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	National Security and International Affairs Division	Unannouriced
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	November 19, 1993	Availabling Crists
	The Honorable Les Aspin The Secretary of Defense	Dist Ava: Availation or Special
	Dear Mr. Secretary:	A-1
DTIC QUALITY INSPECTED 1	control systems to reflect changes versatile, downsized, post-cold wa congressional interest in Army con reviewed the Army's action plan to requirements for command and co	r Army. Because of continuing mmand and control systems, we o determine how it affects the
Background	focus from a single Warsaw Pact of contingencies, such as Operation 1 degree of mobility. The Army no le enemy on familiar battlefields with fixed positions. Instead, it must st packages with the appropriate con- moment of need to fight a less well According to the Army, Operation command and control shortcomin command and control on the mov- such as the Army's downsizing of doctrine to account for fewer forw to the need to restructure comman Projection Army Command and Co- which resulted from an Army com February 1992, outlines a series of initiatives, and recommendations control for the future force. The A 4 to 6 years.	nion have shifted the U.S. military's contingency to smaller regional Desert Storm, which require a high onger emphasizes fighting a well-known a massive, forward-deployed forces in rategically deploy specific force nmand and control equipment at the ll-known enemy, wherever the location. Desert Storm revealed a number of gs. A major deficiency was the lack of e on the battlefield. Other developments, its forces and revision of its war-fighting vard-deployed combat units, contributed and and control and the subsequent Force ontrol Action Plan. ¹ The June 1993 plan, mand and control effort started in ⁵ command and control concepts, for achieving effective command and rmy expects to implement this plan in

¹Force projection is the demonstrated ability to rapidly alert, mobilize, deploy, and conduct operations anywhere in the world.

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	strategic level, the theater army level, and the Army Tactical Command and Control System (ATCCS), which functions at corps level and below. The ATCCS program, which is one of the Army's highest acquisition priorities, is intended to enhance its war-fighting capabilities by automating its tactical command and control and improving its communications capabilities. It is designed to rapidly collect, process, analyze, display, coordinate, and exchange timely battlefield information to enhance the decision-making process. Currently, ATCCS consists of five major command and control segments to be linked together by three communication segments into one system of systems with common hardware and software.
Results in Brief	The Army has recognized the need to change its command and control structure to support a versatile, downsized Army while facing fiscal constraints and has made laudable progress toward defining the issues related to achieving that goal. In its 1993 action plan, the Army concluded that a major shift was needed from the cold war command and control architecture based on a European scenario to a post-cold war scenario. It identified 51 issues, resulting in significant changes to acquisitions needed to implement the concepts envisioned for post-cold war command and control.
	However, the Army has not yet assigned priorities to these issues or identified the plan's impact in terms of cost increases or savings, and therefore, cannot target limited funding to the appropriately sequenced critical issues. In addition, the plan's effects on command and control systems' requirements and procedures have not yet been fully determined.
Army Plan Concluded That Major Changes Are Needed in Post-Cold War Command and Control	In June 1993, the Army Training and Doctrine Command and several other Army agencies completed the Force Projection Army Command and Control Action Plan to address how best to achieve command and control under a force projection Army. The plan noted that the command and control architecture designed for a Soviet and Warsaw Pact threat scenario required major changes. According to the plan, the European scenario with corps and divisions operating side-by-side with hierarchical distribution of information over ground-based communications systems has to be replaced by a scenario designed to support corps/division war-fighters moving rapidly across the battlefield.
	The Army's current command and control structure is devised for a European scenario. According to the Army, the post-cold war scenario

requires such changes as command and control automation with supporting communications systems operating on the move, distant sustaining bases, a larger more fluid battlefield with extended distances between formations, and the more extensive use of satellite communication and position/navigation data. The Army stated that numerous factors, such as the changed threat, reduced budgets and forces, power projection strategy, and a new world order, have dictated this change. According to the plan, Force Projection Army command and control will give the Army the capability to meet the command and control demands of the future force.

The Force Projection Army Command and Control Action Plan contains 51 issues with recommendations that would restructure the Army's command and control systems and procedures. These issues vary greatly, covering such areas as satellite use, antennas, vehicles, command and control systems, and radio development. The Army has generally grouped the issues under categories of command and control on the move, intelligence, communications, command and control automation, supporting the force, and technology enhancements. For example, the command and control vehicle is a command-and-control-on-the-move issue while the Military Strategic and Tactical Relay satellite system is a communications issue.

The recommended changes will impact command and control requirements of the future force in such areas as (1) the development of new systems, vehicles, radios, and antennas; (2) systems improvements; (3) quantity reductions and terminations of ongoing programs; and (4) the redetermination of requirements for information flow to support both strategic and tactical command and control. One direct impact to tactical command and control is the planned addition of a satellite communication segment to the current ATCCS architecture of nine segments (five command and control, three communications, and one common hardware and software). Figure 1 illustrates the proposed addition of the satellite or fourth communications segment.



Source: U.S. Army.

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According to the Army's plan, the key difference between the communications architecture under the old European scenario and the post-cold war scenario is the ability to constantly maintain communications between the various decisionmakers on and off the battlefield. Besides the division, corps, and theater levels, satellite assets will be placed down to the maneuver brigade level to (1) prevent information bottlenecks connected with ground-based architectures and

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	(2) extend the range of communications across the entire battlefield. The Army considers satellite technology a key initiative for its post-cold war communications requirements. It believes satellites will enable it to pass intelligence and other information directly to the user. This is a significant advance from ground-based systems. In addition, the Army believes that satellite technology can (1) apply to a wide range of functions, (2) provide significant improvements in battlefield information management, and (3) provide potential benefits such as savings in strategic lift by reducing deployments of oversized processing centers.
Action Plan Lacks Priorities and Funding Impacts	The Army's Force Projection Command and Control Action Plan did not prioritize the issues and did not contain an overall cost impact that identified the cost increases or savings connected with the plan's recommendations. With the Army's budget declining and the ongoing downsizing of the force structure, it is critical that the Army prioritize its command and control requirements along with the supporting communications systems to target limited funding to the appropriately sequenced critical issues.
Action Plan Did Not Prioritize Issues	Priorities have not been established for the 51 issues contained in the action plan. The issues were not assigned a priority ranking to consider such factors as relative importance to other issues, the status of system development, and appropriate sequencing.
	Absent this prioritization, the Army risks spending scarce resources on systems that will not meet its needs. For example, the Army is currently acquiring a command and control vehicle that is intended to make the ATCCS systems mobile. This vehicle's primary purpose is to carry ATCCS computer and communications equipment to allow for full command and control capability on the move. However, the ATCCS systems, which have been in development for up to 14 years, continue to have development problems. It would seem prudent to prioritize the fixing of ATCCS over the development of the command and control vehicle. In other words, the Army should fix the command and control system before putting it on the move.
	While we recognize that changing to the post-cold war command and control scenario has been a time-consuming, resource intensive effort and will have a difficult transition period, the assignment of priorities or ranking of issues is critical to focusing limited future resources on those

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	issues that will result in a successful effort. This is particularly important for those issues that would be the foundation for the overall effort.
Action Plan Did Not Have Cost Impacts	The 51 issues in the action plan have not been analyzed in terms of their cost increases or savings. Some issues could be expensive and take a long time to complete. For example, we noted that the command and control segments of ATCCS have been under development from 7 to 14 years at a cost of about \$2.9 billion as of December 1992. The estimated total cost is about \$9.5 billion.
	The Army's overall budget has declined over several years, and, according to the Army, it faces tight fiscal constraints in its future budgets, including pressures on its command, control, and communications funding. Consequently, it is important for the Army to develop realistic cost estimates for the plan's issues so that limited resources can be directed toward priority issues that have been properly sequenced.
Recommendations	The Army is moving in a positive direction with its action plan to change command and control for the post-cold war environment. However, further progress toward this goal will require that it ensure that priorities and cost impacts are developed and considered as the plan moves forward in the Army's planning and budgeting processes. We recommend that the Secretary of Defense ensure that the Secretary of the Army (1) prioritize the command and control issues and (2) determine the cost impact of the Force Projection Army Command and Control Action Plan. The results of these efforts could then be used to focus limited funding to the appropriately sequenced critical issues.
Agency Comments and Our Evaluation	The Department of Defense (DOD) agreed that the Army must prioritize its command and control needs and determine the cost impacts of the plan's issues. However, it did not concur with our draft recommendations that the Secretary of Defense should direct the Secretary of the Army to perform these tasks because DOD believes the Army already has a system in place that" address prioritization and cost impact. The Army plans to use its routine planning, programming, budgeting, and execution system to prioritize issues and develop applicable cost impact figures.
	We are concerned that, without a very focused approach initially, the existing system will not yield an adequate result in addressing the changes

that are required for command and control. For example, ATCCS has already been subject to the planning and budgeting system yielding only limited results, and the Army is still without a fully usable, interoperable ATCCS. In using this system, the Army has already provided \$2.9 billion on ATCCS command and control systems, yet some systems have been ongoing for more than 10 years and are still not fielded. If the plan had assigned initial priorities to the individual issues and contained estimated cost impacts rather than just an inventory of issues, the Army could have had a very focused baseline from which decisionmakers could proceed for more definitive evaluation in its planning and budgeting system.

We have changed our recommendations to recognize the Army's routine process. However, we believe that the plan is very important to the Army's future capabilities. Therefore, DOD should ensure that the plan's issues are adequately considered in a resource-constrained environment. We also believe that our changed recommendations provide added emphasis that DOD should ensure that the Army makes effective decisions for post-cold war command and control that result in limited funding being appropriately sequenced to the critical issues first. We will therefore continue to monitor DOD and Army actions to implement our recommendations. DOD's comments on the draft of this report are included in their entirety in appendix II.

As the head of a federal agency, you are required by 31 U.S.C. 720 to submit a written statement on actions taken on our recommendations to the Senate Committee on Governmental Affairs and the House Committee on Government Operations not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

We are sending copies of this report to the Secretary of the Army, interested congressional committees, and other interested parties. Copies will be made available to others on request. Our scope and methodology are discussed in appendix I. Please contact me on (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; Edwin B. Griffin, Evaluator-in-Charge; and Robert J. Gentile, Evaluator.

Sincerely yours,

Foris J. Godingues

Louis J. Rodrigues Director, Systems Development and Production Issues

Appendix I Scope and Methodology

We reviewed the Army's Force Projection Command and Control Action Plan to determine its impact on the requirements for command and control systems and procedures. We reviewed various Department of Defense (DOD) and Army documents, including plans, briefings and cost information. We discussed this information with officials at the following offices:

- Program Executive Office for Command and Control Systems and Program Executive Office for Communications Systems, Fort Monmouth, New Jersey.
- Army Tactical Command and Control System (ATCCS) program offices, McLean, Virginia; Redstone Arsenal, Alabama; and Fort Monmouth, New Jersey.
- Office of the Secretary of Defense for Command, Control, Communications, and Intelligence; Department of the Army's Office of the Deputy Chief of Staff for Operations and Plans and the Office of the Director of Information Systems, Command, Control, Communications, and Computers; Deputy Assistant Secretary for Research and Technology; the Joint Staff Command, Control, Communications, and Computers Architecture and Integration Division, Washington, D.C.
- Combined Arms Command, Fort Leavenworth, Kansas.
- Army Signal Center, Fort Gordon, Georgia.
- Army Training and Doctrine Command, Fort Monroe, Virginia.
- · Army Operational Test and Evaluation Command, Alexandria, Virginia.
- Army Science Board, Washington, D.C.

We performed our review from October 1992 to June 1993 in accordance with generally accepted government auditing standards.

Appendix II		
Comments From the Department of Defense		
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te: GAO comments		
oplementing those in the provident text appear at the		
d of this appendix.		ASSISTANT SECRETARY OF DEFENSE
		WASHINGTON, D.C. 20301-3040
		Sentember 16 1002
	COMMAND, CONTROL, Communications And	September 16, 1993
	INTELLIGENCE	
	Mr. Frank C. Conahan Assistant Comptroller (General
	National Security and I Affairs Division	International
	U.S. General Accountir Washington, D.C. 205	
	Dear Mr. Conahan:	
e comment 1.	Office (GAO) draft rep Determine Command a Code 395211), OSD Ca	ment of Defense (DoD) response to the General Accounting ort, "BATTLEFIELD AUTOMATION: "Army Needs to and Control Priorities and Costs," dated August 11, 1993 (GAO se 9497. The Department partially concurs with the report. dressing all the issues discussed in the GAO report.
e comment 2.	provided the Army fift meet its post cold-war recognized, however, determine cost impact	tion Army Command and Control Study and subsequent plan y one issues for further study to determine the roadmap to command and control mission requirements. It should be that those efforts were not intended to prioritize issues and s. Instead, command and control priorities and funding needs d through the Army Planning, Programming, Budgeting, and
	Execution System. The reflect those priorities	d through the Army Planning, Programming, Budgeting, and next Army Program Objective Memorandum will specifically and associated funding needs.
	control priorities and f required. My office wi	already accomplishing efforts to identify command and unding needs, further Secretary of Defense direction is not Il review the Army's command and control priorities and the next Army Program Objective Memorandum submission, 393.
	The detailed Doc provided in the enclos draft report.) comments on the report findings and recommendations are ure. The DoD appreciates the opportunity to comment on the
		Sincerely,
		Emmett Paige, Jr.
	Enclosure	e e connect wige, at.

	GAO DRAFT REPORT - DATED AUGUST 11, 1993 (GAO CODE 395211), OSD CASE 9497 "BATTLEFIELD AUTOMATION: ARMY NEEDS TO DETERMINE COMMAND AND CONTROL PRIORITIES AND COSTS" DEPARTMENT OF DEFENSE COMMENTS **** FINDINGS • FINDING A: Effective Command and Control for the Future. The GAO
	reported that the Army must strategically deploy specific force packages with the appropriate command and control equipment at the moment of need, to fight an unknown enemy, wherever the geographic location. The GAO reported that the June 1993 plan, which resulted from an Army command and control effort started in February 1992, outlines a series of command and control concepts, initiatives, and recommendations for achieving effective command and control for the future force. The GAO observed that the Army expects to implement the plan in 4 to 6 years. The GAO reported that the Army Command and Control System is a network of systems Army commanders use to employ and sustain military forces in a theater of operation. The GAO observed that the Army Command and Control System includes both the command and control system at the theater army level and the Army Tactical Command and Control System-which functions at corps level and below. The GAO reported that the Army acquisition priorities, is intended to enhance the warfighting capabilities of the Army by automating its tactical command and control and improving its communications capabilities. The GAO explained that it is designed to collect, process, analyze, display, coordinate, and exchange timely battlefield information repidlyto
Now on pp. 1 and 2.	enhance the decision-making process. (pp. 1-4/ GAO Draft Report) DOD RESPONSE: Concur. In February 1992 the Army initiated the Force Projection Army Command and Control Study to determine changes necessary to provide Army Command and Control requirements in the post cold-war environment. The concepts, initiatives, and recommenda- tions contained in the Force Projection Army Command and Control Study provide a road map for analysis and evaluation of future command and control initiatives that could achieve command and control objectives for the Army in the post cold-war environment. The study was completed in June 1993, and the results were approved for implementation as the Force Projection Army Command and Control Plan.
	Enclosure



The GAO noted, for example, that the command and control vehicle is a command and control on the move issue, while the Military Strategic and Tactical Relay Satellite System is a communications issue.
The GAO reported that, according to the Army plan, the key difference between the communications architecture under the old European scenario and the post-cold war scenario is the ability to maintain constant communications between the various decision makers on and off the battlefield. The GAO added that, besides the divisions, corps, and theater levels, satellite assets would be placed down to the maneuver brigade level to (1) prevent information bottlenecks connected with ground-based architectures and (2) extend the range of communications across the
entire battlefield. The GAO explained that the Army considers satellite technology a key initiative to meet its post-cold war communications requirements. (pp. 4-8/ GAO Draft Report)
DOD RESPONSE: Concur. The Army leadership approved the Force Projection Army Command and Control Plan in June 1993, and in turn directed its implementation. The plan illustrates a departure from the European, Soviet and Warsaw Pact, threat scenario-driven architecture to one that will support the current Force Projection concept. The Plan also identifies reasons for needed command and control changes and further identifies end for needed command and control changes and further identifies of the plan are 51 issues that were identified as candidates for restructuring Army command and control systems and/or procedures for supporting the post cold-war environment. The 51 issues were further tasked to various organizations, to include supporting agencies, within the Army, to study and provide analysis to determine the validity and applicability for supporting a Force Projection Army. Milestones for completion of the analysis were established.
• FINDING C: The Army Action Plan Lacks Priorities and Funding Impacts. The GAO reported that the Army Force Projection Command and Control Action Plan did not prioritize the issues and did not contain an overall cost impact that identified the cost increases or savings connected with the plan's recommendations. The GAO pointed out with the Army budget declining and the ongoing downsizing of the force structure, it is critical that the Army prioritize its command and control requirements, along with the supporting communications systems, to target limited funding to the appropriately sequenced critical issues.
Issues Not Prioritized—The GAO found that priorities have not been established for the 51 issues contained in the action plan. The GAO indicated that the issues were not assigned a priority ranking to consider such factors as relative importance to other issues, the status of system development, and appropriate sequencing. The GAO concluded that absent prioritization, the Army risks spending scarce resources on systems that will not meet its needs. The GAO cited the example that the Army is currently acquiring a command and control vehicle that is intended to provide mobility for the Army Tactical Command and Control System. The GAO asserted, however, that the Army Tactical Command and Control

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Now on pp. 5 and 6. See comment 2.	would seem prudent to prioritize the fixing of the Army Tactical Command and Control System over the development of the command and control vehicle. The GAO recognized that the post-cold war command and control effort had been a time-consuming, resource intensive effort and will have a difficult transition period. The GAO concluded, however, that the assignment of priorities or ranking of issues is critical to focusing limited future resources on those issues that will result in a successful effort. Cost Impact Not Addressed-The GAO reported that the impact of addressing the 51 issues in the action plan in terms of cost increases or savings had not been determined. The GAO concluded, however, that some issues could be expensive to address and take a long time to complete. The GAO noted, for example, that as of December 1992, the command and control segments of the Army Tactical Command and Control System have been under development from 7 to 14 years at a cost of about \$2.9 billion. The GAO reported that the estimated total cost is about \$2.9 billion. The GAO further reported that, according to the Army, its overall budget had declined over several years-and it faces tight fiscal constraints in its future budgets, including pressures on its command, control, communications, and intelligence funding. Consequently, the GAO conclude that it is important for the Army to develop realistic cost estimates for the plan issues so that limited resources can be directed toward priority issues suft of implementation of the plan. However, it was never the intent of the Army to use the plan at a document to prioritize issues for funding purposes, and did not provide any cost analysis for increases or avings as a result of implementation of the plan. However, it was never the intent of the Army Hanning, Programming, Budgeting, and Execution System. The Force Projection Army Command and Control Plan provided a series of command and control concepts, initiatives, and investment strategies that the study identified as easinis to
	framework. Implementation of the Force Projection Army Command and Control Plan required further study and analysis of each of the 51 issues to determine which were valid and applicable to support the force projection command and control requirements. The valid issues must then be incorporated into the Army Planning, Programming, Budgeting, and Execution System process, through input into the Enhanced Concepts- based Requirements System. The elements identified in the Army Command and Control Master Plan and the Army Modernization Plan are eventually prioritized and funded in the Program Objective Memorandum, a part of the Army Planning, Programming, Budgeting,
	The Force Projection Army Command and Control Plan specifically states, that the plan is a forerunner to the next Army Command and Control Master Plan. The Plan also identifies four concurrent approaches to implementation of the Force Projection Army Command and Control Plan.

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	One of those approaches states that the appropriate action issues must be incorporated into the Enhanced Concept Based Requirements System in order to ensure the Force Projection Army Command and Control concepts are represented and resourced in the Army Modernization Plan and funded in the Program Objective Memorandum. It is through those documents that the issues the Army has determined are valid will be prioritized, competed with other Army programs, and funded within the Army funding authorization.

	RECOMMENDATIONS
Now on p. 6.	 <u>RECOMMENDATION 1:</u> The GAO recommended that the Secretary of Defense direct the Secretary of the Army to prioritize the command and control issues. (p. 11/GAO Draft Report)
See comment 1.	DOD RESPONSE: Partially concur. The Department concurs that the Army must prioritize its command and control needs to take advantage of limited resources. However, the Department does not concur that the Secretary of Defense should direct the Army to prioritize the command and control issues from the Force Projection Army Command and Control Plan. As explained in the DoD response to Finding C, the Army will prioritize the issues through the Planning, Programming, Budgeting, and Execution System process. The Assistant Secretary of Defense for Command, Control, Communications and Intelligence will review the Army Program Objective Memorandum submission for prioritization of command and control issues. Submission of the next Army Program Objective Memorandum is expected in October 1993.
Now on p. 6.	 <u>RECOMMENDATION 2:</u> The GAO recommended that the Secretary of Defense direct the Secretary of the Army to determine the cost impact of the Force Projection Army Command and Control Action Plan. (p. 11/GAO Draft Report)
See comment 1.	DOD RESPONSE: Partially concur The Department concurs that the Army must determine the cost impact of the issues from the Force Projection Army Command and Control Plan that are deemed valid and applicable. The Army will accomplish that during the Planning, Programming, Budgeting, and Execution System process. The Department does not concur that the Secretary of Defense should direct the Secretary of Army to determine the cost impact of the Force Projection Army Command and Control Plan, since the Army, as explained in the DoD response to Finding C, will accomplish that step through its ongoing Planning, Programming, Budgeting, and Execution System process.

	Appendix II Comments From the Department of Defense
	The following are GAO's comments on DOD's letter dated September 16, 1993.
GAO Comments	1. Our draft report recognized that the Army was moving in a positive direction with its action plan to change command and control for a post-cold war environment. We also realize that the Army has a routine process which is to prioritize issues and develop applicable cost impacts. We have changed our recommendations to recognize this process. However, we believe that the plan is very important to the Army's future capabilities. Therefore, DOD should ensure that the plan's issues are adequately considered in a resource-constrained environment. We also believe that our changed recommendations provide added emphasis that DOD should ensure that the Army makes effective decisions for post-cold war command and control that result in limited funding being appropriately sequenced to the critical issues first. If the plan had initially prioritized the issues and estimated its cost impact, the Army would have been further along in focusing limited funding to the appropriately sequenced critical issues. We believe that the action plan is too important to be handled as a routine matter. We will therefore continue to monitor DOD and Army actions to implement our recommendations.
	2. We recognize that the Army plans to use its routine planning, programming, budgeting, and execution system to prioritize issues and develop applicable cost impact figures. However, we are concerned that, without a very focused approach initially, the existing system will not yield an adequate result in addressing the changes that are required for command and control. For example, ATCCS has already been subject to the planning and budgeting system yielding only limited results, and the Army is still without a fully usable, interoperable ATCCS. In using this system, the Army has already provided \$2.9 billion on ATCCS command and control systems, yet some systems have been ongoing for more than 10 years and are still not fielded.