing CHS contract that enables the Army to order equipment as needed. In other words, a production line is already established. As for acquiring equipment for operational testing, the Army has already purchased enough equipment for the CSSCS operational test.

Also, there is no urgent requirement for CSSCS. In the past, other systems have been justified for low-rate initial production on the basis of an urgent need. However, the Army has not established a CSSCS program requirement based on an urgent need.

The ATCCS program already has an excess number of computers and related equipment for development purposes. If the Army continues with its current strategy, the number of excess computers is likely to increase. For example, the Maneuver Control System's operational test was scheduled for May 1993. However, the failure to develop maneuver control version-11 software has delayed this program's operational test to late 1995 and resulted in excess developmental computers. The Maneuver Control System has 251 computers, and most of them are not needed for developmental purposes. This common hardware can be used to meet CSSCS requirements. The Maneuver Control System project manager has made 139 systems available for other ATCCS programs.

Also, changes in the ATCCS fire support segment should make the 211 computers currently on hand available for other ATCCS users. The Army has determined that the ATCCS fire support segment needs a more capable reduced instruction set computer, which it plans to evaluate during the fire support segment's operational test, beginning in July 1994. Technical testing, which showed that the fire support software uses 100 percent of computer capacity when it should be at 50 percent, appears to support the need for the reduced instruction set computer. After completing the 1994 test, the Army will then begin procuring these computers to replace the

current CHS models it has already acquired. Other ATCCS users could then field these CHS computers rather than buying more.

CSSCS Demonstration Is Not a Basis for Production

The Army downscoped the 1993 testing from a full operational test to a 1-week demonstration of the system's capabilities. This demonstration may be useful in determining the system's readiness for operational testing and subsequent full-rate production approval. However, use of the 1-week demonstration as the basis for initiating low-rate initial production would have resulted in substantially increasing program risks because

- the software used in the demonstration must be enhanced before it can be fielded;
- the demonstration was limited,the critical requirement to automatically exchange data among and between ATCCS control segments was not demonstrated; and
- the equipment configuration demonstrated did not include the planned replacement for the transportable computer's communications interface device—the Tactical Communications Interface Module.

Premature Acquisitions Have Been Wasteful

The Army's CSSCS acquisition strategy of prematurely acquiring equipment continues an ATCCS strategy that has resulted in wasted equipment acquisitions and costly upgrades. For example, the Army prematurely spent $155 million on Maneuver Control System equipment that it decided, in 1990,[1] no longer met user requirements. The Army also prematurely invested $126 million in militarized equipment that was withdrawn from units and excessed. Another $29 million of nondevelopmental equipment was not deployed because light divisions refused to accept it due to its bulky size and excessive weight. This equipment was subsequently placed in a warehouse until the Army could find another use for it.

The 12- to 18-month cycle in computer technology changeovers means that the Army must upgrade or scrap computers it bought prematurely because the software was not ready. In 1988, the Army bought 970 early model CHS computers at a cost of $37.6 million before completing software development for ATCCS programs. Subsequently, software development problems delayed the introduction of these computers to the field. In the interim, advances in computer technology have occurred, allowing the Army to buy four newer generations of CHS computers, all of which have

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

increased capabilities that enable the hardware to run ATCCS software more efficiently than earlier models.

Also, the Army chose to upgrade computers it did not need at substantial extra costs to the ATCCS program. For example, we found that the CHS equipment upgrades resulted in the Army spending over $16.6 million to upgrade 861 CHS computers. Some of these computers have been upgraded twice. For example, some early model computers were upgraded in 1990 and again in 1993 to the current CHS model. The original unit cost was $18,418 and the upgrades cost $45,714, for a total unit cost of $64,132. The current CHS model is estimated to cost $37,316, or $26,816 less per unit than the cost to acquire and upgrade the early model.

To support these early model computers, the Army prematurely acquired expensive peripheral equipment that its units no longer want. For example, the Army has decided to replace the CHS computer's communications interface device (the adaptable programmable interface unit) with the tactical communications interface module as soon as the required software is completed. The adaptable unit weighs 50 pounds, while the tactical module is an internal computer card.

Software development problems delayed implementing and fielding of the old communications device, while acquisitions continued. This wasteful approach resulted in the Army acquiring 597 adaptable units at a cost of $6.3 million. The Army is now trying to find a use for this equipment. Active and National Guard units do not want the adaptable units because of their bulky size and excessive weight. If the Army had developed workable and fieldable software packages before buying significant quantities of CHS equipment and peripherals, it could have fielded the most modern hardware and avoided the cost of upgrading older CHS computers and replacing related peripherals.

CSSCS Development Was Not Following Army Guidance

The CSSCS program does not follow the acquisition approach defined in the Army's recently published plan to modernize its forces, which emphasizes the need to take more time to develop systems properly. The Army plan recognizes the impact of the reduced threat and budgetary pressures. The January 1993 Army Modernization Plan, which outlines the Army's modernization course to achieve land force dominance, states,

"With a less urgent threat, and the fiscal constraints imposed on the defense department, DOD has revised its acquisition approach: today we can take more time to develop and

evaluate new technologies before making decisions on weapons/systems production. The effect of this new approach serves to reduce concurrence in development programs and retain existing equipment for longer periods."

Congressional Guidance Was Not Being Followed

The Army's strategy to initiate low-rate initial production for CSSCS does not follow congressional acquisition guidance, which states that the services should take time to develop weapon systems right the first time. For example, in its report on the fiscal year 1991 National Defense Authorization Bill, the Senate Committee on Armed Services provided guidance for the development and acquisition of systems, which stated 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 wanted the services to develop a system right the first time rather than commit to a troubled system. For example, the Committee stated that, ". . .the development, testing and production of weapons systems have overlapped, only to spend large amounts of money to make weapons work right after they are in the field." The Committee also stated that "DOD 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 weapons systems."

In addition, the conference report for the fiscal year 1991 DOD appropriation expressed concern over the Army's approach for developing, testing, and deploying ATCCS as an integrated system. Congressional conferees directed that each segment's test and evaluation plan be revised to include interoperability testing at development and operational testing milestones.

Fiscal Year 1994 Congressional Budget Action Impacts CSSCS Procurement

The House and Senate Appropriations Committees denied DOD's 1994 request for $12.8 million in procurement funds to buy 108 CSSCS computers. At the Army's request, the committee conferees increased the fiscal year 1994 CSSCS research, development, test, and evaluation appropriation by $4 million, to $24.5 million. The Army plans to use these funds to buy 29 computers for CSSCS operational testing, which is to begin in July 1994. However, we have noted above that the Army already has a sufficient number of computers to conduct CSSCS operational testing.

Recommendations

Given that the Army's unsettled CSSCS acquisition strategy could result in the premature procurement of additional CSSCS hardware, we recommend that the Secretary of Defense direct the Secretary of the Army to

- defer procurement of CSSCS computers until the system software that is to be fielded successfully (1) completes an operational test that demonstrates its military effectiveness and (2) demonstrates automated data exchange among and between the ATCCS control segments and
- use existing ATCCS sources of CSSCS equipment to meet CSSCS operational testing equipment requirements.

Agency Comments and Our Evaluation

DOD essentially agreed with our report and believes that actions taken by DOD and the Army have addressed the report's issues. Thus, DOD believes that additional direction to the Army on the report's issues is not warranted. Specifically, they stated that reviews by DOD's and the Army's management will change the CSSCS acquisition strategy to include (1) completing an operational test that measures operational effectiveness and suitability to include the ability to automatically exchange data between and among the ATCCS segments and (2) delaying procurement of computers until sufficient operational testing has been completed.

While DOD's and the Army's plans are in concert with our recommendations, the Army has not implemented them yet, and therefore, we believe that our recommendations still warrant action to ensure that (1) system software is fully developed and operationally tested, (2) the system's military effectiveness and the ability to automatically exchange data between and among ATCCS segments is successfully demonstrated, and (3) no premature equipment acquisitions occur. We will continue to monitor actions to implement this. DOD's comments and our response are included in appendix I.

Scope and Methodology

We examined the Army's development and acquisition efforts to determine whether they will ensure that the CSSCS program is ready to initiate acquisition of CHS computers and related equipment. We discussed this information with officials at the following offices:

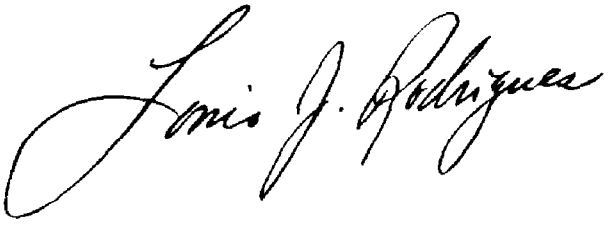
- Program Executive Office for Command and Control Systems, Fort Monmouth, New Jersey.
- ATCCS program offices Fort Belvoir and Fort Lee, Virginia, and Fort Monmouth, New Jersey.

- Office of the Secretary of Defense for Command, Control, Communications, and Intelligence; Office of the Director of Information Systems for Command, Control, Communications, and Computers; Office of the Director, Operational Test and Evaluation; Office of the Deputy Director, Defense Research and Engineering (Test and Evaluation); and Office of the Assistant Secretary of the Army; Washington, D.C.
- Army Materiel Systems Analysis Activity, Aberdeen, Maryland.
- Operational Evaluation Command, Alexandria, Virginia.
- Test and Experimentation Command, Fort Hood, Texas.
- Combined Arms Command, Fort Leavenworth, Kansas.
- CSSCS software development contractor office, Carson, California.
- System integration contractor office, Fort Washington, Pennsylvania.

We performed our review from October 1992 to December 1993 in accordance with generally accepted government auditing standards. This report has been revised to reflect recent program events, congressional actions, agency comments on the draft report, and Army proposals for changing the program's schedule and acquisition strategy.

We are sending copies of this report to the Director, Office of Management and Budget; the Secretary of Defense; the Secretary of the Army; and other interested parties. Copies will be made available to others on request.

Please contact me at (202) 512-4841 if you or your staff have any questions concerning this report. Major contributors to this report were William L. Wright, Assistant Director, Paul A. Puchalik, Evaluator in Charge, and Robert G. Perasso, Evaluator.



Louis J. Rodrigues
Director, Systems Development
and Production Issues

Comments From the Department of Defense

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301-3040

COMMAND, CONTROL, COMMUNICATIONS AND INTELLIGENCE

October 7, 1993

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: "Premature Acquisition of the Army's Combat Service Support Control System", dated August 31, 1993 (GAO Code 395215), OSD Case 9517. The Department partially concurs with the report.

See comment 1.

Appropriately, the Army made a decision to slip operational testing for the Combat Service Support Control System into the fourth quarter FY 1994. This decision moved the associated full rate production decision into FY 1995 thus putting the FY 1994 procurement funding at risk. The Program Manager proposed alternative solutions to obligate the FY 1994 funding. As reported by the GAO, changes to the program acquisition and testing strategies to procure additional computers for operational testing were among the alternative solutions.

Subsequent to completion of the GAO review work, this office, along with other members of the OSD staff, reviewed the program with the Army. As a result, the Army conducted a Management Review of the Combat Service Support Control System which resulted in an Army decision not to pursue the Program Manager's alternative strategy for obligating the FY 1994 procurement funding for additional computers for testing.

Instead, the Army is revising the System's development plan to delay procurement of additional computers until effectiveness has been demonstrated. My office will ensure the revised Army program appropriately reflects those recent decisions. The revised Acquisition Program Baseline and the Test and Evaluation Master Plan are due to be completed by 30 October 1993.

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

Sincerely,

Emmett Paige, Jr.

Enclosure

GAO DRAFT REPORT - DATED AUGUST 31, 1993
(GAO CODE 395215) OSD CASE 9517

"BATTLEFIELD AUTOMATION: PREMATURE ACQUISITION OF THE ARMY'S COMBAT SERVICE SUPPORT CONTROL SYSTEM"

DEPARTMENT OF DEFENSE COMMENTS

* * * * *

FINDINGS

- FINDING A: The Army Tactical Command and Control System. The GAO reported that the Army Tactical Command and Control System is comprised of five command and control segments, three communications segments, and one Common Hardware and Software segment to provide computer commonality. The GAO also reported that the ability of the Army Tactical Command and Control 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 noted that the Maneuver Control System segment is the focal point for data exchange between the Army Tactical Command and Control System segments.

  The GAO reported that the purpose of the Combat Service Support Control System segment is to automate the collection, analysis, and dissemination of logistical, medical, financial, and personnel information to theater, force level, and combat services support commanders. The GAO further reported that,when fully fielded in 2003, the Army estimates it will have spent $408.4 million on the Combat Service Support Control System. The GAO noted that the service support information furnished to the Army Tactical Command and Control System is used by commanders, along with other information, to assess the state of readiness of a unit and to evaluate its ability to deploy. The GAO observed that the Combat Service Support Control System segment will share selected information with the other four Army Tactical Command and Control System segments. The GAO explained that the system architecture is comprised of two computers--the transportable and lightweight computer units. The GAO further explained that the lightweight computer is to be used at locations with lower processing requirements. The GAO pointed out that, due to the delay in development of the lightweight computer, its current report focuses on the acquisition of the transportable computer. (pp. 1-2/ GAO Draft Report)

  Now on pp. 1-2.

  DOD RESPONSE: Concur.

- FINDING B: Delays Cause Changes to Combat Service Support System Development and Acquisition Strategy. The GAO reported that, in 1992, the Combat Service Support Control System program strategy included conducting an operational test in May 1993--along with the Maneuver Control System operational test. The GAO found that delays in the

Enclosure

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maneuver program and the Combat Service Support Control System software development problems led to the January 1993 decision to delay the Combat Service Support Control System operational testing from May to September 1993. The GAO reported that an Army test readiness review in April 1993 concluded the delays in conducting technical tests and the need to correct critical software deficiencies would require further slippage in operational testing. The GAO observed that the operational testing is now scheduled to begin in May and last through July 1994. The GAO noted that, in response, the Army then scheduled a six-week limited user test to begin in September and last to November 1993, which was subsequently reduced to a 1-week demonstration, due to limited testing funds. The GAO noted that no automated exchange of data is planned for the November 1993 demonstration.

The GAO concluded that the cited delays have resulted in planned enhancements being deferred until after operational testing. The GAO added that the deferred planned enhancements include (1) replacing the transportable computer's adaptable program interface unit with the smaller and lighter tactical communications interface module and (2) improving mapping and other software capabilities. The GAO concluded that, as a result, the software used for the demonstration must be enhanced before it can be fielded.

The GAO reported the Army requested $12.8 million in procurement funds for FY 1994 to buy 108 computers, initiating the full-rate production of the Combat Service Support Control System. The GAO noted that, as a result of delays in operational testing required to support the full-rate production decision, the Army changed its acquisition strategy and is now going to use those funds to buy the same 108 computers under a low-rate production contract. (pp. 5-7/ GAO Draft Report)

Now on pp. 5-6.

DOD RESPONSE: Partially concur. The Department agrees that, for various reasons, the Initial Operational Test and Evaluation for the Combat Service Support Control System was delayed from May to September 1993, subsequently delayed to May 1994, and is now scheduled for mid-July to mid-September 1994. Among those reasons were (1) software enhancements to fix shortfalls found during technical testing, (2) adjustment to meet Army Tactical Command and Control System testing requirements, (3) delay of the start of technical testing for the Combat Service Support Control System, and (4) availability of testing units and testing windows. The testing delays were conscious decisions by the Army based upon the recommendations from Army Operational Testing Readiness Reviews. The Department also agrees that the Army decided to conduct limited user testing during the September 1993 period, since the Initial Operational Test and Evaluation had slipped and the name, duration and scope of the limited user testing has varied.

The Department does not concur that a 1-week demonstration will be used to support an acquisition decision to spend $12.8 million dollars of procurement funding to purchase 108 computers under a low-rate production contract. On August 23, 1993, subsequent to the distribution of this GAO report, the Army conducted, a Management Review of the

See comment 1.

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Combat Service Support Control System to determine if a change was warranted to the acquisition and testing strategy for the program. The Army review was as a result of a Defense Acquisition Executive Summary Review in July 1993 by the Under Secretary Of Defense (Acquisition and Technology). Based upon its management review, the Army determined the following:

A Limited User Test will be conducted from October through November 1993 at Fort Hood, Texas using elements of III Corps. The Limited User Test will be conducted under realistic tactical conditions and will include testing the Combat Service Support Control System in a subset of Command Posts to include the III Corps Headquarters, the Second Armored Division, as well as Command Posts associated with the Corps Support Command and the Armored Cavalry Regiment. Objectives of the Limited User Test are to evaluate the Combat Service Support Control System performance and capability to support Corps and Division tactical operations using organic tactical communications.

See comment 2.

Interoperability between the Combat Service Support Control System and various Standard Army Management Information Systems and the ability of the Combat Service Support Control System to support Force Level Control information requirements are now included in the Limited User Testing. The testing will provide valuable information regarding the maturity of the system, identify problems and provide user feedback in sufficient time to prepare the Combat Service Support Control System for the Initial Operational Test and Evaluation.

See comment 1.

The Army will no longer pursue an acquisition strategy for the Combat Service Support Control program based upon a Low Rate Initial Production in FY 1994 to procure additional computers. The Management Review concluded that a small quantity of additional computers were required for operational testing in FY 1994 and that Research, Development, Testing, and Evaluation funding would be pursued in lieu of procurement funding. Action has been initiated through the Assistant Secretary of the Army (Research, Development, and Acquisition) to the Senate Appropriations Committee to increase FY 1994 Research, Development, Testing, and Evaluation funding to allow for the purchase of those developmental and test systems.

- **FINDING C: The Army's Current Basis for Combat Service Support Control System is Flawed.** The GAO concluded that the Combat Service Support Control System strategy does not meet the DoD guidance for low-rate initial production, which includes--(1) establishing a production line and (2) acquiring equipment for operational testing. The GAO reported that the Army cited the following two reasons for the low-rate production strategy:

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-to equip the remaining units of III Corps (two divisions, a separate brigade and round out units); and

-to provide equipment to the training base.

The GAO concluded, however, that there is no need to establish a production line because the Combat Service Support Control System program acquires its equipment through the common hardware and software contract, which enables the Army to order equipment as needed. The GAO further concluded that the Army already had purchased enough equipment for the Combat Service Support Control System operational test.

The GAO also concluded that there is no urgent requirement for the Combat Service Support Control System. The GAO pointed out that, in the past, other systems have been justified for low-rate initial production on the basis of an urgent need. The GAO found that (1) the Army Tactical Command and Control System program already has an excess number of computers and related equipment for development purposes and (2) if the Army continues with its current strategy, the number of excess computers is likely to increase. The GAO cited the example that the Maneuver Control System has 251 computers, and most of them are not needed for developmental purposes. The GAO also asserted that the common hardware can be used to meet the Combat Service Support Control System requirements. The GAO also found that the Maneuver Control System project manager made 139 systems available for other Army Tactical Command and Control System programs.

The GAO concluded changes in the Army Tactical Command and Control System fire support segment (Advanced Field Artillery Tactical Data System) should make the 211 computers currently on hand available for other Army Tactical Command and Control System users. The GAO explained the Army had determined that the Army Tactical Command and Control System fire support segment needs a reduced instruction set computer. The GAO noted that the Army plans to evaluate the reduced instruction set computer during the fire support segment operational test, beginning in May 1994. The GAO reported that the Army will then begin procuring the reduced instruction set computers instead of the current common hardware and software models it had already acquired. The GAO also noted that would make more computers available for the Army Tactical Command and Control System users. (pp. 7-11/ GAO Draft Report)

Now on pp. 6-7.

DOD RESPONSE: Partially concur. The Department agrees that the original strategy of pursuing a Low Rate Initial Production to take advantage of FY 1994 procurement funding is no longer appropriate. Therefore, as discussed in the DoD response to Finding B, the Army is no longer pursuing the strategy.

The Department does not agree with the GAO that the 251 computers from the Maneuver Control System and the 211 computers from the Advanced Field Artillery Tactical Data System are excess and can be diverted for meeting the Combat Service Support Control System

See comment 3.

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requirements. The following is an accountability listing of the 251 computers associated with the Maneuver Control System:

139 - Test Unit at Fort Hood, Texas
12 - Maneuver Control System Prototype Effort
53 - Various Development Activities (New Equipment Training, Army Tactical Command and Control Experimentation Site, Future Battle Lab at Fort Gordon, Georgia, Electronic Proving Grounds, Etc)
26 - Maneuver Control System Re-integration Effort
21 - Contractor Government Furnished Equipment (Common Army Tactical Command and Control Software System Development, MILTOPE Corporation Logistics Diagnostics, X.25 development, Etc.)

251 - Total In Use

As the centerpiece for the Army Tactical Command and Control System, the Maneuver Control System has the responsibility for supporting overall Army Tactical Command and Control System development and testing. As indicated in the above accountability listing the 251 computers are being employed in valid development efforts.

The following is an accountability of the 211 computers associated with the Advanced Field Artillery Tactical Data System:

82 - Operational Test Unit at Fort Hood, Texas
42 - Training (New Equipment Training, Training Development Site, and Training Plan Development at Fort Sill, Oklahoma)
53 - Development (Magnavox, ARL Corporation, and Fort Sill, Oklahoma)
2 - System Manager, Fort Sill, Oklahoma
2 - Program Manager Office
15 - Program Executive Office, Command and Control Systems
15 - Army Tactical Command and Control System Experimentation Site, Fort Lewis, Washington

211 - Total

The Advanced Field Artillery Tactical Data System is currently undergoing technical testing. The Initial Operational Test and Evaluation has slipped to September 1994. All 211 computers are needed to support continued development and preparation for operational testing. The GAO is correct that the Advanced Field Artillery Tactical Data System has identified a need for the Reduced Instruction Set Computer. The faster computer will be used, along with current computers, for operational testing. Once operational testing is completed, the Advanced Field Artillery Tactical Data System production schedule will, at best, permit the start of fielding for the faster computers in the last quarter of FY 1995 and an associated redistribution of associated slower computers. That will not be in time, however, to support initial Combat Service Support Control System requirements.

See comment 4.

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- **FINDING D: Combat Service Support Control System Demonstration is Not a Basis for Production.** The GAO reported that the Army downscoped the 1993 testing from a full operational test to a 1-week demonstration of the capabilities of the system. The GAO found, however, that based on the reduced level of testing, the Army now plans to initiate the Combat Service Support Control System procurement. The GAO explained that the 1-week demonstration could be useful in determining the system readiness for the 1994 operational test and subsequent full-rate production approval scheduled for FY 1995. The GAO concluded that the use of the 1-week demonstration, rather than successful operational tests, as the basis for initiating production results is substantially increasing program risks because (1) the software must be enhanced before it can be fielded, (2) the critical requirement to automatically exchange data among and between the Army Tactical Command and Control System control segments will not be demonstrated, and (3) the equipment configuration to be demonstrated does not include the planned replacement for the transportable communications interface device of the computer--the Tactical Communications Interface Module. (pp. 10-11 GAO Draft Report)

Now on p. 7.

DOD RESPONSE: Concur. The Department agrees that using a demonstration to make a procurement decision would have increased the program risks. As discussed in the DoD response in Finding B, however, the Army is no longer pursuing a strategy to make a Low Rate Initial Production decision based on the results of a 1-week demonstration.

- **FINDING E: Premature Acquisitions Have Been Wasteful.** The GAO concluded that the Army acquisition strategy of acquiring equipment for the Combat Service Support Control System before completing operational testing continues a strategy used on the overall Army Tactical Command and Control System--one which has resulted in wasted equipment acquisitions and costly upgrades. The GAO pointed out that the Army, without demonstrating operational effectiveness--(1) prematurely spent $155 million on Maneuver Control System equipment that it decided, in 1990, no longer met user requirements, (2) prematurely invested $126 million in militarized equipment, which was withdrawn from units and excessed, (3) did not deploy another $29 million of non-developmental equipment, because light divisions refused to accept the equipment due to its bulky size and excessive weight, and (4) subsequently placed the equipment in a warehouse until another use could be found.

The GAO pointed out that the 12- to 18-month cycle in computer technology changeovers means that the Army must upgrade or scrap computers it bought prematurely because the software was not ready. The GAO noted that, in 1988, the Army bought 970 early model Common Hardware and Software computers at a cost of $37.6 million before completing software development for the Army Tactical Command and Control System programs. The GAO reported that subsequently, software development problems delayed the introduction of the computers to the field. The GAO found that, in the interim, advances in computer technology have occurred, allowing the Army to buy four newer generations of Common Hardware and Software computers--all of which

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have increased capabilities that enable the hardware to run the Army Tactical Command and Control System software more efficiently than the earlier models.

The GAO also reported that the Army chose to upgrade computers it did not need at substantial extra costs to the Army Tactical Command and Control System program. The GAO cited an example where the Common Hardware and Software equipment upgrades resulted in the Army spending over $16.6 million to upgrade 861 Common Hardware and Software computers. The GAO found that some of those computers have been upgraded twice--i.e., some early model computers were upgraded in 1990 and again in 1993 to the current Common Hardware and Software model. The GAO noted that the original unit cost was $18,418 and the upgrades cost $45,714--for a total unit cost of $64,132. The GAO pointed out that the current Common Hardware and Software model is estimated to cost $37,316, or $26,816 less per unit than the cost to acquire and upgrade the early model.

The GAO further reported that, to support the early model computers, the Army prematurely acquired expensive peripheral equipment that units no longer want. The GAO showed, for example, that the Army has decided to replace the communications interface device (the adaptable programmable interface unit) of the Common Hardware and Software computer with the tactical communications interface module as soon as the required software is completed. The GAO noted that the adaptable unit weighs 50 pounds, while the tactical module is an internal computer card.The GAO reported that software development problems delayed the implementation and fielding of the old communications device, while acquisitions continued. The GAO also reported that the wasteful approach resulted in the Army acquiring 597 adaptable units at a cost of $6.3 million. The GAO explained that the Army is now trying to find a use for that equipment. The GAO noted that the Active and National Guard units do not want the adaptable units because of their bulky size and excessive weight. The GAO reported that if the Army had developed working and fieldable software packages before buying significant quantities of Common Hardware and Software equipment and peripherals, it could have fielded the most modern hardware and avoided the cost of upgrading older Common Hardware and Software computers and replacing related peripherals. (pp. 10-14/GAO Draft Report)

Now on pp. 7-8.

See comment 5.

DOD RESPONSE: Partially concur. The Department agrees that the Maneuver Control System has experienced less than total success during the long acquisition effort. The Department does not agree, however, that the fielding of the initial militarized tactical computer terminals and the subsequent non-developmental computers as surrogates has proven to be wasteful. Although not the ultimate solutions, the experience gained from those early efforts has provided valuable feedback to the future development of the Army Tactical Command and Control programs.

The Department agrees that the approach the Army selected for purchasing computers for development and testing of the Army Tactical Command and Control System has not been totally successful. The initial procurement of Common Hardware computers in 1988 for development

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and testing of the Army Tactical Command and Control System was made in accordance with Department of Defense directives and was done with the intent that complex software developments could be completed on a schedule that would allow Initial Operational Testing and Evaluations for Army Tactical Command and Control Programs and associated full production decisions to occur as scheduled. Since that effort has not been fully successful, the Army has been forced to upgrade the computers that were purchased in 1988 to maintain state-of-the-art capability--in some cases more than once. The same situation is true for the adaptable programmable interface unit that the GAO identifies.

See comment 6.

The procurement of equipment for the Combat Service Support Control System is not comparable to the past experiences of the Maneuver Control System. The Combat Service Support Control System is the newest effort by the Army to automate command and control systems and, as such, has been able to take advantage of the lessons learned from development of the Maneuver Control System.

- **FINDING F: Combat Service Support Control System Development is not Following Army Guidance.** The GAO found that the Combat Service Support Control System program does not follow the acquisition approach defined in the recently published Army plan to modernize its forces which emphasizes the need to take more time to develop systems properly. The GAO noted that the Army recognizes the impact of the reduced threat and budgetary pressures. The GAO also noted that the January 1993 Army Modernization Plan, which outlines the modernization course of the Army to achieve land force dominance, states, "With a less urgent threat, and the fiscal constraints imposed on the Defense Department, DoD has revised its acquisition approach: today we can take more time to develop and evaluate new technologies before making decisions on weapons/systems production. The effect of this new approach serves to reduce concurrence in development programs and retain existing equipment for longer periods." (p. 14/GAO Draft Report)

Now on pp. 8-9.

DOD RESPONSE: Partially concur. The Department acknowledges that in July 1993 there was some question as to the planned development of the Combat Service Support Control System. As discussed in the DoD response to Finding B, however, the Army conducted a Management Review of the System in August 1993, which resulted in a revision to the planned development. The revised program schedule will provide more time to complete the development. The Army is currently in the process of adjusting the Acquisition Program Baseline and the Test and Evaluation Master Plan to reflect the revised plan. Completion of the revised documents is expected by October 31, 1993.

See comment 1.

See comment 6.

- **FINDING G: Congressional Guidance is Not Being Followed.** The GAO reported that the strategy of the Army to initiate limited procurement for the Combat Service Support Control System does not follow congressional acquisition guidance, which states that the Services should take time to develop weapon systems right the first time. The GAO states, for example, in its report on the fiscal year 1991 DoD Authorization Bill, the Senate Committee on Armed services provided guidance for the development

and acquisition of systems which stated 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 GAO also reported that the Committee wanted the Military Services to develop a system right the first time, rather than commit to a troubled system. The GAO referenced the Committee statement, to the effect, "...the development, testing and production of weapons systems have overlapped, only to spend large amounts of money to make weapons work right after they are in the field." The GAO further noted that the Committee also stated, "DoD 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 weapons systems."

The GAO noted that, in addition, the conference report for the FY 1991 DoD appropriation expressed concern over the approach the Army was taking for developing, testing, and deploying the Army Tactical Command and Control System as an integrated system. The GAO reported that the congressional conferees directed that each segment of the test and evaluation plan be revised to include interoperability testing at development and operational testing milestones. The GAO concluded that the current test strategy of the Army would initiate limited Combat Service Support Control System procurement without testing an automated and integrated the Army Tactical Command and Control System. The GAO asserted that, nonetheless, current Army plans call for the procurement to start 3 months prior to such a demonstration. (pp. 15-16/GAO Draft Report)

Now on p. 9.

DOD RESPONSE: Partially concur. The DoD acknowledges that, immediately prior to August 1993, there was some question as to the planned development of the Combat Service Support Control System. However, as discussed in the DoD response to Finding B, the decision from the Army Management Review of the Combat Service Support Control System changes the acquisition strategy. The System will now remain in development during FY 1994, will not proceed with the procurement of hardware based upon a Limited User Test, and will undergo a thorough Initial Operational Test and Evaluation in FY 1994 followed by a Full Rate Production Decision in FY 1995. The Army Tactical Command and Control horizontal interoperability testing will be a part of the Initial Operational Test and Evaluation and will be outlined in the Test and Evaluation Master Plan for the Combat Service Support Control System, which should be available by October 30, 1993.

See comment 1.

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RECOMMENDATION

- **RECOMMENDATION:** The GAO recommended that the Secretary of Defense direct the Secretary of the Army to defer procurement of the Combat Service Support Control System computers until the system

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software that is to be fielded successfully (1) completes an operational test that demonstrates its military effectiveness and (2) demonstrates automated data exchange among and between the Army Tactical Command and Control System control segments. (p. 11/GAO Draft Report)

Now on p. 10.

DOD RESPONSE: Partially concur. The Department agrees that Combat Service Support Control System must complete an Initial Operational Test and Evaluation that measures operational effectiveness and suitability to include the ability to automatically exchange data among and between the Army Tactical Command and Control System control segment prior to making a Full Rate Production Decision. As discussed in the DoD responses to Findings B, F, and G, the Army conducted a Management Review of the System in August 1993, and determined that the development plan should be revised. Under the revised schedule, procurement of the System computers will be delayed until sufficient operational testing has been completed to demonstrate effectiveness. The Army is currently revising the Acquisition Program Baseline and the Test and evaluation Master Plan to reflect the revised development approach. Completion of those revised documents is expected by October 30, 1993. Accordingly, additional Secretary of Defense direction to the Army is not warranted.

See comment 1.

See comment 6.

The following are GAO's comments on the Department of Defense's (DOD) letter dated October 7, 1993.

GAO Comments

1. The positive actions taken by the DOD and the Army to change the Combat Service Support Control System (CSSCS) program's acquisition strategy are a step in the right direction. We will continue to monitor the program to ensure that (1) system software is fully developed and operationally tested, (2) the system's military effectiveness and the automated exchange of data among and between Army Tactical Command and Control System (ATCCS) segments is successfully demonstrated, and (3) no premature equipment acquisitions occur.

2. The automated exchange of data between and among ATCCS segments was not demonstrated during the limited user test. The Army plans to demonstrate this capability during the 1994 ATCCS testing.

3. DOD's accountability listing provides the location of Maneuver Control System (MCS) Common Hardware and Software (CHS) computers, but it fails to identify how the 139 computers assigned to the test unit at Fort Hood are being used for developmental purposes. No MCS software development is occurring at Fort Hood. According to an Army official, MCS operational testing is not scheduled until June 1995, and MCS does not plan to seek a Milestone III decision to procure and field CHS hardware until September 1995. We agree that these computers should be used to support the development and testing of all ATCCS programs. This role should be expanded to enable mature ATCCS programs that have passed operational testing to field this excess MCS equipment before it becomes outmoded.

4. The recently announced delay in operational testing from July to September 1994 and the subsequent review and approval processes will result in CSSCS procurement deliveries not starting until the last quarter of fiscal year 1995. DOD's response states the Advanced Field Artillery Tactical Data System's fielding schedule could allow its current computers to be available in the last quarter of fiscal year 1995. This is the same time frame that the production CSSCS computers would be fielded. Thus, the field artillery system's computers would be available to support CSSCS fielding requirements.

5. It is true that the Army gained valuable experience from using the militarized and nondevelopmental equipment. However, its repeated premature equipment acquisitions illustrate what happens when

equipment is bought before the software works correctly and the system demonstrates military effectiveness. For example, had the Army followed prudent acquisition strategy, it would have avoided having to (1) warehouse about one-third of the militarized systems it prematurely purchased and never fielded and (2) find a use for 597 adaptable programmable interface units that Active and National Guard units do not want.

6. The Army's recent decision not to acquire more equipment for CSSCS until operational testing is successful and the system demonstrates its military effectiveness does indicate that a valuable lesson was learned. It should be noted, however, that until we raised the issue during our audit, the Army's CSSCS acquisition strategy could have resulted in further premature acquisitions.

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