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Briefing Report to the Chairman, Legislation and National Security Subcommittee, Committee on Government Operations, House of Representatives

March 1990

NAVY COMMAND AND CONTROL

Data Fusion Needs and Capabilities for Battle Group Commanders

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National Security and
International Affairs Division

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March 7, 1990

The Honorable John Conyers, Jr.
Chairman, Legislation and National
Security Subcommittee
Committee on Government Operations
House of Representatives

Dear Mr. Chairman:

As you requested on February 8, 1989, and in subsequent discussions with your office, we assessed the acquisition management of selected data fusion efforts within the U.S. Navy Command and Control System (NCCS). Data fusion is defined as the merging of information from a variety of sources. It is essential for making sound and timely combat decisions.

This briefing report provides the results of the first phase of our review, which addresses battle group commanders' data fusion needs and capabilities at sea (afloat) to support combat decisions. The second phase, currently underway, will address Navy commanders' data fusion needs and capabilities ashore.

RESULTS IN BRIEF

According to the Navy, automated data fusion development has been hampered because of funding difficulties. As an alternate approach, the Navy is developing a limited interim system, has expanded and plans to modify existing systems, and has consolidated some data fusion programs. However, none of these efforts will fully meet the data fusion requirements--individually or collectively. Until a full capability is available (now planned for 1994), data fusion will be limited, resulting in a continuing unsatisfactory tactical picture for battle group commanders.

BACKGROUND

U.S. Navy battle groups afloat are faced with an increasingly sophisticated array of weapon capabilities from aircraft, surface ships, and submarines that pose a potential threat over large portions of the oceans. This

threat capability has led to a significant reduction in the time that battle group commanders have available to react to hostile situations. As a result, the Navy has identified a need for (1) wide-area surveillance, (2) communications that are secure and resistant to electronic jamming, and (3) an automated data fusion capability to more effectively manage information received about this potential threat.

The Assistant Secretary of the Navy for Research, Engineering, and Systems, in a statement on the Navy's fiscal years 1988-89 research, development, test, and evaluation budget, emphasized that (1) wide-area surveillance is key to the Navy's forward deployed strategy, (2) reliable communications are essential to control weapon systems, including those that extend beyond the horizon, and (3) rapid data fusion is critical to effective decision-making at all levels of command. Basically, battle group commanders need an accurate picture of their area of responsibility to make sound and timely combat decisions and to efficiently use their weapons.

Navy battle groups afloat obtain threat data from numerous sources through NCCS, which consists of various facilities, equipment, communications, procedures, and personnel. NCCS is organized into two parts--NCCS afloat and NCCS ashore.

-- NCCS afloat systems include sensors and other electronic equipment that belong to the battle groups. These systems collect and process data about potential threats and targets that extend out to about 1,000 miles from the battle groups. The data is referred to as organic because the systems are under the control of battle group commanders.

-- NCCS ashore systems include sensors and other electronic equipment that provide national and theater-wide data. Data from these systems are processed and evaluated at installations ashore before being provided to the battle groups and are referred to as nonorganic because the associated systems are not controlled by battle group commanders.

NAVY CONSIDERS CURRENT DATA FUSION CAPABILITIES AFLOAT AS UNSATISFACTORY

According to the Navy, current data fusion capabilities afloat are incomplete, manpower intensive, and time-consuming. An automated capability to more rapidly and

effectively fuse data from systems ashore with data from systems afloat does not currently exist. The problem is intensified by an increasing volume of data from wide-area surveillance sensors located both inside and outside the battle groups. The Navy states that these data fusion problems result in an unsatisfactory tactical picture for decision-making by battle group commanders.

A December 1986 Navy operational test report on fleet capabilities to conduct over-the-horizon detection, classification, and targeting highlighted these problems. The report stated that (1) manual correlation[1] delays were a major obstacle to producing a timely tactical picture, (2) errors occurred because multiple target tracks appeared for only a single platform, (3) transfer of nonorganic data to commanders was excessively slow, (4) commanders disregarded some nonorganic data because sources were omitted, and (5) target tracks were duplicated and maintained, which overloaded the processing systems.

FULL AFLOAT CORRELATION CAPABILITY DELAYED WHILE LESS CAPABILITY IS ACQUIRED

In 1983, the Navy established an operational requirement for an automated data fusion capability. A 1985 Navy Decision Coordinating Paper establishing an Afloat Correlation System (ACS) project to meet this requirement stated that ACS should be operational in 1990. However, full performance of an operational ACS is now scheduled for 1994--4 years later than originally planned. Meanwhile, other systems are being acquired, expanded, and modified, none of which will have the required ACS capabilities.

ACS Design and Funding History

ACS is designed to (1) merge data collected from battle group organic sensors with data from nonorganic sensors outside the battle group, (2) correlate data by establishing relationships between new contacts and known tracks of air, surface, and subsurface platforms, and (3) transfer data to other systems for presentation while providing automated

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[1]Correlation is defined as establishing the relationship between new contacts and known tracks of air, surface, and subsurface platforms.

decision aids to battle group commanders. In 1985, the Navy planned to develop, procure, and operate 17 shipboard and 2 shore-based ACSs at a total estimated cost of about $291 million.

ACS is one of several battle force information systems designed to support battle group operations. However, it is the only system designed to do the unique functions of integrating and correlating nonorganic data with organic data, and displaying the resulting information at both the sensitive compartmented and general services levels of classification. Currently, no single automated system exists that brings data together in one place afloat for evaluation and display to battle group commanders. Navy officials stated that an ACS capability is critical for improving battle group command and control and to support battle group operations.

According to the Navy, ACS development has been hampered during 2 of the last 5 years because of funding difficulties. For example, Navy officials stated that in fiscal year 1987, the Congress reduced the ACS research, development, test, and evaluation budget request from $15.1 million to $10.1 million and directed the Navy to proceed cautiously to provide time to evaluate lessons learned from other data fusion programs. The officials also stated that this resulted in delaying the ACS project about one year. Regarding the fiscal year 1988 budget, Navy officials stated that because congressional actions specified full funding for two other projects within the same program element, the $11 million requested for ACS was effectively reduced to $1.4 million. The officials also stated that this disrupted the ACS project, causing further delay.

Navy officials stated that during the other 3 fiscal years, however, the Navy either reprogrammed funds to meet its needs or did not experience funding reductions. In fiscal year 1986, the Navy requested $3 million. The Congress provided $1.8 million based on concerns that the Navy needed to work more closely with the other services on data fusion issues. In May 1986, however, the Navy reprogrammed $1.2 million back into the ACS project. In fiscal years 1989 and 1990, the Navy received the amounts requested--$11.7 million and $8.3 million, respectively.

Limited Interim ACS Is Being Developed

Navy officials stated that because of the funding difficulties, they restructured the ACS project in June 1988 to provide for an interim system called the ACS Operational Development Model (ODM). However, ODM is expected to have considerably less capability than the Navy originally planned for ACS. For example, ACS is required to fuse and correlate a given amount of targeting and tracking data and handle multilevels of security data up through sensitive compartmented information. The ODM is only designed to provide about one-half of the ACS target tracking capability and has no means of handling sensitive compartmented information.

Under the 1988 restructuring, the Navy planned a sea-based development test for ODM in 1990, followed by an operational test in late 1992. However, Navy representatives stated that some of this testing may be delayed until ACS software is judged ready. ACS software to meet full data fusion requirements is not scheduled to be completed until fiscal year 1994.

Other Limited Data Fusion Efforts

Because of the critical need for data fusion, Navy officials explained that non-ACS funds were used to expand and modify existing systems to provide fleet commanders with other limited data fusion capabilities. For example, according to these officials, fleet commanders requested in 1985 that deployment of an off-the-shelf system called the Prototype Ocean Surveillance Terminal (POST) be expanded. POST collects, correlates, and displays a variety of nonorganic intelligence information, but is limited to about 5 to 15 percent of the ACS requirements. The Navy has now spent about $3 million to install about 40 POST systems on major combatant ships. In addition to this expanded deployment, the Navy planned an improvement program to modify and enhance POST capabilities (specifically, correlation and multiple target tracking software). This capability was originally scheduled to become available in the fall of 1989, but the Navy decided to delay its implementation because of insufficient resources.

The Navy also planned to upgrade its Tactical Flag Command Center/Flag Data Display System (TFCC/FDDS) to use the improved POST software. The Navy has deployed TFCC/FDDS on six aircraft carriers, and according to Navy officials,

plans to add 16 more to the fleet inventory. TFCC/FDDS is used by battle group commanders to process and display organically received general service data. It includes a limited fusion capability--also about 5 to 15 percent of the ACS requirements. If improved POST and TFCC/FDDS were used together, the Navy expects its data fusion capability to meet about 40 to 50 percent of the ACS requirements.

Current Afloat Correlation Plans

In August 1989, the Navy consolidated the ACS program with other NCCS afloat programs to integrate fleet support requirements, reduce costs, and eliminate duplicate system development. However, Navy officials acknowledged that this consolidation effort will still not provide an adequate tactical picture to battle group commanders. They stated that the data fusion capabilities afloat will still be incomplete, manpower intensive, and time-consuming until the full ACS capability is provided in 1994.

OBJECTIVES, SCOPE, AND METHODOLOGY

As requested by the Chairman, Legislation and National Security Subcommittee, House Committee on Government Operations, we assessed the acquisition management of selected Navy data fusion efforts to identify deficiencies, evaluate plans to overcome any deficiencies, and determine the progress being made. We are reporting on the results of our work in two phases. This briefing report addresses battle group commanders' data fusion needs and capabilities at sea (afloat) to support combat decisions. A second effort, currently underway, will address Navy commanders' data fusion needs and capabilities ashore.

We interviewed officials responsible for Navy data fusion efforts in the Office of the Secretary of Defense, Office of the Chief of Naval Operations, Office of the Navy Comptroller, and Space and Naval Warfare Systems Command. We also interviewed selected contractor representatives associated with Navy data fusion systems afloat. We reviewed and analyzed planning and contractual documents, cost and schedule information, system requirements and design data, and correspondence concerning the management and direction of the Navy's afloat data fusion program. Our review was performed from November 1988 to January 1990 in accordance with generally accepted government auditing standards.

As agreed with your office, we did not obtain official agency comments. However, we did discuss the contents of this briefing report with Navy officials and their comments have been incorporated where appropriate.

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Unless you publicly announce its contents earlier, we plan no further distribution of this briefing report until 30 days from the date of this letter. At that time, we will send copies to the Secretaries of Defense and Navy; the Director, Office of Management and Budget; and other interested parties.

Please contact me at 275-4841 if you or your staff have any questions concerning this report. Other major contributors are listed in appendix I.

Sincerely yours,

Louis J. Rodrigues
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