United States General Accounting Office

GAO

Report to the Chairman and Ranking Minority Member, Subcommittee on Readiness and Management Support, Committee on Armed Services, U.S. Senate

February 2003

DOD BUSINESS SYSTEMS MODERNIZATION

Improvements to Enterprise Architecture Development and Implementation Efforts Needed

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Why GAO Did This Study

The Department of Defense (DOD) is developing an enterprise architecture, or corporate modernization blueprint, to guide and constrain its ongoing and planned business system investments. GAO was asked to review DOD's processes and controls for developing the enterprise architecture and ensuring that ongoing IT investments are consistent with its enterprise architecture development efforts.

What GAO Recommends

To assist DOD in successfully developing an enterprise architecture and using it to gain control over its ongoing business system investments, we are making recommendations to the Secretary of Defense to ensure that DOD (1) expands its use of effective architecture development processes and controls and (2) strengthens controls over its ongoing business systems investments.

DOD concurred with our recommendations and described recently completed, ongoing, and planned efforts to address them.

DOD BUSINESS SYSTEMS MODERNIZATION

Improvements to Enterprise Architecture Development and Implementation Efforts Needed

What GAO Found

DOD has undertaken a challenging and ambitious task to, within 1 year, develop a departmentwide blueprint for modernizing its over 1,700 time-worn, inefficient, and nonintegrated business processes and supporting information technology (IT) assets. Such a blueprint, commonly called an enterprise architecture, is an essential modernization management tool. We support the Secretary of Defense's decision to develop an architecture and the department's goal of acquiring systems that provide timely, reliable, and relevant information.

Successfully doing so requires the application of effective enterprise architecture and IT investment management processes and controls. While DOD is following some of these enterprise architecture practices, it is not following others, in part because it is focused on meeting its ambitious schedule. More specifically, with respect to developing the architecture, DOD has yet to (1) establish the requisite architecture development governance structure and process controls needed to ensure that ownership of and accountability for the architecture are vested with senior leaders across the department, (2) clearly communicate to intended architecture stakeholders the purpose, scope, and approach to developing the initial and subsequent versions of the architecture, and their roles and responsibilities, and (3) define and implement an independent quality assurance process. Until it follows these practices, DOD increases the risk of developing an architecture that will be limited in scope, be resisted by those responsible for implementing it, and will not support effective systems modernization.

DOD has taken initial steps aimed at improving its management of ongoing business system investments. However, DOD has yet to establish the necessary departmental investment governance structure and process controls needed to adequately align ongoing investments with its architectural goals and direction. Instead, DOD continues to allow its component organizations to make their own parochial investment decisions, following different approaches and criteria. This stovepiped decision-making process has contributed to the department's current complex, error-prone environment of over 1,700 systems. In particular, DOD has not established and applied common investment criteria to its ongoing IT system projects using a hierarchy of investment review and funding decision-making bodies, each composed of representatives from across the department. DOD also has not yet conducted a comprehensive review of its ongoing IT investments to ensure that they are consistent with its architecture development efforts. Until it takes these steps, DOD will likely continue to lack effective control over the billions of dollars it is currently spending on IT projects.

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

February 28, 2003

The Honorable John Ensign
Chairman
The Honorable Daniel K. Akaka
Ranking Minority Member
Subcommittee on Readiness and Management Support
Committee on Armed Services
United States Senate

In May 2001,[1] we reported that the Department of Defense (DOD) had neither an enterprise architecture for its financial and financial-related business operations, nor the management structure, processes, and controls in place to effectively develop and implement one. In September 2002, the Secretary of Defense designated improving financial management operations, which include not only finance and accounting but also business areas such as logistics, acquisition, and personnel management, as 1 of the department's top 10 priorities. In addition, the Secretary established a program to develop and implement an enterprise architecture. In response to your request, we determined whether DOD is (1) following effective processes and controls in developing its enterprise architecture and (2) ensuring that ongoing information technology (IT) investments are consistent with its enterprise architecture development efforts.

On January 31, 2003, we briefed your offices on the results of this review and the recommendations we are making to the Secretary of Defense. This report transmits those briefing materials, including our scope and methodology, as appendix I.

DOD has undertaken a challenging and ambitious task to, within 1 year, develop a departmentwide enterprise architecture (blueprint) for modernizing its business operations and systems. We support DOD's goals of developing an architecture to guide and constrain its modernization efforts and acquiring systems that provide timely, reliable, and relevant information. Toward these goals, DOD has taken a number of positive steps, including

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[1]U.S. General Accounting Office, *Information Technology: Architecture Needed to Guide Modernization of DOD's Financial Operations*, GAO-01-525 (Washington, D.C.: May 17, 2001).

- designating improving financial management operations as 1 of its top 10 priorities;

- establishing a program office responsible for managing the enterprise architecture development effort;

- capturing key data needed to develop the "As Is" architecture, such as documenting its inventory of over 1,700 business systems; and

- requiring DOD Comptroller review and approval of IT investments that meet certain criteria.

Our May 2001[2] report provided a number of fundamental steps on how DOD should approach the development of its enterprise architecture. At that time, we had also recommended that the department limit business system investments until the enterprise architecture is developed. While DOD has taken some positive actions, as specified above, the department has yet to implement some of our recommendations and certain best practices for developing and implementing the architecture. The following discussion summarizes those key practices DOD has yet to employ.

Architecture Development

Successful architecture development requires the application of proven management practices. Thus far, DOD has not implemented certain practices. Specifically, DOD has yet to

- establish the requisite architecture development governance structure needed to ensure that ownership of and accountability for the architecture is vested with senior leaders across the department;

- develop and implement a strategy to effectively communicate the purpose and scope, approach to, and roles and responsibilities of stakeholders in developing the enterprise architecture; and

- fully define and implement an independent quality assurance process.

Not implementing these practices increases DOD's risk of developing an architecture that will be limited in scope, be resisted by those responsible

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[2]GAO-01-525.

for implementing it, and will not support effective systems modernization. DOD recognizes the need to follow these practices, and attributes its delays in doing so to tight schedule demands, unawareness of certain best practices, and competing resource priorities. Among other things, it plans to strengthen the architecture governance and management structure.

Architecture Implementation and Control of Ongoing Investments

Ensuring that ongoing IT investments are consistent with DOD's architecture development efforts requires the application of proven investment management practices. To date, DOD has not implemented certain practices. Specifically, DOD has yet to establish an investment management governance structure that includes

- a hierarchy of investment review boards composed of representatives from across the department who are assigned investment selection and control responsibilities based on project threshold criteria;

- a standard set of investment review and decision-making criteria for use by all boards, including criteria to ensure architectural compliance and consistency; and

- a specified, near-term date by which ongoing investments have to be subjected to this investment review process, and by which decisions should be made as to whether to proceed with each investment.

Until the investment management governance structure is established, DOD component organizations will continue to make their own parochial investment decisions, following different approaches and criteria. As we have previously reported,[3] this stovepiped decision-making process has contributed to the department's current complex, error-prone systems environment. This deeply embedded cultural resistance to a more holistic decision-making process is a substantial risk to successful development and implementation of the enterprise architecture. DOD's leadership plans to strengthen its governance and oversight over ongoing IT investments.

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[3]U.S. General Accounting Office, *DOD Financial Management: Important Steps Underway But Reform Will Require a Long-term Commitment*, GAO-02-784T (Washington, D.C.: June 4, 2002).

Recommendations for Executive Action

To assist DOD in its efforts to effectively develop and implement an enterprise architecture, and guide and constrain its business system investments, and to address the problems discussed during the briefing, we reiterate the recommendations that we made in our May 2001 report[4] that DOD has yet to implement. In addition, we recommend that the Secretary of Defense ensure that

- the enterprise architecture executive committee members are singularly and collectively made explicitly accountable to the Secretary for delivery of the enterprise architecture, including approval of each version of the architecture;

- the enterprise architecture program is supported by a proactive marketing and communication program; and

- the quality assurance function (1) includes the review of adherence to process standards and reliability of reported program performance, (2) is made independent of the program management function, and (3) is not performed by subject matter experts involved in the development of key architecture products.

Additionally, we recommend that the Secretary gain control over ongoing IT investments by

- establishing a hierarchy of investment review boards, each responsible and accountable for selecting and controlling investments that meet defined threshold criteria, and each composed of the appropriate level of executive representatives, depending on the threshold criteria, from across the department;

- establishing a standard set of criteria to include (1) alignment and consistency with the DOD enterprise architecture and (2) our open recommendations governing limitations in business system investments pending development of the architecture; and

- directing these boards to immediately apply these criteria in completing reviews of all ongoing IT investments, and to not fund investments that

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[4]GAO-01-525.

do not meet these criteria unless they are otherwise justified by explicit criteria waivers.

Agency Comments and Our Evaluation

In written comments on a draft of this report (see appendix II), the Under Secretary of Defense (Comptroller) stated that the department concurred with our recommendations and described recently completed, ongoing, and planned efforts to address them. For example, the department stated that it is currently developing a new architecture development and implementation governance structure and a marketing and communication strategy to facilitate ongoing development activities. Additionally, the department stated that it is providing for the independence of its quality assurance function by organizationally moving it under the Director of Business Modernization and Systems Integration. DOD stated that it would also require the reporting of quality assurance information to the architecture Executive Steering Committee. We did not verify or evaluate the extent to which the efforts described in DOD's comments will address our recommendation.

Regarding the scope of quality assurance reviews, the department stated that it has established and implemented a quality assurance function that includes review of architecture products, program performance, and architecture development process standards. We agree that the quality assurance function includes review of architecture products. However, neither during our review nor in its comments did the department provide documentary evidence to support that its quality assurance reviews address program performance and adherence to architecture development process standards. Further, as stated in our report, quality assurance function officials told us that they were never tasked to perform such reviews.

We are sending copies of this report to the Chairmen and Ranking Minority Members of other Senate and House committees and subcommittees that have jurisdiction and oversight responsibilities for the Department of Defense. We are also sending copies to the Secretary of Defense; the Secretary of the Army; the Secretary of the Navy; the Secretary of the Air Force; the Under Secretary of Defense (Comptroller); the Under Secretary of Defense (Acquisition, Technology, and Logistics); the Under Secretary of Defense (Personnel & Readiness); the Assistant Secretary of Defense (Command, Control, Communications, and Intelligence); the Director of

the Defense Finance and Accounting Service; and the Director of the Office of Management and Budget. Copies will also be available at no charge on our Web site at www.gao.gov.

Should you or your staff have any questions on matters discussed in this report, please contact us at (202) 512-9095 or (202) 512-3439, respectively. We can also be reached by e-mail at kutzg@gao.gov or hiter@gao.gov. GAO contacts and key contributors to this report are listed in appendix III.

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Briefing to Subcommittee Staff

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DOD BUSINESS SYSTEMS MODERNIZATION: Improvements to Enterprise Architecture Development and Implementation Efforts Needed

Briefing for the Staff of the
Subcommittee on Readiness and Management Support,
Senate Armed Services Committee

January 31, 2003

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Outline of Briefing

- Introduction
- Objectives
- Scope and Methodology
- Results in Brief
- Background
- Results
- Conclusions
- Recommendations
- Agency Comments

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Introduction

In September 2002, the Secretary of Defense designated improving financial management operations, which includes not only finance and accounting but also such business areas as logistics, acquisition, and personnel management, as 1 of the department's top 10 priorities.

Effectively managing such a large and complex endeavor requires, among other things, a well-defined and enforced blueprint for operational and technological change, commonly referred to as an enterprise architecture. The Department of Defense (DOD) is in the process of developing an enterprise architecture for its business systems modernization efforts. At the same time, it continues to invest billions of dollars in existing and new systems.

The use of enterprise architectures is an information technology (IT) management best practice. Our experience with federal agencies has shown that attempting a major modernization effort without a well-defined and enforceable enterprise architecture results in systems that are duplicative, are not well integrated, are unnecessarily costly to maintain and interface, and do not effectively optimize mission performance.

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Objectives

As agreed, our objectives were to determine whether DOD is

- following effective processes and controls in developing its enterprise architecture and
- ensuring that ongoing IT investments are consistent with its enterprise architecture development efforts.

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Scope and Methodology

To accomplish our objectives, we

- used relevant federal guidance and best practices to define the controls and processes needed for effective architecture development and implementation (see app. I);

- reviewed DOD documentation associated with developing the architecture, including steering committees' charters, contractor work orders and deliverables (e.g., development methodology and program management plan), risk management and quality assurance process definitions and results, and ongoing system review processes and results;

- attended various DOD architecture development program meetings and workshops to determine, among other things, the program's scope, strategy, methodology, stakeholder understanding and commitment, and progress;

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Scope and Methodology (cont.)

- compared the architecture development and implementation management processes and controls to applicable criteria, including recognized best practices;

- reviewed DOD's and the military services' policies and procedures to obtain an understanding of their processes for developing and reviewing their IT budgets and selecting and controlling their IT investments; and

- reviewed and analyzed DOD's fiscal year 2003 IT budget request to determine the amount of IT funding requested for selected systems.

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Scope and Methodology (cont.)

- To augment our document reviews and analyses, we interviewed officials from various DOD organizations and contractors, including
  - the Office of the Under Secretary of Defense (Comptroller), the Financial Management Modernization Program Management Office, and the Financial Management Modernization Program Support Office;
  - the Office of the Assistant Secretary of Defense for Command, Control, Communications and Intelligence/Chief Information Officer (CIO);
  - the Offices of the Army, Navy, and Air Force Assistant Secretaries for Financial Management and Comptrollers;
  - the Offices of the Army, Navy, and Air Force CIOs;
  - International Business Machines (IBM); and
  - MITRE Corporation.

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Scope and Methodology (cont.)

We did not independently validate cost and budget information provided by DOD, or the completeness or accuracy of draft architecture products.

We conducted our work primarily at DOD headquarters offices in Washington, D.C., and Arlington, Virginia.

The work was performed from July 2002 through January 2003 in accordance with U.S. generally accepted government auditing standards.

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Results in Brief

DOD has undertaken a challenging and ambitious task to, within 1 year, develop a departmentwide enterprise architecture, or blueprint, for modernizing its business operations and systems [1]. We support DOD's goals of developing an architecture to guide and constrain its modernization efforts and acquiring systems that provide timely, reliable, and relevant information. Toward these goals, DOD has taken a number of positive steps, including

- designating improving financial management operations as 1 of its top 10 priorities;
- establishing a program office responsible for managing the enterprise architecture development effort;
- capturing key data needed to develop the "As Is" architecture, such as documenting its inventory of over 1,700 business systems; and
- requiring DOD Comptroller review and approval of IT investments that meet certain criteria.

[1]Section 1004 of Public Law 107-314, December 2, 2002, recently required the Secretary of Defense to develop a financial management enterprise architecture that meets certain minimum requirements by May 1, 2003.

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Results in Brief (cont.)

While DOD has taken positive steps and is continuing to take further actions to address some of our concerns, the department is still not meeting certain critical best practices for developing and implementing the architecture.

Architecture Development

Successful architecture development requires the application of proven management practices. However, DOD has yet to

- establish the requisite architecture development governance structure needed to ensure that ownership of and accountability for the architecture is vested with senior leaders across the department;
- develop and implement a strategy to effectively communicate the purpose and scope, approach to, and roles and responsibilities of stakeholders in developing the enterprise architecture; and
- fully define and implement an independent quality assurance process.

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Results in Brief (cont.)

DOD recognizes the need to follow these practices, and attributes its delays in doing so to tight schedule demands, unawareness of certain best practices, and competing resource priorities. Among other things, it plans to strengthen the architecture governance and management structure.

However, until each of these practices is followed, DOD has increased the risk of developing an architecture that will be limited in scope, will be resisted by those responsible for implementing it, and thus will not support effective systems modernization.

Architecture Implementation and Control of Ongoing Investments
Ensuring that ongoing IT investments are consistent with DOD's architecture development efforts requires the application of proven investment management practices. However, DOD has yet to establish an investment management governance structure that includes

- a hierarchy of investment review boards composed of representatives from across the department who are assigned investment selection and control responsibilities based on project threshold criteria;

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Results in Brief (cont.)

- a standard set of investment review and decision-making criteria for use by all boards, including criteria to ensure architectural compliance and consistency; and
- a specified, near-term date by which ongoing investments have to be subjected to this investment review process, and by which decisions should be made as to whether to proceed with each investment.

Instead, DOD continues to allow its component organizations to independently make their own investment decisions, following different approaches and criteria. As we have previously reported,[2] this stovepiped decision-making process has contributed to the department's complex, error-prone systems environment. This deeply embedded cultural resistance to a more holistic decision-making process is a substantial risk to successful development and implementation of the enterprise architecture. Its leadership plans to strengthen its governance and oversight of its ongoing IT investments.

[2]U.S. General Accounting Office, *DOD Financial Management: Important Steps Underway But Reform Will Require a Long-term Commitment*, GAO-02-784T (Washington, D.C.: June 4, 2002).

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Results in Brief (cont.)

Until these practices are followed, DOD will likely continue to invest in business systems that are duplicative, not integrated, and overly costly and do not optimally support mission operations.

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Results in Brief (cont.)

Recommendations

To assist DOD in successfully developing an enterprise architecture and using it to gain control over its ongoing business system investments, we are making recommendations to the Secretary of Defense to ensure that DOD (1) expands its use of effective architecture development processes and controls, and (2) strengthens controls over its ongoing business systems investments.

In commenting on a draft of this briefing, DOD officials stated that they generally agreed with our findings, conclusions and recommendations, with the exception of our assessment of the adequacy of its quality assurance function. With regard to quality assurance, they stated that this function currently addresses adherence to process standards and reported program performance. However, they did not provide evidence that supported this statement.

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Background

We have long reported that DOD's serious financial management and related business system problems result in a lack of information needed to make sound decisions, and that these problems hinder the efficiency of operations and leaves the department vulnerable to fraud, waste, and abuse. Such problems led us in 1995 to put both DOD financial management and systems modernization on our list of high-risk areas in the federal government, a designation that continues today.[3]

To assist DOD in addressing these high risk areas, the DOD Inspector General, the military service audit agencies, and GAO have conducted numerous audits and reviews and made scores of recommendations that are aimed at correcting the root causes of its problems. The department has acknowledged that its present financial management environment has serious inadequacies and does not, for the most part, comply with the framework for financial reform set out by Congress, such as the Chief Financial Officers Act of 1990.

[3]U.S. General Accounting Office, *High-Risk Series: An Overview*, GAO/HR-95-1 (Washington, D.C.: February 1995); *High-Risk Series: Defense Financial Management*, GAO/HR-97-3 (Washington, D.C.: February 1997); *High-Risk Series: An Update*, GAO/01-263 (Washington, D.C.: January 2001); and *Performance and Accountability Series: Major Management Challenges and Program Risks – Department of Defense*, GAO/03-98 (Washington, D.C.: January 2003).

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Background (cont.)

Recent GAO Reviews Identified Need for an Enterprise Architecture

In May 2001, we reported[4] that the department had neither an enterprise architecture for its financial and financial-related business operations, nor the management structure, processes, and controls in place to effectively develop and implement one. We also reported that the department planned to spend billions of dollars on new and modified business systems that would function independently from one another and outside the context of an enterprise architecture.

We concluded that if the department continued down this path, it would only perpetuate its existing business operations and systems environment, which was

- duplicative,
- not interoperable,
- unnecessarily costly to maintain and interface, and
- not optimizing mission performance and accountability.

[4]U.S. General Accounting Office, *Information Technology: Architecture Needed to Guide Modernization of DOD's Financial Operations*, GAO-01-525 (Washington, D.C.: May 17, 2001).

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Background (cont.)

To address its problems, we recommended that the Secretary of Defense, among other things,

- immediately designate the modernization program a departmental priority and that the Deputy Secretary of Defense lead this effort;
- issue a policy that directed the development, implementation, and maintenance of an enterprise architecture;
- empower an organization consisting of senior management from across the department with the authority to develop and maintain the architecture and serve as the department's investment review board, and hold it accountable for both;
- appoint a Chief Architect and establish and adequately staff and fund a program office to develop and maintain the architecture; and
- ensure that the Chief Architect
  - establishes architecture management processes and controls,
  - defines and implements the architecture development approach and methodology,
  - develops the baseline architecture, the target architecture, and the sequencing plan, and
  - maintains the architecture.

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Background (cont.)

We further recommended that, until the enterprise architecture is developed and a departmentwide investment management review process is established, DOD components limit business system investments to

- deployment of systems that have already been fully tested and involve no additional development or acquisition cost,
- stay-in-business maintenance needed to keep existing systems operational,
- management controls needed to effectively invest in modernized systems, and
- new systems or existing system changes that are congressionally directed or are relatively small, cost-effective, and low risk and can be delivered in a relatively short time frame.

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Background (cont.)

In addition, we testified in March 2002,[5] that despite well-intentioned prior efforts to reform financial management operations, the department has failed largely because of

- a lack of sustained top-level leadership and management accountability for correcting problems;
- deeply embedded cultural resistance to change, including military service parochialism and stovepiped operations;
- a lack of results-oriented goals and performance measures and monitoring; and
- inadequate incentives for seeking change.

We concluded that our experience has shown that well-intentioned initiatives will only succeed if there are the right incentives,

[5]U.S. General Accounting Office, *DOD Financial Management: Integrated Approach, Accountability, Transparency, and Incentives Are Keys to Effective Reform*, GAO-02-497T (Washington, D.C.: Mar. 6, 2002).

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Background (cont.)

transparency, and accountability and that for DOD, this means having, among other things,

- the direct, active support and involvement of the Secretary of Defense and
- an enterprisewide architecture to guide and direct modernization investments.

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Background (cont.)

What Is an Enterprise Architecture?
An enterprise architecture provides a clear and comprehensive picture of an entity, whether it is an organization (e.g., federal department, military service, or agency) or a functional or mission area that cuts across more than one organization (e.g., financial management or homeland security). This picture consists of snapshots of the enterprise's current operational and technological environment and its target environment, as well as a capital investment road map for transitioning from the current to the target environment.

Enterprise architecture development, implementation, and maintenance are basic tenets of effective IT management. Managed properly, these architectures can clarify and help optimize the interdependencies and interrelationships among an organization's business operations and the underlying IT infrastructure and applications that support these operations.

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Background (cont.)

Employed in concert with other important IT management controls, such as institutional investment management practices, enterprise architectures can greatly increase the chances that organizations' operational and IT environments will be configured in such a way as to optimize mission performance.

History and Status of DOD Enterprise Architecture Efforts

Following our May 2001 report,[6] the Secretary directed the development and implementation of a departmentwide enterprise architecture, and established a program to accomplish this. In doing so, the Secretary assigned responsibility for the program to the DOD Comptroller, in coordination with the Under Secretary of Defense (Acquisition, Technology, and Logistics) and the DOD CIO.

[6]GAO-01-525.

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Background (cont.)

In October 2001, the DOD Comptroller established the Financial Management Modernization Executive Committee to oversee the architecture and the systems modernization efforts, and the Financial Management Modernization Steering Committee to advise and guide the program.

In April 2002, DOD awarded a contract to IBM for approximately $95 million to begin developing the architecture.

DOD has divided its architecture development into two phases.
Phase I (April 2002 - November 2002) focused on
- documenting the current or "As Is" architecture and
- developing what DOD termed a "strawman" architecture, which was defined to mean a version of the "To Be" architecture that (1) was *unconstrained* by existing laws, regulations, policies, and procedures, (2) addressed *selected*, previously identified deficiencies, and (3) incorporated leading commercial business practices.

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Background (cont.)

Phase II (October 2002 - April 2003) is focused on developing

- a version of the "To Be" architecture that (1) is *constrained* by relevant laws, regulations, policies, and procedures, (2) addresses *all* previously identified deficiencies, and (3) incorporates leading commercial business practices;

- a strategy for transitioning from the "As Is" to the "To Be" architectural environments; and

- obtaining stakeholder participation and commitment.

Architecture and Systems Modernization Costs

For fiscal years 2002 and 2003, Congress appropriated approximately $98 million and $96 million, respectively, to support DOD's effort to develop and implement the enterprise architecture and transition plan.

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Background (cont.)

<u>DOD's Current Business Systems Environment</u>

According to DOD, its current business systems environment consists of over 1,700 systems to support operations and management decision making, such as accounting, acquisition, finance, logistics, and personnel.

As we have previously reported,[7] this environment was not designed to be, but rather has evolved into the overly complex and error-prone operation that exists today, including (1) little standardization across DOD components, (2) multiple systems performing the same tasks, (3) the same data stored in multiple systems, and (4) manual data entry into multiple systems.

To operate and maintain this environment, DOD's fiscal year 2003 IT budget request was approximately $18 billion.

[7]GAO-02-784T.

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Objective 1: Results

DOD Has Taken Some Positive Steps Towards Developing the Architecture; However, Key Processes and Controls Are Not Being Followed

DOD has undertaken a challenging and ambitious task: to, within 1 year, develop a departmentwide enterprise architecture, or blueprint, for modernizing its business operations and systems. We agree with DOD's goal of developing and implementing an architecture to guide and constrain investments in systems that provide timely, reliable, and relevant information for informed decision making. We also support DOD's efforts and recognize that the department has taken positive steps in developing the architecture. Specifically, the department has

- designated improving financial management operations as 1 of its top 10 priorities;
- issued a memorandum directing the development, implementation, and maintenance of an enterprise architecture;
- established a program office responsible for managing the enterprise architecture development effort;

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Objective 1: Results (cont.)

- selected an architecture framework and repository tool to assist in developing the architecture;
- gathered key data needed to develop the "As Is" architecture, such as documenting its inventory of over 1,700 business systems; and
- engaged DOD subject matter experts (business and systems) to assist in developing the architecture.

However, DOD is not following other architecture development best practices that are designed to reduce the risk that enterprise architecture programs will fail or fall short of their potential.

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Objective 1: Results (cont.)

1. DOD has not assigned accountability for enterprise architecture development to a DOD-wide executive entity.

Enterprise architectures are corporate assets that are intended to represent the strategic direction of the enterprise. As such, best practices recommend that an organization establish an Enterprise Architecture Executive Steering Committee, consisting of top executives, to direct and oversee the architecture program, and to be accountable for approving the initial and subsequent versions of the architecture. Sustained support and commitment by this committee to the architecture, as well as the committee's ownership of it, are critical to a successful enterprise architecture development effort.

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Objective 1: Results (cont.)

DOD has established two executive committees to provide program guidance, both consisting of senior leaders from across the department. However, these committees are not responsible for directing and overseeing the architecture effort, and they are not accountable for approving the architecture. Instead, the responsibility of each is limited to providing guidance to the program office, and advising the DOD Comptroller on the program.

We observed and were told by department officials that the perception within the department is that ownership and accountability for the architecture resides solely with the DOD Comptroller, and not with DOD's military services, agencies, and the Office of the Secretary of Defense principal staff assistants, such as the Under Secretary of Defense (Acquisition, Technology and Logistics). To address this, the program office recently developed a draft proposal to improve the program accountability structure and is currently soliciting stakeholders' comments. Program officials stated that the new structure will identify DOD business areas and establish business (domain) owners who will be accountable for all aspects of the architecture within their domain. DOD plans to implement its revised accountability structure by no later than May 2003.

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Objective 1: Results (cont.)

According to a program official, the department assigned accountability for the enterprise architecture effort to the Comptroller in response to a recommendation in a study directed by the Secretary of Defense.

Until DOD corrects this accountability structure, the success of its enterprise architecture program is at risk. Past DOD initiatives to improve its business processes and systems, such as the Corporate Information Management (CIM) initiative, failed in part because they did not (1) obtain and sustain the departmentwide senior management leadership, commitment, and support needed to succeed and (2) effectively overcome deeply embedded cultural resistance to change, including military service parochialism.

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Objective 1: Results (cont.)

2. DOD has not developed an effective strategy for communicating with architecture stakeholders.

As noted earlier, enterprise architectures are corporate assets to be owned and used by the major business area executives. As such, it is critical that architecture plans and activities be transparent to, and have the support of, these stakeholders and their teams.

To this end, best practices recommend that, before developing the architecture, organizations initiate a marketing program to educate stakeholders about the value of the architecture and emphasize the agency head's support and commitment. Once initial participation and commitment is achieved, best practices recommend that an agency develop and implement an enterprise architecture communications strategy to facilitate the exchange of information and to keep business area executives and their teams informed and engaged.

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Objective 1: Results (cont.)

DOD does not have a marketing program or a communications plan for its enterprise architecture efforts. Instead, it has attempted to communicate the program's purpose, scope, approach, and stakeholder responsibilities as part of its development efforts. For example, it has (1) conducted a program kickoff meeting to provide a general explanation of the enterprise architecture goals, objectives, and processes, (2) involved business area subject matter experts in the development process, and (3) conducted workshops to discuss initial versions of architecture products.

According to Army, Navy, and Air Force stakeholders we interviewed, DOD has not clearly communicated the architecture program's purpose, scope, approach, and stakeholder responsibilities.

Further, our observations at workshops held to brief stakeholders on the program corroborated these statements. That is, we observed that in many cases workshop participants did not have a clear understanding of the program.

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Objective 1: Results (cont.)

- For example, numerous questions were raised at these workshops regarding the purpose of the initial version of the "To Be" architecture (i.e., strawman architecture) and the participants' roles and responsibilities for reviewing it.

DOD officials agreed that some stakeholders are confused about the program's scope and strategy, as well as their roles and responsibilities, and acknowledged that the department's lack of a marketing program and communications plan has contributed to the problem. DOD program officials stated that the department recognizes that implementing a communications and change management strategy is critical to the success of architecture implementation. As a result, the program manager stated that the department plans to have its contractor develop such a marketing/communications strategy to be completed by April 2003. The department has not yet issued a statement of work and did not provide a timeframe by which it will.

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Objective 1: Results (cont.)

According to the program manager, the department did not prepare this strategy earlier because of competing priorities and tight schedule demands.

Without a sufficiently open and transparent architecture development program that ensures full stakeholder understanding, DOD increases the risk of developing an architecture that is limited in scope, resisted by business owners, and not supportive of effective business systems modernization.

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Objective 1: Results (cont.)

3. DOD has not established an effective process for ensuring architecture quality.

Best practices recommend that entities establish and implement a quality assurance function to ensure (1) architecture products meet prescribed quality standards and measures, (2) reported program performance (e.g., satisfaction of cost and schedule commitments) is reliable, and (3) program management is adhering to relevant process standards. Furthermore, these best practices recommend that the quality assurance function be independent of the enterprise architecture program, reporting directly to an enterprise architecture executive steering committee.

DOD has established a quality assurance function. However, the department has not developed a plan that documents whether the scope of this function's activities extends to all 3 areas, and our review of documentation and interviews with responsible officials showed that quality assurance activities only include the first of the three. Compounding this scope limitation, the function is not independent of the program management office.

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Objective 1: Results (cont.)

- With respect to the three areas, program officials stated that quality reviews include only architecture products. Based on our examination of completed quality reviews, we confirmed that they addressed architecture products. In contrast, program office documentation states that the quality assurance function will also include adherence to relevant process standards; however, this is not occurring. Our examination of completed quality reviews showed that none addressed adherence to process standards. Further, as stated by these officials and confirmed by the documents, the quality assurance function is not addressing reported program performance.

In addition, the quality assurance function is not independent. That is, the quality assurance manager reports directly to the program director, and not to the architecture steering committee; and the same subject matter experts responsible for developing the architecture products are performing certain quality assurance reviews. For example, the same subject matter experts who developed the strawman architecture were involved in the quality assurance review of it. In addition,

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Objective 1: Results (cont.)

- The quality assurance function raised concerns regarding the quality of the architecture development methodology and the program management plan. However, because the quality assurance function reports to the program office, program officials still approved these documents without adequately addressing the concerns. Moreover, these concerns were never brought to the attention of the executive steering committee.

According to program officials, the department did not prepare a quality assurance plan because of schedule demands and staffing limitations. Further, they stated that the quality assurance function was never tasked to ensure that process standards were being met or that reported program performance data were reliable. The program control team leader also stated that the quality assurance function was not reviewing program performance data because this was a program office responsibility. With regard to independence, the quality assurance manager stated that the department was not aware of the requirement to report to an executive steering committee.

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Objective 1: Results (cont.)

According to program officials, DOD plans to reconsider the scope of their quality assurance activities and provide for independent reporting to the executive steering committee.

Until these deficiencies are corrected, the department lacks reasonable assurance that it is producing high-quality architecture products.

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Objective 2: Results

DOD Does Not Have the Means in Place for Ensuring That Ongoing IT Investments Are Consistent with Its Enterprise Architecture Efforts

DOD has taken certain steps to control ongoing investments. Specifically, the DOD Comptroller has

- issued memorandums that set forth the requirement for Comptroller review and approval of IT investments that meet certain criteria—for example, systems currently under development are not supposed to go beyond the pilot/prototype phase without the Comptroller's written approval; and
- assessed selected IT projects as part of the budget process, which resulted in a reduction of over $222 million in IT funding for fiscal years 2003 through 2005.

However, these steps do not incorporate three key IT investment control best practices.

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Objective 2: Results (cont.)

1. DOD has not established a corporate investment management governance structure for IT systems.

Best practices recommend that an organization establish an investment review board, or a hierarchy of boards associated with investments that meet different thresholds, to select and control IT investments. Among other things, this board(s) should be composed of representatives from across the organization and have the authority to make IT investment (i.e., funding) decisions.

DOD has not established an investment review board structure consisting of a hierarchy of boards that are (1) assigned portfolios of investments based on certain threshold criteria, (2) comprised of representatives from across the department, and (3) responsible for selecting which IT investments to fund and for controlling those that are funded. Instead, the DOD components continue to independently make their own investment decisions.

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Objective 2: Results (cont.)

As we have previously reported,[8] this stovepiped investment decision-making process is the result of deeply embedded cultural resistance to change and military service parochialism.

According to program officials, DOD leadership plans to strengthen its governance and oversight of its ongoing IT investments. DOD officials stated that this revised governance structure will incorporate a hierarchy of investment review boards.

As a result, the department does not have a critical structure in place to effectively select and control its IT investments, and runs the risk of continuing to invest in systems that perpetuate its existing incompatible, duplicative, and overly costly environment of over 1,700 business systems that do not optimally support mission performance.

[8]GAO-02-784T.

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Objective 2: Results (cont.)

2. DOD is not yet using an explicit set of standard criteria for selecting and controlling its IT investments, to include consistency and compliance with its ongoing architecture development efforts.

Best practices recommend that investment review boards use common investment criteria when selecting among competing investment options and controlling ongoing investments. One critical criterion is alignment of the investment with the enterprise architecture.

DOD has established some and is establishing other IT investment criteria that according to program officials will be used by review boards to select and control investments. However, this criteria has not been finalized or made part of an investment review process. Further, the criteria does not implement our open recommendations which would limit current investments to

- deployment of systems that have already been fully tested and involve no additional development or acquisition cost,
- stay-in-business maintenance needed to keep existing systems operational,

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Objective 2: Results (cont.)

- management controls needed to effectively invest in modernized systems, and
- new systems or existing system changes that are congressionally directed or are relatively small, cost-effective, and low risk and can be delivered in a relatively short time frame.

DOD officials told us that they are in the process of developing a structured approach, including criteria for assessing a system's technical characteristics, economic justification, interoperability with other systems, and compliance with federal financial management standards.

Without common investment criteria, the department will be unable to ensure that the new and ongoing IT projects are consistent with the strategic direction of the department, as is yet to be defined and captured in the enterprise architecture. Absent this control, DOD will likely continue to invest in systems that perpetuate its existing incompatible, duplicative, and overly costly systems environment that does not optimally support mission performance.

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Objective 2: Results (cont.)

3. DOD has not conducted a comprehensive review of its ongoing IT investments to ensure that they are consistent with its architecture development efforts.

Best practices recommend that an organization review ongoing investments periodically to ensure, among other things, that funds are being spent in a manner that is consistent with the organization's enterprise architecture.

While the DOD Comptroller has reviewed selected investments, DOD does not have a plan to review the full complement of the department's IT investments in this manner, nor has it established a date by which it will.

- The DOD Comptroller reviews are limited primarily to major automated information systems acquisitions, which represent $1.4 billion (approximately 8 percent) of the $18 billion fiscal year 2003 IT budget request for business systems.

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Objective 2: Results (cont.)

According to program officials, the Comptroller's office does not have the resources to conduct such reviews.

- Only four individuals are currently conducting these reviews.
- DOD officials stated that they intend to hire 9 additional individuals to conduct these reviews.

Until the department exercises effective control over its ongoing IT investments, it will likely continue to invest in systems that perpetuate its existing incompatible, duplicative, and overly costly systems environment that does not optimally support mission performance.

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Conclusions

DOD is aggressively developing an enterprise architecture that is intended to guide and constrain its business systems modernization. Moreover, its stated goal is to acquire systems that provide timely, reliable, and relevant information for management to make informed decisions. As such, DOD is committed to doing the right thing. However, unless it goes about it the right way, it is unlikely that its enterprise architecture development effort will result in a quality product, meaning a corporate asset and decision-making tool that DOD business executives buy into and follow. It is imperative that DOD position itself for architecture success by doing the up-front things called for in best practices and avoiding a schedule-driven strategy that bypasses these keys to success. Our open recommendations to DOD addressing how it should approach development of its enterprise architecture are founded on these keys to success. Unless the department embraces and follows through in implementing these recommendations, and the best practices on which they are founded, it increases the risk that its architecture efforts will fall far short of providing a clear and comprehensive blueprint for effective and efficient business systems modernization.

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Conclusions (cont.)

At the same time, it is essential for DOD to get control over the funds currently being invested in business systems. Thus far, DOD's efforts to do so are limited in scope. As a result, it has only scratched the surface in controlling billions of dollars of ongoing investments in light of its architecture development efforts. The keys to its success in gaining control are to apply the proven IT investment management best practices that are the foundation of our open recommendations for implementing the architecture.

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Recommendations

To assist DOD in its efforts to effectively develop and implement an enterprise architecture, and guide and constrain its business system investments, and to address the problems discussed in this briefing, we reiterate the recommendations that we made in our May 2001 report[9] that DOD has yet to implement. In addition, we recommend that the Secretary of Defense ensure that

- the enterprise architecture executive committee members are singularly and collectively explicitly accountable to the Secretary for delivery of the enterprise architecture, including approval of each version of the architecture;
- the enterprise architecture program provides for ensuring stakeholder commitment and buy-in through a proactive marketing and communication program; and

[9]GAO-01-525.

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Recommendations (cont.)

- the quality assurance function (1) includes the review of adherence to process standards and reliability of reported program performance, (2) is made independent of the program management function, and (3) is not performed by subject matter experts involved in the development of key architecture products.

Additionally, we recommend that the Secretary gain control over ongoing IT investments by

- establishing a hierarchy of investment review boards, each responsible and accountable for selecting and controlling investments that meet defined threshold criteria, and each composed of the appropriate level of executive representatives, depending on the threshold criteria, from across the department;
- establishing a standard set of criteria, to include (1) alignment and consistency with the DOD enterprise architecture and (2) our prior yet to be implemented recommendations concerning limitations in business system investments pending development of the architecture; and

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Recommendations (cont.)

- directing these boards to immediately apply these criteria in completing reviews of all ongoing IT investments and to not fund investments that do not meet these criteria, unless they are otherwise justified by explicit criteria waivers.

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Agency Comments

We provided a draft of this briefing to DOD officials representing the Office of the Under Secretary of Defense (Comptroller), the Department of the Navy's Chief Information Officer, and the Secretary of the Air Force's Financial Management Program. Among these officials were the Deputy Under Secretary of Defense (Financial Management) and the Deputy Chief Financial Officer.

In commenting on the draft, these officials stated that they generally agreed with our findings, conclusions and recommendations, with the exception of our assessment of the adequacy of its quality assurance function. In the areas where they did agree, they stated that the department is taking actions that are consistent with our recommendations.

With regard to quality assurance, they stated that this function currently addresses adherence to process standards and reported program performance. However, they did not provide us with any evidence that supported this statement.

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Agency Comments (cont.)

These officials also provided updated and clarifying information, which we have incorporated as appropriate in the briefing.

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Appendix I: Guidance

Chief Information Officer Council. *A Practical Guide to Federal Enterprise Architecture*, Version 1. Washington, D.C.: February 2001.

U.S. General Accounting Office. *Information Technology Investment Management: A Framework for Assessing and Improving Process Maturity.* GAO/AIMD-10.1.23, Version 1. Washington, D.C.: May 2000.

U.S. General Accounting Office *Assessing Risks and Returns: A Guide for Evaluating Federal Agencies' IT Investment Decision-making.* GAO/AIMD-10.1.13, Version 1. Washington, D.C.: February 1997.

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Comments from the Under Secretary of Defense

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COMPTROLLER

FEB 2 7 2003

Mr. Gregory Kutz
Director
Financial Management and Assurance
United States General Accounting Office
Washington, DC 20548

Dear Mr. Kutz,

My original reply of February 21, 2003, is rescinded. This is the Department of Defense (DoD) response to the most recent GAO draft report, "DoD Business Systems Modernization: Improvements to Enterprise Architecture Development and Implementation Efforts Needed," dated February 7, 2003, (GAO Code 192070/GAO-03-458).

We concur in the recommendations of this draft report. The DoD comments to the draft GAO recommendations are enclosed. My point of contact for this matter is Mr. Steven Worton, Director for Business Modernization and Systems Integration. Mr. Worton may be contacted by e-mail at wortons@osd.pentagon.mil or by telephone at (703) 607-3370.

Dov S. Zakheim

Enclosure:
As stated

DoD Comments to GAO Draft Report:
"DoD Business Systems Modernization: Improvements to Enterprise Architecture
Development and Implementation Efforts Needed," dated February 7, 2003,
(GAO Code 192070/GAO-03-458)

GAO Recommendation 1: The GAO recommended that the Secretary of Defense ensure that the enterprise architecture executive committee members are singularly and collectively made explicitly accountable to the Secretary for delivery of the enterprise architecture, including approval of each version of the architecture.

DoD Comment to GAO Recommendation 1: Concur. The Department currently is developing a governance structure that will include detailed responsibilities for the enterprise architecture (EA) executive committee, the Financial Management Modernization Program (FMMP) Steering Committee, the FMMP Domain Owners, and the FMMP Domain Owners' Lead Agents. Included in these detailed responsibilities will be the stipulation that the EA executive committee members are singularly and collectively accountable to the Secretary for delivery of the enterprise architecture. The proposed governance structure is in the review and coordination phase. We plan for the governance structure to be approved in March 2003.

GAO Recommendation 2: The GAO recommended that the Secretary of Defense ensure that the enterprise architecture program is supported by a proactive marketing and communication program.

DoD Response to GAO Recommendation 2: Concur. The Department agrees that a proactive marketing and communication program is essential to eliciting best participation by the cross-functional DoD representatives managing development of the EA. In this regard, the Department awarded a change management contract in December 2002, for the purpose of developing a change and communication management strategy and plan, obtaining the input and advice of the EA's stakeholders, and communicating the anticipated changes to various levels and stakeholders within the Department and to the public. We plan on the change and communication management strategy and plan being completed by April 30, 2003. This plan is an ongoing process which will be further refined by the Domain Owners and adjusted as necessary.

GAO Recommendation 3: The GAO recommended that the Secretary of Defense ensure that the quality assurance function: 1) includes the review of adherence to process standards and reliability of reported program performance, 2) is made independent of the program management function, and 3) is not performed by subject matter experts involved in the development of key architecture products.

DoD Response to GAO Recommendation 3: Concur. The Department has established and implemented a quality assurance (QA) process that includes architecture products, program performance using earned value management (EVM), and process standards. The Program Office will document the QA process currently being performed by April 30, 2003.

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Further, we have a contractor providing independent verification and validation (IV&V) assessment of all contractual deliverables, including the architecture products.

We agree that, currently, the quality assurance (QA) function is not independent of the program management function, but is independent of the architecture development group. The QA function was moved from the architecture group in January 2003 and reports directly to the Director, Business Modernization and Systems Integration. The QA staff is not involved in architecture development processes. We will begin reporting Quality Assurance information to the Executive Steering Committee to mitigate this factor beginning March 2003.

GAO Recommendation 4: The GAO recommended that the Secretary of Defense gain control over ongoing IT investments by establishing a hierarchy of investment review boards, each responsible and accountable for selecting and controlling investments that meet defined threshold criteria, and each composed of appropriate level of executive representatives, depending on the threshold criteria, from across the Department.

DoD Response to GAO Recommendation 4: Concur. The Governance Strategy contains a requirement for an investment review board (IRB). The IRB will utilize a "portfolio management" approach. They will consider both new procurements and current system modifications. The details of the operations and structure of the IRB are planned to be completed March 31, 2003. We welcome any input GAO can provide and will invite GAO to these meetings.

GAO Recommendation 5: The GAO recommended that the Secretary of Defense gain control over ongoing IT investments by establishing a standard set of criteria, to include 1) alignment and consistency with the DoD enterprise architecture, and 2) GAO's prior recommendations governing limitations in business system investments pending development of the architecture.

DoD Response to GAO Recommendation 5: Concur. DoD has taken a variety of steps to limit IT investments that may be inconsistent with the architecture. First, we have issued guidance for use by the FMMP Systems Review team in the system life cycle milestone decision process. This guidance includes standards for EA compliance, economic and business case analysis, return on investment requirements, and compliance with the "Federal Financial Management Improvement Act of 1996." Secondly, the USD(C) has issued two memoranda that outline system review requirements. One memorandum relates to Enterprise Resource Planning (ERP) initiatives (August 21, 2002) and one memorandum relates to new system development or modifications to existing systems (October 12, 2002). These memoranda stipulate USD(C) certification and approval requirements. Finally, the Governance Structure will incorporate an IRB with defined processes.

GAO Recommendation 6: The GAO recommended that the Secretary of Defense gain control over ongoing IT investments by directing investment review boards to immediately apply the GAO defined criteria in completing reviews of all ongoing Information Technology (IT) investments, and to not fund investments that do not meet these criteria unless they are otherwise justified by explicit criteria waivers.

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DoD Response to GAO Recommendation 6: Concur. We intend that the actions of the FMMP System Review team and the Governance Strategy will lead to an improved control over IT investments.

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GAO Contacts and Staff Acknowledgments

GAO Contacts

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Acknowledgments

In addition to the individuals named above, key contributors to this report included Johnny Bowen, Teressa Broadie-Gardner, Christopher DePerro, Eric Essig, Brian Johnson, Neelaxi Lakhmani, John Ledford, Evelyn Logue, Mai Nguyen, Sanford Reigle, Darby Smith, Stacey Smith, Al Steiner, and Randolph Tekeley.

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