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

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STRATEGIC DEFENSE INITIATIVE PROGRAM

Better Management Direction and Controls Needed

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National Security and
International Affairs Division

November 27, 1987

The Honorable Bill Chappell, Jr.
Chairman, Subcommittee on Defense
Committee on Appropriations
House of Representatives

Dear Mr. Chairman:

As requested, this report discusses certain management issues associated with the Department of Defense's Strategic Defense Initiative program. It specifically contains information on management of the systems analysis and battle management area and on internal controls for the Strategic Defense Initiative Organization.

We are sending copies of this report to the Secretary of Defense and to the Director, Office of Management and Budget.

Sincerely yours,

Frank C. Conahan

Frank C. Conahan
Assistant Comptroller General

Executive Summary

Purpose

The Department of Defense's (DOD) Strategic Defense Initiative (SDI) is a multibillion dollar research program to determine the feasibility of establishing a defense system against nuclear ballistic missiles by the early 1990s. A key element of the system is battle management/command, control, and communications (BM/C3) which includes the systems that tie weapons, sensors, and computers together. BM/C3 is controversial because of its complexity, and it could be a critical limiting factor to the entire SDI system design.

The Chairman, Subcommittee on Defense, House Committee on Appropriations, asked GAO to assess the SDI Organization's (SDIO) management of the Systems Analysis and Battle Management (SABM) program element, particularly as it related to the BM/C3 component.

Background

SDIO was chartered to implement the SDI program with an emphasis on centralized management and decentralized execution. SDI research is being done in five major areas—SABM which includes BM/C3; Surveillance, Acquisition, Tracking, and Kill Assessment; Directed Energy Weapons; Kinetic Energy Weapons; and Survivability, Lethality, and Key Technologies.

One goal of SABM research is to explore those technologies that will enable the SDI system to have adequate and reliable computer processing capabilities and communications. This particular part of the SDI program is frequently criticized as being unattainable. Another goal is concerned with developing an overall blueprint for the system (system architecture), and a means for coordinating and directing the components and functions of the system (battle management architecture).

Results in Brief

SDIO needs to improve its ability to provide timely and effective management direction and oversight of the SABM program. It has experienced several problems that result from inefficiencies in contracting, inadequate oversight relative to existing work directives, and limited progress in integrating system and battle management architectures. The problems, if not corrected, could reduce SDIO's ability to provide needed information for an informed systems development decision planned for the early 1990s.

SDIO also needs to implement a formal internal management control program. The absence of such a program has resulted in poor program documentation and limited dissemination of program information. It also

prevents managers from having reasonable assurance that SDIO programs will be adequately protected against fraud, waste, or mismanagement, and are operating in accordance with the law.

Principal Findings

Research Contracting Inefficiencies

Some research efforts within the SABM program resulted in inefficiencies because contracts were terminated before the intended work was completed. Although SDIO officials attributed these inefficiencies to a rapidly changing program and funding shortages, executing agency officials pointed to SDIO's inadequate direction and planning.

Inadequate Oversight of Work Directives

There was inadequate oversight relative to SDIO's work package directives in the SABM program. About 47 percent of the total dollar value of the planned research during most of fiscal year 1986 was not covered by approved directives. In addition, work was performed and items were acquired that were outside the scope of applicable directives. Also, the overall funding profile of one major directive was inconsistent with the detailed funding plans and milestones.

Limited Progress in Integrating Architectures

Although outside experts strongly recommended integrating the system and battle management architectures, SDIO made little progress in accomplishing it for nearly 2 years. Architecture development was modified and extended several times during 1985 and 1986 to allow for expanded and more detailed analysis of architecture issues. Greater emphasis was given to this effort in April 1987.

Lack of Formal Internal Management Control Program

SDIO's internal controls, as required by the Federal Managers' Financial Integrity Act, were deficient, and SDIO had not developed a formal internal management control program. As a result, poor documentation and limited dissemination of program information hampered management oversight and external program reviews and caused possible duplication of effort and confusion within the SABM organization.

Recommendations

GAO recommends that the Secretary of Defense require the Director, SDIO to place increased management attention on providing direction and

oversight to the executing agencies associated with the SABM program. This should minimize inefficiencies and increase the usefulness of work package directives as the primary management document.

GAO also recommends that the Secretary of Defense (1) ensure that SDIO implements an internal management control program and (2) report SDIO's material management control weaknesses and describe the plans and schedule for correcting the weaknesses, in accordance with the Federal Managers' Financial Integrity Act.

Agency Comments

While DOD agreed with GAO's recommendations, it expressed concern about some aspects of GAO's findings. These concerns are recognized and discussed in GAO's report.

Contents

Executive Summary		2
Chapter 1 Introduction		8
	The SDI Program	8
	Battle Management/Command, Control, and Communications: The Paramount Problem	9
	Objective, Scope, and Methodology	10
Chapter 2 SABM Program Needs Better Management Direction and Oversight		11
	Some Research Contracting Resulted in Inefficiencies	11
	Inadequate Oversight of WPDs	13
	Limited Progress in Integrating Separate Architecture Efforts	16
Chapter 3 Internal Management Control Program Needed for SDIO		20
	Inadequate Program Documentation	21
	DOD's Annual FMFIA Reports Did Not Mention SDIO's Lack of an IMC Program	22
Chapter 4 Conclusions, Recommendations, and Agency Comments		24
	Conclusions	24
	Recommendations	24
	Agency Comments	24
Table	Table 3.1: SDIO Documentation Deficiencies	21
Figure	Figure 2.1: System and BM/C3 Architecture Efforts	17

Abbreviations

BM/C3	battle management/command, control, and communications
DOD	Department of Defense
FMFIA	Federal Managers' Financial Integrity Act
GAO	General Accounting Office
IMC	internal management control
RADC	Rome Air Development Center
SABM	Systems Analysis and Battle Management
SDI	Strategic Defense Initiative
SDIO	SDI Organization
WPD	work package directive

Introduction

In a March 1983 speech, the President called for a comprehensive scientific research effort to render nuclear weapons impotent and obsolete. Following the speech, a defensive technology study team, known as the Fletcher Panel, was established to define a long-term research and development program aimed at eliminating the ballistic missile threat. In January 1984, the Secretary of Defense established a research program based on the Fletcher Study and called it the Strategic Defense Initiative (SDI).

The SDI Program

The Fletcher Panel concluded in its report[1] that

- powerful new technologies are becoming available that justify a major technology development effort offering future technical options to implement a defensive strategy;
- focused development of technologies will require strong central management;
- system component survivability is critical and requires a combination of technologies and tactics that remain to be worked out; and
- significant demonstrations of developing technologies for critical ballistic missile defense functions can be performed over the next 10 years that will provide visible evidence of progress in developing the technical capabilities required of an effective in-depth defense system.

Following the Panel's report, the Secretary of Defense established the SDI Organization (SDIO) as a separate Department of Defense (DOD) agency reporting directly to the Secretary. Its mission is

"to manage and direct the conduct of a vigorous research program, including advanced technologies, that will provide the basis for an informed decision regarding the feasibility of eliminating the threat posed by nuclear ballistic missiles of all ranges, and of increasing the contribution of defensive systems to U.S. and allied security."

The research involves five major program elements—Systems Analysis and Battle Management (SABM); Surveillance, Acquisition, Tracking, and Kill Assessment; Directed Energy Weapons; Kinetic Energy Weapons; and Survivability, Lethality, and Key Technologies. Research is carried out by various laboratories, the military services, the Department of Energy, the Defense Advanced Research Projects Agency, the Defense Nuclear Agency, the National Security Agency, the National Aeronautics

[1] Eliminating the Threat Posed by Nuclear Ballistic Missiles, James C. Fletcher, Study Chairman, October 1983.

and Space Administration (all called executing agencies), and thousands of contractors.

Six major elements of SDI are now in the concept demonstration/validation phase of the acquisition process. This phase is expected to provide the basis for an informed decision on whether to proceed into the next phase—full-scale development—in the early 1990s. The Congress appropriated $1.4 billion for research in fiscal year 1985, $2.8 billion in fiscal year 1986, and $3.5 billion in fiscal year 1987. Much of the planned work is a continuation and acceleration of research that DOD was already performing. Of the total $25.5 billion which SDIO estimated it needed to complete the research, DOD expected to spend from $15 billion to $18 billion in the same or similar areas even if the SDI program had not been initiated.

Battle Management/ Command, Control, and Communications: The Paramount Problem

There is considerable controversy surrounding SDI's feasibility, and much of it is focused on the battle management/command, control, and communications (BM/C3) component of the SABM program. A BM/C3 system will need to control the diverse elements of the entire SDI system by analyzing sensor data and focusing the actions of weapons and sensors in a relatively short time to destroy a barrage of incoming ballistic missiles. To accomplish this (1) communication links must be established to transmit data, (2) computer networks must be designed to process voluminous amounts of data, and (3) algorithms[2] and software have to be developed. Although some scientists and engineers believe that the needed technology for this purpose will be available in the near future, others believe that the software required is unattainable and that such a system cannot be trusted because it can never be adequately tested. The Fletcher Panel concluded that while it is likely that processor technology will advance to the level needed to manage the system, a considerable amount of work has to be done in software engineering.

BM/C3 could be the critical limiting factor to the rest of the system design. In fact, experts have informed SDIO that the entire system must be designed with BM/C3 system limitations in mind. A panel of experts from industry, government, and academia commissioned by SDIO—The Eastport Study Group—concluded in December 1985 that

"... the anticipated complexity of the battle management software and the necessity to test, simulate, modify, and evolve the system make battle management and

[2]Computational procedures for solving problems.

command, control and communication (BM/C3) the paramount strategic defense problem."

Objective, Scope, and Methodology

The Chairman, Subcommittee on Defense, House Committee on Appropriations asked us to assess SDIO's management of the SABM program element, particularly as it related to the BM/C3 component. We specifically examined (1) SDIO's approach to providing direction and exercising oversight of the SABM program and (2) the adequacy of SDIO's internal management controls (IMCs). Our review was performed at SDIO in Washington, D.C.; the Air Force Systems Command's Space Division, Electronic Systems Division, and Rome Air Development Center (RADC); the Army's Strategic Defense Command; and the Navy's Office of Naval Research.

We interviewed management officials, scientists, and engineers who are involved in the program; acquired and analyzed data on existing and planned research; and reviewed financial records, contract files, and progress reports. Our approach included reviewing (1) the directions received by the executing agencies from SDIO regarding research priorities, (2) the effect on the research of funding uncertainties and shifting priorities, and (3) how well both current and future efforts have been planned to reach a full-scale development decision by the early 1990s.

Our review was performed from April 1986 through April 1987 in accordance with generally accepted government auditing standards.

SABM Program Needs Better Management Direction and Oversight

In SDIO's interim charter of April 1984, the Secretary of Defense assigned overall SDI program management responsibility to the Director, SDIO and emphasized the principles of centralized management and decentralized execution. The current DOD Directive 5141.5 for SDIO requires the Director, SDIO to exercise management oversight of all SDI programs and resources within DOD. Despite these assigned responsibilities, there has been inadequate management direction and oversight of the SABM program which could reduce SDIO's ability to provide needed information for an informed systems development decision planned for the early 1990s.

The SABM program includes research to develop architectures for an SDI system and to identify and design required hardware and software technologies to communicate and process sensor and weapons data among satellites and ground stations. Approximately $605 million had been allocated to the SABM program element for fiscal years 1985 through 1987. Although funding uncertainties have been a problem, there have also been several problems relative to the research program which resulted from (1) inefficiencies in research contracting, (2) inadequate oversight of work package directives (WPDs)—the primary management document, and (3) limited progress in linking systems and BM/C3 architectures.

Some Research Contracting Resulted in Inefficiencies

Some research efforts within the SABM program resulted in inefficiencies because contracts were terminated before the intended work was completed. SDIO officials attributed these inefficiencies to a rapidly changing program and funding shortages, while some executing agency officials told us that the inefficiencies were due to SDIO's inadequate direction and planning.

We noted the following instances of inefficiencies:

- During August of fiscal years 1985 and 1986, SDIO urged the procurement offices at several research activities to accelerate awarding of contracts or have their funds withdrawn. The activities advertised their needs, evaluated proposals, and negotiated contracts, but SDIO withdrew the funds before procurement actions were completed because of internal management decisions that changed program direction. As a result, 11 separate procurement actions were aborted. In addition, two contracts at RADC were canceled just 6 days after being signed. In commenting on a draft of this report, DOD stated that SDIO was forced to reduce or eliminate some of the lower priority BM/C3 technology development

efforts primarily because of internal funding withdrawals from the SABM program to meet critical funding needs elsewhere.

- Twenty-two contracts related primarily to artificial intelligence, software engineering, and processor development were terminated at RADC in September 1986, even though SDIO had decided in April 1986 not to pursue that particular research. SDIO made this decision in response to the Eastport Study, but did not promptly instruct RADC to terminate the contracts. Thus, the research continued for an additional 5 months. SDIO then withdrew funding. Our review showed that SDIO's actions resulted in about $5 million being spent on 15 of these contracts that were valued at about $11.6 million. In commenting on our draft report, DOD stated that SDIO's approach permitted an orderly termination of the contracts and in most of these cases, a report of the work done or a useful product was received, therefore SDIO's actions were not inefficient or irresponsible.
- In fiscal year 1985, contractors working on RADC's effort to simulate battle management algorithms were instructed to first develop computer software and then choose the computer hardware they considered best for running simulations. After four $250,000 contracts were completed and RADC was preparing to select the contractor to proceed into the simulation phase, SDIO decided to provide the hardware for the simulations. However, the hardware specified was not compatible with any of the contractors' software. Because of this, and insufficient funds for fiscal year 1987, the entire effort was canceled after spending $1 million. DOD stated, in commenting on our draft report, that RADC now has plans to use the hardware in a redirected processor evaluation task.

Some government purchasing agents and contractors told us that because of such actions, members of the defense industry were becoming disillusioned with the SDI program. In September 1986, RADC sent a message to the Air Force Systems Command stating:

> "By prematurely limiting our technological options, we have greatly increased the risk in each of RADC's WPDs which in the long term will seriously jepordize [sic] the overall chances of success for the SDI program. The most ominous consequence of these actions, and of paramount concern to RADC, is that we have broken faith with the government/industry team by wasting their time and talent on false starts and terminated contracts."

Educational institutions have also been affected. After making commitments to graduate students, granting sabbaticals to faculty, and hiring researchers and administrative staff, institutions found that they were unable to support these individuals. Officials from two universities told

us that based on their experience with the SDI program, their administrations were seriously reconsidering university policies regarding the performance of defense research.

Various executing agency officials informed us that the principal reason for these problems was inadequate direction and planning from SDIO. For example, an Air Force official responsible for two major research areas within the SABM program element said that the program lacked focus and that top-down direction is needed to better identify critical technologies and architectures. The official stated that the Air Force was having trouble proceeding in some of the program areas without such direction. In a Navy organization, a senior research official stated that there was little SDIO guidance on how to spend funds. The official emphasized the need to better focus BM/C3 research and concentrate on specific problems that must be solved to support a systems development decision in the early 1990s.

Some researchers, in looking for more direction, were unable to determine how their work fit in with the work being done at other locations, or how it would meet SDIO's needs. SDIO acknowledged this problem in a BM/C3 working group meeting in October 1986 and pointed out that definitive answers were not available, but must be found quickly. In addition, a research official at the Air Force Systems Command's Space Division said that the lack of a plan is particularly frustrating. The official said that SDIO does not have a means for determining when it is time to move into the full-scale development phase.

Inadequate Oversight of WPDs

SDIO uses WPDs as its primary management document to provide guidance to the executing agencies. WPDs represent technical agreements that are intended to identify the research objectives, define technical evaluation measures, and specify the funding required and available.

We noted several examples of inadequate management oversight relative to WPDs within the SABM program. For instance, much of the program's fiscal year 1986 work was not covered by approved WPDs. All WPDs should be approved by the beginning of each fiscal year (October) to provide the necessary guidance to executing agencies. However, by June 1986 (9 months after the beginning of the fiscal year), 10 of the total 32 WPDs in the SABM program had not been approved, although draft WPDs did exist in some cases. This represented about 47 percent ($105.7 million out of the $227 million) of the total dollar value of the planned SABM research. The unapproved work included major research

efforts associated with BM/C3 technology, the National Test Bed, and affordability issues. In commenting on our draft report, DOD stated that late enactment of the fiscal year 1986 budget and the extensive staff work required to gain final approval of the WPDs led to this situation. It believed, however, that through other less formal management methods, SDIO was able to carry out the agreed efforts with the services to ensure that the work was responsive to program needs. In our view, SDIO's limited discipline in approving the desired research and establishing milestones and funding information for which the executing agencies could be held accountable seemed inconsistent with its emphasis on WPDs as the primary management document.

Other examples of inadequate WPD oversight involved the performance of work and acquisition of items that were outside the scope of the applicable WPD. For instance, research associated with architectures was being done under WPD B413 even though that WPD did not authorize any architecture research. In commenting on this example, DOD's opinion was that the work was justifiable because the products from other architecture efforts did not contain the necessary detail to support battle management efforts. Although the work may have been necessary, there was inadequate assurance that the work was meeting the needs of the SDI program because it was not coordinated with the Air Force task manager responsible for such research.

In another instance, SDIO transferred $1 million from WPD B411 to WPD B413, and then to the Air Force Institute of Technology at Wright-Patterson Air Force Base

"to support research in multiprocessor computer architectures; concurrent battle management algorithms;and HW/SW (hardware/software) approaches to fault tolerant multiprocessors."

The stated purpose of this transfer appeared appropriate relative to the purpose of WPD B413. However, upon discussing the fund transfer with RADC and Institute officials, we learned that the money was actually used to purchase computers for the Institute with the hope of recruiting promising graduates into the SDI program. Little research was performed, and the $1 million went to purchase a main processor plus 13 Zenith microcomputers—the standard Air Force personal computer. It is questionable whether these purchases were consistent with the intent of the WPD. DOD commented that two research thesis documents, which were consistent with the scope of the WPD, were received.

Although SDIO officials acknowledged that they had problems with several WPDs in fiscal year 1986, they stated that changes were made in fiscal year 1987 by refining and automating the WPD process to assure more timely WPD approvals and to make the information easier to use. SDIO now requires research activities to follow a WPD format that (1) states the goals of the research, (2) shows how the efforts depend on the results of related projects, (3) assesses the relative risk of the specific efforts, and (4) provides certain information about the contracts.

In an attempt to verify that such WPD changes led to improvements, we examined WPD B413 for fiscal year 1987 and found that the overall funding profile was inconsistent with the detailed funding plans and milestones. This indicates that management oversight problems still exist. When the Air Force Systems Command presented this WPD to SDIO for approval, funding for the planned work from fiscal years 1987 through 1992 was estimated at $278.8 million. Although SDIO approved the overall WPD in December 1986, it reduced the total out-year funding estimates (fiscal year 1988 through 1992) by 30 percent without changing the funding profiles and major milestones associated with the 12 individual subtasks. Air Force System Command officials stated that the approved WPD could not be executed as written. This is because contracts are awarded for work that requires more than one year to complete, and a reduction in out-year funding affects the original milestones. In effect, the Air Force lacked adequate guidance on the relative importance of the subtasks, and delays in the schedule of events are practically guaranteed.

SDIO officials told us that their planning and oversight efforts were hampered by staffing shortages. This point was also made by a member of the SDI Advisory Committee in a testimony before the House Committee on Armed Services in July 1987. The panel member stated that SDIO has much too small a staff to create and manage an integrated program, thus threatening central direction, coherence, and leadership. Overall, however, DOD did not agree that there were significant inadequacies of management oversight of WPDs in fiscal year 1986, or that such inadequacies still exist.

Limited Progress in Integrating Separate Architecture Efforts

Although integration of SDI architectures was strongly recommended by outside experts, SDIO made little progress in accomplishing it for nearly 2 years. In April 1987, however, greater emphasis was given to this effort.

SDI's system architecture[1] is to describe the components of the overall system that are needed to detect, identify, discriminate, intercept, and destroy ballistic missiles in flight. The BM/C3 architecture is to describe the means (hardware, software, and human role) for coordinating and directing the components and functions of the overall SDI system. It is necessary to integrate these two types of architectures to ensure effective operations of a future ballistic missile defense system.

The need to properly link the design of the battle management system to that of the total ballistic missile defense system was emphasized as early as 1983 in the Fletcher Study. This study concluded that:

"The battle management system will, through its software, define and control the functioning of the entire defense and, thereby, define its effectiveness and establish performance requirements for weapons and sensors. . . The battle management system and its software must be designed as an integral part of the BMD [ballistic missile defense] system as a whole, not as an applique."

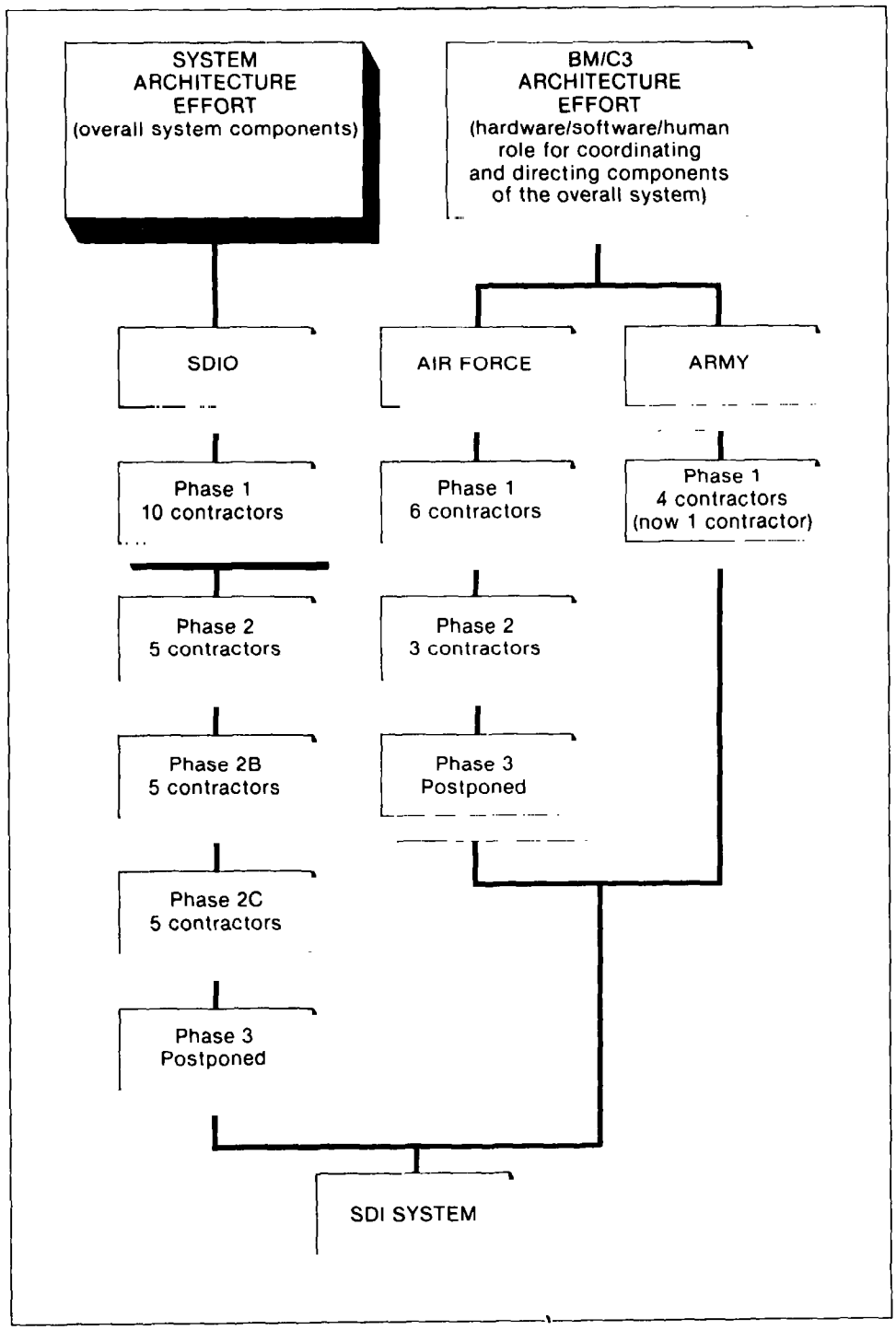
However, separate system and BM/C3 architectures evolved. These efforts were modified and extended several times during 1985 and 1986 to allow for expanded and more detailed analysis of architecture issues. Figure 2.1 outlines the history and status of SDIO's architecture efforts through April 1987.

The phase 1 system architecture contracts were awarded by SDIO in December 1984 to 10 different contractor teams—each team receiving $1 million for a 6-month period. These studies were completed in the summer of 1985. In December 1985, the Eastport Study Group criticized the phase 1 systems architecture contractors for not adequately considering the BM/C3 area. The Group reported that despite the advice of the 1983 Fletcher Study, the contractors had developed their architectures around sensors and weapons, and essentially treated BM/C3 as a part of the system that could be easily and hastily added. The Group agreed with the Fletcher study by concluding that

"the 'applique approach' of designing the system first and then writing the software to control it is the wrong approach for SDI. System architecture and battle management must be developed together."

[1] Now referred to as strategic architecture.

Figure 2.1: System and BM/C3 Architecture Efforts



SDIO agreed with the assessment and expressed a need for better integration of these efforts.

Refinement of the system architecture work began with phase 2, shortly after phase 1 was completed, by competitively selecting five contractors among the original 10 teams. Each phase 2 team was provided about $5 million to continue their efforts. These five contracts were subsequently amended to add work (referred to as phase 2B) at an additional cost of about $11 million. Phase 3, called System Architecture Requirements and Specification, was intended to be a comprehensive contractor effort to provide a more detailed definition of system, technical survivability, and other requirements. It was scheduled to begin in early fiscal year 1987, but was postponed indefinitely by SDIO partly because of the need to better ensure system and BM/C3 architecture integration. As a result, the five phase 2 contracts were amended a second time to extend through January 1988 (referred to as phase 2C) at an additional cost of about $43 million.

Meanwhile, the Air Force Electronic Systems Division and the Army Strategic Defense Command (executing agencies for SDIO) awarded contracts for BM/C3 architecture studies. The Air Force started its phase 1 contracts in July 1985 and completed them in January 1986 using six contractors at a cost of about $4.8 million. It then began phase 2 by competitively selecting three contractors among the original six, for a total projected cost of $7.5 million. This effort was completed in January 1987. Phase 3 was delayed indefinitely because of SDIO's decision to postpone the phase 3 systems architecture effort. The Army started its phase 1 BM/C3 effort with four contractors in February 1986 at a cost of about $32 million. However, the Army now has only one phase 1 contractor at a cost of about $8 million. According to an Army representative, the Army may have to rework its on-going BM/C3 effort, and the scope of the remaining work is uncertain due to SDIO's postponement of phase 3 systems architecture effort and unavailability of funds.

In May 1986, the Air Force and the Army expressed concern to SDIO representatives about the lack of progress in linking the system and BM/C3 efforts. Both were concerned that the effect of the BM/C3 architecture on weapons and sensors had not been sufficiently defined. They identified corrective actions that were needed.

In October 1986, an SDIO official stated that the system architecture and battle management architecture contractors had yet to make the serious

tradeoffs needed between BM/C3 and other system components. The official further stated that BM/C3 architecture workshops that were intended to "close the loop" on this problem were ineffective and that integrating the efforts of the system and BM/C3 architecture contractors may require some radical reorganization. Discussions among SDIO officials centered on the need for an integrated system architecture to ensure that BM/C3 study results are adequately considered. These officials pointed out that no plan existed to do this and that no common guidelines and assumptions existed for the five systems contractors, the three Air Force BM/C3 contractors, and the Army BM/C3 contractor.

When the phase 2C system architecture work was initiated in April 1987, one intended purpose of the work was to fully integrate the BM/C3 function into the system architecture work. The extent to which this will be successful remains to be seen when the work is completed—now scheduled for the second quarter of fiscal year 1988.

DOD agreed that progress in integrating the architecture efforts was slow. However, it pointed out that the difficulty of the architecture effort and the need to fully explore the BM/C3 trade-offs vis-a-vis sensors and weapons was recognized from the outset.

Internal Management Control Program Needed for SDIO

SDIO's internal controls, as required by the Federal Managers' Financial Integrity Act (FMFIA) of 1982, were deficient, and SDIO had not developed a formal IMC program as required by DOD Directive 5010.38. As a result, poor documentation and limited dissemination of program information (1) hampered management oversight and external program reviews and (2) caused possible duplication of effort and confusion within the SABM program organization. In addition, DOD did not mention the lack of an SDIO IMC program in its fiscal year 1984, 1985, or 1986 FMFIA reports to the President and the Congress.

The FMFIA (31 U.S.C. 3512) requires that agencies establish and periodically evaluate their internal accounting and administrative controls, and report annually on the status of such controls. Internal controls encompass an organization's plans, policies, procedures, and records that management uses to direct and guide its operations. Agencies need an effective IMC program to facilitate program execution; enhance management oversight; support external review; and protect against fraud, waste, and mismanagement.

The Office of Management and Budget Circular A-123 revised on August 4, 1986, requires the establishment and maintenance of a cost-effective internal control system. The circular states that the system should provide reasonable assurance that government resources are protected against fraud, waste, mismanagement, or misappropriation and that programs are effectively and efficiently managed to achieve agency goals.

DOD Directive 5010.38, which implements FMFIA and Circular A-123, requires that each DOD component establish a comprehensive IMC system and cites general and specific control standards that should be applied. These standards (1) define the minimum level of quality acceptable for internal control systems in operation, (2) constitute the criteria against which systems are to be evaluated, and (3) apply to all operations and administrative functions. One of the specific standards deals with documentation which is defined in the directive as including:

"written policies, organization charts, procedural write-ups, manuals, memoranda, flow charts, decision tables, completed questionnaires, software, evidence of supervision, and any other related written materials used to describe the IMC methods and measures and to communicate responsibilities and authorities for operating such methods and measures."

Inadequate Program Documentation

We found that little documentation existed to record significant events in SDIO's SABM area. The documentation that was present was not readily available in the quality and quantity needed to monitor and analyze the operations. SDIO's guidance to the executing agencies and to contractors was often verbal and ad hoc, and written administrative and management procedures are nearly nonexistent.

Table 3.1 illustrates specific SDIO deficiencies relative to documentation requirements in each of the broad areas stipulated in the standards.

Table 3.1: SDIO Documentation Deficiencies

Documentation Standard	SDIO Implementation Status
Documentation (milestone charts, flow charts, written policies, and decision papers) must be purposeful useful to managers in controlling program operations.	Documentation does not exist in most cases
Documentation (organization charts, procedural write-ups, manuals, directives, and instructions) must be purposeful and useful to auditors and others involved in analyzing operations.	Documentation does not exist in most cases
Written evidence of significant events.	Not done in many cases.
Documentation to facilitate tracing transactions	Generally not available.

Generally, we found that there were not written instructions to guide SDIO operations in the SABM area. There were no written policy and administrative directives or procedures other than the WPDs and a few viewgraphs. SDIO officials informed us that they plan to establish an internal policy and procedures system which will include an organization manual, a financial management procedures manual, WPD program instructions, military construction program instructions, internal control program instructions, and audit and contracting policies and procedures. SDIO prepared its first official organization chart nearly 2-1/2 years after it was established, and this chart is limited to identifying offices at the highest organizational levels. A more detailed functional breakdown of the organization was not available.

Insufficient written guidance has led to confusion between SDIO and its executing agencies and contractors. For example, in July 1986, we reported[1] that SDIO did not have specific written policies regarding the use of its research funds for operational support. Also, concerning SDIO controls over construction projects, the report stated:

[1]Strategic Defense Initiative Program: Controls Needed Over Construction and Operational Support Funds (GAO/NSIAD-86-145, July 24, 1986).

"There seemed to be uncertainty and confusion within the Army and the Air Force organizations regarding the process to be followed in submitting project documents for review by higher authorities and the services' and SDIO's responsibilities in notifying the Congress of the projects."

More recently, officials in a Navy executing organization told us that, although they are members of several working groups, they did not know what other executing organizations were doing in similar areas. They also stated that many times they were notified too late to attend management and guidance meetings.

Air Force Electronic Systems Division representatives told us that they informally coordinate with other SDI executing agencies and participate in working group meetings that are intended to keep similar research effort teams informed of other SDI BM/C3 work. It was through a working group meeting that the Electronic Systems Division learned that the Naval Research Laboratory was performing algorithm research similar to the work being done at the Air Force RADC and, to some extent, the Air Force Space Division. Records of working group meetings, however, were sparse, resulting in limited information relative to decisions made at these meetings.

SDIO officials acknowledged that they are behind in developing an IMC program because of the newness of the organization and its rapid growth. The responsibility for the management functions of program definition, evaluation, and control rests with the SDIO Director. The Director recognized the importance of establishing a formal IMC program and sent a memorandum to the Assistant Secretary of Defense (Comptroller) in August 1986 pledging to devote top-level management support to this matter. As of October 20, 1986, the SDIO Comptroller was officially assigned the responsibility to coordinate the process of formally establishing written SDIO policy and procedures. Currently, however, only one person working part time is assigned the responsibility of developing an IMC program, including documentation standards and internal procedures and instructions.

DOD's Annual FMFIA Reports Did Not Mention SDIO's Lack of an IMC Program

FMFIA requires that the head of each agency report annually, to the President and the Congress, on the agency's status regarding internal accounting and administrative control systems. The agency head must report any material weaknesses in the controls and describe the plans and schedule for correcting the weaknesses. Through 1986, the Office of the Secretary of Defense was responsible under DOD Directive 5010.38

for establishing and maintaining an IMC program for SDIO. However, SDIO is now responsible for its own IMC program.

DOD'S FMFIA reports to the President and the Congress for fiscal years 1984, 1985, and 1986 failed to mention that SDIO did not have an IMC program. The lack of adequate documentation and the inattention to IMC standards are material weaknesses that would likely have been found by DOD and identified in DOD'S FMFIA report if an IMC program had been in effect. We believe the inadequacy of WPDs as a means of program management (described in ch. 2) are also examples of such weaknesses. The Assistant Secretary of Defense (Comptroller) now intends to require a complete IMC report from SDIO by November 15, 1987, for consideration in preparing DOD's fiscal year 1987 FMFIA report. We were told by Office of the Secretary of Defense representatives that because SDIO was small when it started out, little attention was paid to the development of an IMC program. We believe that adequate controls are particularly essential in new organizations to reduce the risks of mismanagement, especially for programs as large and diverse as the SDIO effort. The Office of Management and Budget Circular A-123 requires the establishment and maintenance of internal controls for both existing and new programs and administrative activities.

DOD Comments and Our Evaluation

DOD agreed that its FMFIA reports for fiscal years 1984, 1985, and 1986 did not mention SDIO's lack of an IMC program. However, DOD did not agree that the specific findings—inadequate documentation, inadequate WPD oversight, and inattention to IMC standards—should have been identified in the FMFIA reports because it had no evidence of the findings before our report. We agree that unknown weakness could not have been reported and we have clarified the report accordingly.

Conclusions, Recommendations, and Agency Comments

Conclusions

SDIO needs to improve its ability to provide timely and effective management direction and oversight of the SABM program and to implement a formal IMC program. Such efforts could help correct poor program documentation and limited dissemination of program information.

Specifically, SDIO has experienced several problems relative to the SABM research program. There were some research contracting inefficiencies because contracts were terminated due to changing priorities. In addition, there was limited discipline in overseeing WPDS—SDIO's primary management document. Also, SDIO made limited progress in integrating system and battle management architectures, even though integration was strongly recommended by outside experts for some time. SDIO acted in April 1987, however, to ensure greater architecture integration.

DOD did not ensure that an IMC program was established for SDIO that met the requirements of FMFIA, the Office of Management and Budget Circular A-123, and DOD Directive 5010.38. The SDI effort is large and complex, and developing an IMC program that addresses all aspects of SDIO's management system is a time-consuming process. However, without such a program, SDIO and other managers cannot have reasonable assurance that SDIO programs are adequately protected against fraud, waste, or mismanagement, and are operating in accordance with the law. DOD's FMFIA report to the President and the Congress for fiscal years 1984, 1985, and 1986 should have mentioned that SDIO did not have an IMC program.

Recommendations

We recommend that the Secretary of Defense require the Director, SDIO to place increased management attention on providing direction and oversight to the executing agencies associated with the SABM program. This should minimize inefficiencies and increase the usefulness of WPDS as the primary management document.

We also recommend that the Secretary of Defense (1) ensure that SDIO implements an IMC program and (2) report SDIO's material IMC weaknesses and describe the plans and schedule for correcting the weaknesses, in accordance with FMFIA.

Agency Comments

In its oral comments on our draft report, DOD stated that it concurred with our recommendations. According to DOD, significant actions were initiated by the SDIO Director as a result of the SDI milestone I briefing to

the Defense Acquisition Board.[1] To provide increased management oversight and increased integration of the SDI program, a reorganization of SDIO was effective on September 18, 1987. In addition, SDIO has changed the content of the WPDs for fiscal year 1988 and beyond to align with the work breakdown structure that is being developed for the SDI program. DOD stated that this was a major step in evolving the development of WPDs to ensure consistency across the program.

According to DOD, SDIO is fully aware of the need to establish IMCs and is in the process of developing an IMC program to provide policies and procedures throughout the organization. Several actions were being taken to include assigning responsibilities, providing personnel training, completing and reviewing risk assessment reports, scheduling an inspection by the DOD Inspector General, and preparing the fiscal year 1987 annual statement of assurance.

[1]This Board consists of senior DOD managers and represents the primary forum through which recommendations are made to the Secretary of Defense on matters pertaining to the acquisition of major systems. SDIO's milestone I briefing resulted in the Secretary of Defense's approval for SDIO to proceed with six technology programs into the concept demonstration/validation phase of the acquisition process.

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