October 2007

# BUSINESS SYSTEMS MODERNIZATION

## Air Force Needs to Fully Define Policies and Procedures for Institutionally Managing Investments

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# Highlights

# BUSINESS SYSTEMS MODERNIZATION

## Air Force Needs to Fully Define Policies and Procedures for Institutionally Managing Investments

## Why GAO Did This Study

In 1995, GAO first designated the Department of Defense's (DOD) business systems modernization program as "high-risk" and continues to do so today. In 2004, Congress passed legislation reflecting prior GAO recommendations that DOD adopt a corporate approach to information technology (IT) business systems investment management including tiered accountability for business systems at the department and component levels. To support GAO's legislative mandate to review DOD's efforts, GAO assessed whether the investment management approach of one of DOD's components—the Department of the Air Force (Air Force)—is consistent with leading investment management best practices. In doing so, GAO applied its IT Investment Management (ITIM) framework and associated methodology, focusing on the stages related to the investment management provisions of the Clinger-Cohen Act of 1996.

## What GAO Recommends

GAO recommends that the Department of the Air Force fully define the project and portfolio management policies and procedures discussed in GAO's ITIM framework. In comments on a draft of this report, DOD stated that the Air Force has begun to establish a project-level management process that will be instituted in formal policies and is applying DOD's portfolio management process in its decision making.

To view the full product, including the scope and methodology, click on GAO-08-52. For more information, contact Valerie Melvin at (202) 512-6304 or melvinv@gao.gov.

## What GAO Found

The Air Force has established the basic management structures needed to effectively manage its IT projects as investments, but has not fully implemented many of the related policies and procedures outlined in GAO's ITIM framework (see table). Air Force has fully implemented three of the nine key practices that call for project-level management structures, policies, and procedures, and has not implemented any of the five practices that call for portfolio-level policies and procedures. Regarding project-level practices, it has established an IT investment board that is responsible for defining and implementing the department's business systems investment governance process, has developed procedures for identifying and collecting information about its business systems to support investment selection and control, and has assigned responsibility for ensuring that the information collected during project identification meets the needs of the investment management process. However, Air Force has not fully documented business systems investment policies and procedures for directing investment board operations, selecting new investments, reselecting ongoing investments, or integrating the investment funding and investment selection processes. In addition, it has not implemented any of the policies and procedures for developing and maintaining a complete business system investment portfolio.

Air Force officials stated that they are aware of the absence of documented policies and procedures in certain areas of project-level and portfolio-level management and that they are currently working on guidance to address these areas. For example, officials stated that they had begun drafting portfolio-level policies and procedures. According to Air Force officials, the policies and procedures are expected to be completed and approved by December 2007. Until Air Force fully defines policies and procedures for both individual projects and portfolios of projects, it risks not being able to select and control these business system investments in a way that is consistent and complete, which in turn increases the chances that these investments will not meet mission needs in the most effective manner.

**Status of Air Force's Project- and Portfolio-Level Management Capabilities**

| Stage 2: Building the investment foundation | Key practices executed | Stage 3: Developing a complete investment portfolio | Key practices executed |
|---|---|---|---|
| Instituting the investment board | 1/2 | Defining the portfolio criteria | 0/2 |
| Meeting business needs | 0/1 | Creating the portfolio | 0/1 |
| Selecting an investment | 0/3 | Evaluating the portfolio | 0/1 |
| Providing investment oversight | 0/1 | Conducting post implementation reviews | 0/1 |
| Capturing investment information | 2/2 | | |
| **Overall** | **3/9** | | **0/5** |

Source: GAO.

# Contents

**Abbreviations**

| | |
|---|---|
| CPM | certification process manager |
| CIO | chief information officer |
| DAS | Defense Acquisition System |
| DOD | Department of Defense |
| IT | information technology |
| ITIM | Information Technology Investment Management |
| JCIDS | Joint Capabilities Integration and Development System |
| MAJCOM | Major Command |
| OMB | Office of Management and Budget |
| PPBE | Planning, Programming, Budgeting, and Execution |

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**United States Government Accountability Office**
**Washington, DC 20548**

October 31, 2007

Congressional Committees:

For decades, the Department of Defense (DOD) has been challenged in modernizing its timeworn business systems.[1] In 1995, we designated DOD's business systems modernization program as high risk, and we continue to designate it as such today.[2] Our research on public and private sector organizations shows that an essential ingredient to a successful systems modernization program is having an effective institutional approach to managing information technology (IT) investments.

In May 2001, we recommended that the department establish a corporate approach to investment control and decision making.[3] Between 2001 and 2005, we reported that the department's business systems modernization program was still not being effectively managed,[4] and we made additional investment-related recommendations. Congress subsequently included provisions in the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005[5] that reflected our recommendations, including those for establishing and implementing effective business system investment management structures and processes.

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[1]Business systems are information systems that include financial and nonfinancial systems and support DOD's business operations, such as civilian personnel, finance, health, logistics, military personnel, procurement, and transportation.

[2]GAO, *High-Risk Series: An Update*, GAO-07-310 (Washington, D.C.: January 2007).

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

[4]See, for example, GAO, *DOD Business Systems Modernization: Long-standing Weaknesses in Enterprise Architecture Development Need to Be Addressed*, GAO-05-702 (Washington, D.C.: July 22, 2005); *DOD Business Systems Modernization: Billions Being Invested without Adequate Oversight*, GAO-05-381 (Washington, D.C.: Apr. 29, 2005); *DOD Business Systems Modernization: Limited Progress in Development of Business Enterprise Architecture and Oversight of Information Technology Investments*, GAO-04-731R (Washington, D.C.: May 17, 2004); *DOD Business Systems Modernization: Important Progress Made to Develop Business Enterprise Architecture, but Much Work Remains*, GAO-03-1018 (Washington, D.C.: Sept. 19, 2003); and GAO-01-525.

[5]Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005, Pub. L. No. 108-375, § 332, 118 Stat. 1811, 1851-1856 (Oct. 28, 2004) (codified in part at 10 U.S.C. §2222).

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Between 2005 and 2007,[6] we reported that DOD had made important progress in establishing and implementing these structures and processes; however, much remained to be accomplished. Most recently,[7] we reported that, according to DOD officials, investment management practices are performed at the component level, and that departmental policies and procedures established for overseeing components' execution of these practices are sufficient. However, DOD had not fully defined many of the related policies and procedures outlined in GAO's IT Investment Management framework.

The Fiscal Year 2005 National Defense Authorization Act directs DOD to, among other things, establish and implement effective IT business system investment management structures and processes. As agreed with your offices and to support the legislative mandate that GAO assess DOD's actions to comply with this requirement, the objective of our review was to determine whether the investment management approach of the Department of the Air Force (Air Force) is consistent with leading investment management best practices. To accomplish our objective, we analyzed documents and interviewed department officials to determine whether Air Force has developed the structures, policies, and procedures associated with executing those key practices in our IT Investment Management (ITIM) framework[8] that assist departments and agencies in

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[6]GAO, *Business Systems Modernization: DOD Needs to Fully Define Policies and Procedures for Institutionally Managing Investments*, GAO-07-538 (Washington, D.C.: May 11, 2007); *Defense Business Transformation: A Comprehensive Plan, Integrated Efforts, and Sustained Leadership Are Needed to Assure Success*, GAO-07-229T (Washington, D.C.: Nov. 16, 2006); *Business Systems Modernization: DOD Continues to Improve Institutional Approach, but Further Steps Needed*, GAO-06-658 (Washington, D.C.: May 15, 2006); and *DOD Business Systems Modernization: Important Progress Made in Establishing Foundational Architecture Products and Investment Management Practices, but Much Work Remains*, GAO-06-219 (Washington, D.C.: Nov. 23, 2005).

[7]GAO-07-538.

[8]We rated the key practices as "executed" on the basis of whether the agency demonstrated (by providing evidence of performance) that it had met all of the criteria of the key practice. A key practice was rated as "not executed" when we found insufficient evidence of any elements of a practice being fully performed or when we determined that there were significant weaknesses in Air Force's execution of the key practice.

complying with the investment management provisions of the Clinger-Cohen Act of 1996.[9]

We performed our work at Air Force offices in Arlington, Virginia, from February 2007 through September 2007 in accordance with generally accepted government auditing standards. Details on our objective, scope, and methodology are contained in appendix I.

## Results in Brief

Air Force has established the basic management structures needed to effectively manage its IT projects as investments, but it has not fully implemented many of the related policies and procedures that our ITIM framework outlines. Air Force has fully implemented three of the nine key practices that call for project-level management structures and project-level policies and procedures. Specifically, it has (1) established an investment review board that is responsible for business system investment governance, (2) developed procedures for identifying and collecting information about its business systems to support investment selection and control, and (3) assigned responsibility for ensuring that the information collected during project identification meets the needs of the investment management process. However, Air Force has not fully developed business system investment policies and procedures related to the remaining six key project-level management practices. For example, policies and procedures do not (1) address how investments for systems in operations and maintenance are to be governed; (2) define how systems in operations and maintenance will support ongoing and future business needs; (3) specify how the full range of cost, schedule, and performance data accessible to Air Force is to be used in making selection (i.e., precertification) decisions; (4) specify how reselection decisions (i.e., annual reviews) consider investments that are in operations and maintenance; (5) describe how funding decisions are integrated with the process of selecting an investment; and (6) provide sufficient oversight and visibility into investment management activities, including specifying how corrective actions should be taken.

Further, Air Force has not implemented any of the five practices that call for policies and procedures to develop and maintain a complete business

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[9]GAO, *Information Technology Investment Management: A Framework for Assessing and Improving Process Maturity*, GAO-04-394G (Washington, D.C.: March 2004).

system portfolio. Specifically, it does not have documented policies and procedures for (1) defining the portfolio criteria, (2) creating the portfolio, (3) evaluating the portfolio, and (4) conducting post-implementation reviews of business systems. In addition, the Air Force has not assigned responsibility for managing the portfolio criteria. According to ITIM, adequately documenting both the policies and associated procedures that govern how an organization manages its IT investment portfolios is important because doing so provides the basis for having rigor, discipline, and repeatability in how investments are selected and controlled across the entire organization.

Air Force officials stated that they are aware of the absence of documented policies and procedures in certain areas of project-level and portfolio-level management; officials also stated that they are currently working on new policies and procedures to address these areas that they expect to issue by December 2007. Until Air Force defines policies and procedures for both individual projects and portfolios of projects—and assigns responsibility for managing its business system portfolios—it risks selecting and controlling these business system investments in a way that is not consistent and complete, which in turn reduces the chances that these investments will meet mission needs in the most effective manner.

To strengthen Air Force's business system management capability, we are recommending that the agency fully define the policies and procedures associated with project-level and portfolio-level investment management and assign responsibility for managing its business system portfolios, as discussed in our guidance for IT investment management.[10]

In written comments on a draft of this report, signed by the Deputy Under Secretary of Defense (Business Transformation) and reprinted in appendix II, DOD partially concurred with the report's recommendations. Relative to our recommendations concerning project-level management policies and procedures, DOD stated that Air Force has begun to establish a project-level management process that, while not codified into formal policy, is documented in its investment review guide. Further, it stated that Air Force is committed to formalizing its policies as the processes expand and mature. Our report recognizes that Air Force has drafted a business system investment management process. However, we found that it lacks
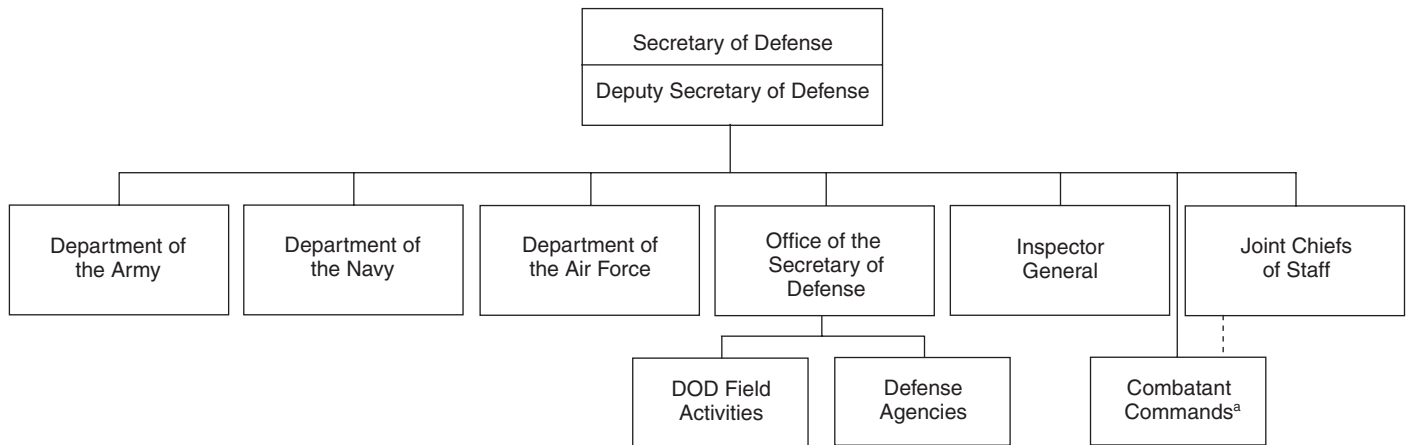
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[10]GAO-04-394G.

critical elements needed to effectively carry out essential investment management activities. Until it fully addresses all critical elements needed for investment management, Air Force will be at risk of not being able to carry out investment management activities in a consistent and disciplined manner. Relative to our recommendations concerning portfolio-level management policies and procedures, DOD stated that Air Force is applying DOD's IT portfolio management process in its decision making. However, as our report notes, Air Force has not implemented a process for managing its business system portfolios. Until it implements such a process, Air Force increases the risk of not selecting the mix of investments that best supports its mission needs.

## Background

DOD is a massive and complex organization. To illustrate, the department reported that its fiscal year 2006 operations involved approximately $1.4 trillion in assets and $2.0 trillion in liabilities, more than 2.9 million military and civilian personnel, and $581 billion in net cost of operations. Organizationally, the department includes the Office of the Secretary of Defense, the Chairman of the Joint Chiefs of Staff, the military departments, numerous defense agencies and field activities, and various unified combatant commands that are responsible for either specific geographic regions or specific functions. Figure 1 provides a simplified depiction of DOD's organizational structure.

**Figure 1: Simplified DOD Organizational Structure**

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                        ┌─────────────────────────┐
                        │  Secretary of Defense    │
                        ├─────────────────────────┤
                        │ Deputy Secretary of Defense │
                        └─────────────────────────┘
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| Department of the Army | Department of the Navy | Department of the Air Force | Office of the Secretary of Defense | Inspector General | Joint Chiefs of Staff |

| | | | DOD Field Activities | Defense Agencies | | Combatant Commands[a] | |

Source: GAO, based on DOD documentation.

[a]The Chairman of the Joint Chiefs of Staff serves as the spokesman for the commanders of the combatant commands, particularly for the administrative requirements of their commands.

In support of its military operations, DOD performs an assortment of interrelated and interdependent business functions, including logistics management, procurement, health care management, and financial management. As we have previously reported,[11] the systems environment that supports these business functions is overly complex and error prone, and is characterized by (1) little standardization across the department, (2) multiple systems performing the same tasks, (3) the same data stored in multiple systems, and (4) the need for data to be entered manually into multiple systems.

## Air Force's Mission, Organizational Structure, and Use of IT

Air Force is a major component of DOD. Its mission is to deliver options for the defense of the United States and its global interests in air, space, and cyberspace. Air Force relies extensively on IT to fulfill these competencies effectively and to meet its organizational mission. It has 909 business systems; of these systems, 832 (91 percent) are in operations and maintenance. In fiscal year 2006, Air Force was allocated approximately

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[11]GAO-06-658.

$651 million[12] for its business systems, of which about $406 million (62 percent) was allocated to systems in operations and maintenance and $245 million (38 percent) was allocated to systems in development and/or modernization.
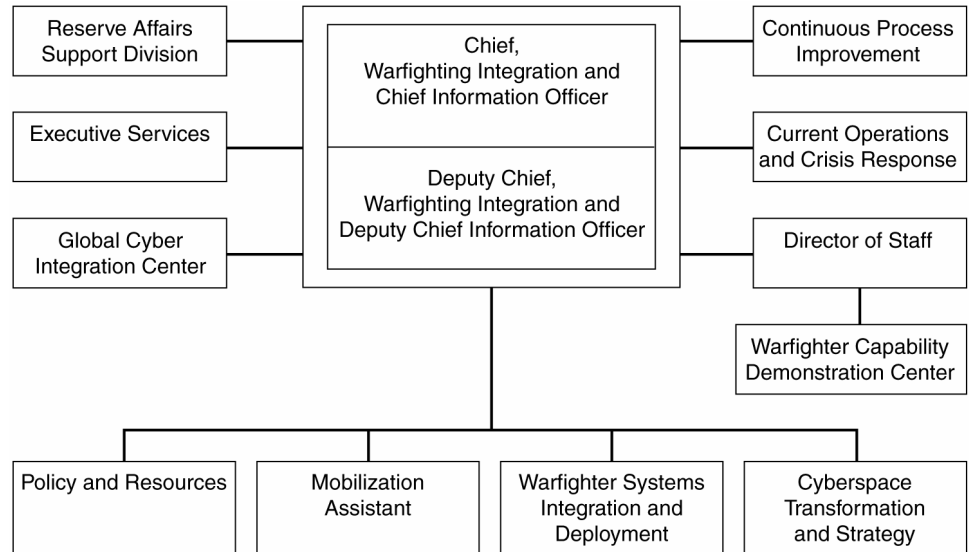
Air Force has created the Office of Warfighting Integration and Chief Information Office to provide the IT and supporting infrastructure to fulfill its mission. Among the goals of this organization are to

- deliver the ability to direct forces while anticipating situations, capabilities, and limitations;

- develop adaptive, trained airmen;

- shape enterprise investments;

- provide policy, standards, oversight, and training to enable airmen to share and exploit accurate information any place and, anytime; and

- transform the communications and information career field to lead Air Force in leveraging information for its competitive advantage.

The Office of Warfighting Integration and Chief Information Office consists of several organizations, as depicted in figure 2.

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[12]According to Air Force program officials, the total amount spent on its business systems includes the amount spent on the Operational Support IT Business Mission Area, Warfighting Mission Area, and Enterprise Information Environment. Approximately $651 million reflects the budget for the Operational Support IT mission area business systems and does not include the amount budgeted for the Warfighting Mission Area and Enterprise Information Environment business systems.

**Figure 2: Air Force Chief Information Officer Organizational Structure**

| Reserve Affairs Support Division | | Chief, Warfighting Integration and Chief Information Officer | | Continuous Process Improvement |
|---|---|---|---|---|
| Executive Services | | | | Current Operations and Crisis Response |
| Global Cyber Integration Center | | Deputy Chief, Warfighting Integration and Deputy Chief Information Officer | | Director of Staff |
| | | | | Warfighter Capability Demonstration Center |
| Policy and Resources | Mobilization Assistant | Warfighter Systems Integration and Deployment | | Cyberspace Transformation and Strategy |

Source: Air Force.

## IT Investment Management Is Critical to Achieving Successful Systems Modernization

Successful public and private organizations use a corporate approach to IT investment management. Recognizing this, Congress enacted the Clinger-Cohen Act of 1996,[13] which requires the Office of Management and Budget (OMB) to establish processes to analyze, track, and evaluate the risks and results of major capital investments in IT systems made by executive agencies.[14] In response to the Clinger-Cohen Act and other statutes, OMB has developed policy and issued guidance for the planning, budgeting,

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[13]The Clinger-Cohen Act of 1996, 40 U.S.C. 11101-11704. This act expanded the responsibilities of OMB and the agencies that had been set under the Paperwork Reduction Act with regard to IT management. See 44 U.S.C. 3504(a)(1)(B)(vi) (OMB); and 44 U.S.C. 3506(h)(5) (agencies).

[14]We have made recommendations to improve OMB's process for monitoring high-risk IT investments; see GAO, *Information Technology: OMB Can Make More Effective Use of Its Investment Reviews*, GAO-05-276 (Washington, D.C.: Apr. 15, 2005).

acquisition, and management of federal capital assets.[15] We have also issued guidance in this area[16] that defines institutional structures, such as investment review boards; processes for developing information on investments (such as costs and benefits); and practices to inform management decisions (such as whether a given investment is aligned with an enterprise architecture).

## IT Investment Management: A Brief Description

IT investment management is a process for linking IT investment decisions to an organization's strategic objectives and business plans. Consistent with this, the federal approach to IT investment management focuses on selecting, controlling, and evaluating investments in a manner that minimize risks while maximizing the return on investment.[17]

- During the selection phase, the organization (1) identifies and analyzes each project's risks and returns before committing significant funds to any project and (2) selects those IT projects that will best support its mission needs.

- During the control phase, the organization ensures that projects, as they develop and investment expenditures continue, meet mission needs at the expected levels of cost and risk. If the project is not meeting expectations or if problems arise, steps are quickly taken to address the deficiencies.

- During the evaluation phase, expected results are compared with actual results after a project has been fully implemented. This comparison is done to (1) assess the project's impact on mission performance,

[15]This policy is set forth and guidance is provided in OMB Circular A-11 (Nov. 2, 2005) (section 300) and in OMB's *Capital Programming Guide*, which directs agencies to develop, implement, and use a capital programming process to build their capital asset portfolios.

[16]See, for example, GAO-04-394G; GAO, *Information Technology: A Framework for Assessing and Improving Enterprise Architecture Management (Version 1.1)*, GAO-03-584G (Washington, D.C.: April 2003); and *Assessing Risks and Returns: A Guide for Evaluating Federal Agencies' IT Investment Decision-making*, GAO/AIMD-10.1.13 (Washington, D.C.: February 1997).

[17]GAO-04-394G; GAO/AIMD-10.1.13; GAO, *Executive Guide: Improving Mission Performance Through Strategic Information Management and Technology*, GAO/AIMD-94-115 (Washington, D.C.: May 1994); and Office of Management and Budget, *Evaluating Information Technology Investments, A Practical Guide* (Washington, D.C.: November 1995).

(2) identify any changes or modifications to the project that may be needed, and (3) revise the investment management process based on lessons learned.

## Overview of GAO's ITIM Maturity Framework

Our ITIM framework consists of five progressive stages of maturity for any given agency relative to selecting, controlling, and evaluating its investment management capabilities.[18] (See fig. 3 for the five ITIM stages of maturity.) This framework is grounded in our research of IT investment management practices of leading private and public sector organizations. The framework can be used to assess the maturity of an agency's investment management processes and as a tool for organizational improvement. The overriding purpose of the framework is to encourage investment selection and control and to evaluate processes that promote business value and mission performance, reduce risk, and increase accountability and transparency. We have used the framework in several of our evaluations,[19] and a number of agencies have adopted it.

ITIM's five maturity stages represent the steps toward achieving stable and mature processes for managing IT investments. Each stage builds on the lower stages; the successful attainment of each stage leads to improvement in the organization's ability to manage its investments. With the exception of the first stage, each maturity stage is composed of "critical processes" that must be implemented and institutionalized in order for the organization to achieve that stage. These critical processes are further broken down into key practices that describe the types of activities that an organization should be performing to successfully

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[18]GAO-04-394G.

[19]GAO, *Information Technology: Centers for Medicare and Medicaid Services Needs to Establish Critical Investment Management Capabilities*, GAO-06-12 (Washington, D.C.: Oct. 28, 2005); *Information Technology: HHS Has Several Investment Management Capabilities in Place, but Needs to Address Key Weaknesses*, GAO-06-11 (Washington, D.C.: Oct. 28, 2005); *Information Technology: FAA Has Many Investment Management Capabilities in Place, but More Oversight of Operational Systems Is Needed*, GAO-04-822 (Washington, D.C.: Aug. 20, 2004); *Bureau of Land Management: Plan Needed to Sustain Progress in Establishing IT Investment Management Capabilities*, GAO-03-1025 (Washington, D.C.: Sept. 12, 2003); *Information Technology: Departmental Leadership Crucial to Success of Investment Reforms at Interior*, GAO-03-1028 (Washington, D.C.: Sept. 12, 2003); *United States Postal Service: Opportunities to Strengthen IT Investment Management Capabilities*, GAO-03-3 (Washington, D.C.: Oct. 15, 2002); and *Information Technology: DLA Needs to Strengthen Its Investment Management Capability*, GAO-02-314 (Washington, D.C.: Mar. 15, 2002).

implement each critical process. It is not unusual for an organization to be performing key practices from more than one maturity stage at the same time. However, our research has shown that agency efforts to improve investment management capabilities should focus on implementing all lower stage practices before addressing the higher stage practices.

**Figure 3: The Five ITIM Stages of Maturity with Critical Processes**

| Maturity stages | Critical processes |
|---|---|
| **Stage 5:** Leveraging IT for strategic outcomes | - Optimizing the investment process<br>- Using IT to drive strategic business change |
| **Stage 4:** Improving the investment process | - Improving the portfolio's performance<br>- Managing the succession of information systems |
| **Stage 3:** Developing a complete investment portfolio | - Defining the portfolio criteria<br>- Creating the portfolio<br>- Evaluating the portfolio<br>- Conducting postimplementation reviews |
| **Stage 2:** Building the investment foundation | - Instituting the investment board<br>- Meeting business needs<br>- Selecting an investment<br>- Providing investment oversight<br>- Capturing investment information |
| **Stage 1:** Creating investment awareness | - IT spending without disciplined investment processes |

Source: GAO.

In the ITIM framework, Stage 2 critical processes lay the foundation for sound IT investment management by helping the agency to attain successful, predictable, and repeatable investment management processes at the project level. Specifically, Stage 2 encompasses building a sound investment management foundation by establishing basic capabilities for selecting new IT projects. This stage also involves developing the capability to control projects so that they finish predictably within established cost and schedule expectations and developing the capability to identify potential exposures to risk and put in place strategies to mitigate that risk. Further, it involves evaluating completed projects to ensure they meet business needs and collecting lessons learned to improve the IT investment management process. The basic management processes established in Stage 2 lay the foundation for more mature management capabilities in Stage 3, which represents a major step forward in maturity, in which the agency moves from project-centric processes to a portfolio approach, evaluating potential investments by how well they support the agency's missions, strategies, and goals.

Stage 3 requires that an organization continually assess both proposed and ongoing projects as parts of a complete investment portfolio—an integrated and competing set of investment options. It focuses on establishing a consistent, well-defined perspective on the IT investment portfolio and maintaining mature, integrated selection (and reselection), control, and post-implementation evaluation processes. This portfolio perspective allows decision makers to consider the interaction among investments and the contributions to organizational mission goals and strategies that could be made by alternative portfolio selections, rather than focusing exclusively on the balance between the costs and benefits of individual investments. Organizations that have implemented Stages 2 and 3 practices have capabilities in place that assist in establishing selection; control; and evaluation structures, policies, procedures, and practices that are required by the investment management provisions of the Clinger-Cohen Act.[20]

Stages 4 and 5 require the use of evaluation techniques to continuously improve both the investment portfolio and the investment processes in order to better achieve strategic outcomes. At Stage 4, an organization has the capacity to conduct IT succession activities and, therefore, can plan and implement the deselection of obsolete, high-risk, or low-value IT investments. An organization with Stage 5 maturity conducts proactive monitoring for breakthrough information technologies that will enable it to change and improve its business performance.

## DOD and Air Force Approach for Identifying, Funding, and Acquiring System Investments

DOD's major system investments (i.e., weapons and business systems) are governed by three management systems that focus on defining needs, budgeting for, and acquiring investments to support the mission—the Joint Capabilities Integration and Development System (JCIDS); the Planning, Programming, Budgeting, and Execution (PPBE) system; and the Defense Acquisition System (DAS). In addition, DOD's business systems are subject to a fourth management system, which, for purposes of this report, we refer to as the Business Investment Management System. For each of these systems, DOD relies on its component agencies to execute the underlying policies and procedures. According to DOD, the four management systems, collectively, are the means by which the

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[20]The Clinger-Cohen Act of 1996, 40 U.S.C. §§ 11311-11313.

department—and its components—selects, controls, and evaluates its business systems investments.

## Joint Capabilities Integration and Development System

JCIDS is a needs-driven, capabilities-based approach to identify mission needs and meet future joint forces challenges. It is intended to identify future capabilities for DOD; address capability gaps and mission needs recognized by the Joint Chiefs of Staff or derived from strategic guidance, such as the National Security Strategy Report[21] or Quadrennial Defense Review;[22] and identify alternative solutions by considering a range of doctrine, organization, training, materiel, leadership and education, personnel, and facilities solutions. According to DOD, the Joint Chiefs of Staff—through the Joint Requirements Oversight Council—has primary responsibility for defining and implementing JCIDS. All JCIDS documents are submitted to the Joint Chiefs of Staff, which determines whether the proposed system has joint implications or is component-unique. If it is designated as joint interest, then the Joint Requirements Oversight Council is responsible for approving and validating the documents. If it is not designated as having joint interests, the sponsoring component is responsible for validation and approval.

## Planning, Programming, Budgeting, and Execution

PPBE is a calendar-driven approach that is composed of four phases that occur over a moving 2-year cycle. The four phases—planning, programming, budgeting, and executing—define how budgets for each DOD component and the department as a whole are created, vetted, and executed. As recently reported,[23] the components start programming and budgeting for addressing a JCIDS-identified capability gap or mission need several years before actual product development begins and before the Office of the Secretary of Defense formally reviews the components'

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[21]*The National Security Strategy Report* required by 50 U.S.C. 404a is a comprehensive report on the national security strategy of the United States submitted by the President to Congress.

[22]See 10 U.S.C. 118. The Quadrennial Defense Review is a comprehensive examination of the national defense strategy, force structure, force modernization plans, infrastructure, budget plan, and other elements of the defense program and policies of the United States with a view toward determining and expressing the defense strategy of the United States and establishing a defense program for the next 20 years.

[23]GAO, *Best Practices: An Integrated Portfolio Management Approach to Weapon System Investments Could Improve DOD's Acquisition Outcomes*, GAO-07-388 (Washington, D.C.: Mar. 30, 2007).

programming and budgeting proposals (i.e., Program Objective Memorandums). Once reviewed and approved, the financial details in the Program Objective Memorandums become part of the President's budget request to Congress. During budget execution, components may submit program change proposals or budget change proposals, or both (e.g., program cost increases or schedule delays). According to DOD, the Under Secretary of Defense (Policy), the Director for Program Analysis and Evaluation, [24] and the Under Secretary of Defense (Comptroller) have primary responsibility for defining and implementing the PPBE system.

## Defense Acquisition System

DAS[25] is a framework-based approach that is intended to translate mission needs and requirements into stable, affordable, and well-managed acquisition programs. It consists of five key program life-cycle phases. These five phases are as follows:

**Concept Refinement**: Intended to refine the initial JCIDS-validated system solution (concept) and create a strategy for acquiring the investment solution. A decision is made at the end of this phase (Milestone A decision) regarding whether to move to the next phase (Technology Development).

**Technology Development**: Intended to determine the appropriate set of technologies to be integrated into the investment solution by iteratively assessing the viability of various technologies while simultaneously refining user requirements. Once the technology has been demonstrated in a relevant environment, a decision is made (Milestone B decision) regarding whether to move to the next phase (System Development and Demonstration).

**System Development and Demonstration**: Intended to develop a system or a system increment and demonstrate through developer testing that the system or system increment can function in its target environment. A decision is made at the end of this phase (Milestone C

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[24]The Director for Program Analysis and Evaluation is the principal staff assistant who conducts independent analysis for, and provides independent advice on, all DOD program and evaluation matters to the Secretary and Deputy Secretary of Defense.

[25]As described in DOD Directive 5000.1, May 12, 2003 and DOD Instruction 5000.2, May 12, 2003.

decision) regarding whether to move to the next phase (Production and Deployment).

**Production and Deployment**: Intended to achieve an operational capability that satisfies the mission needs, as verified through independent operational test and evaluation, and ensures that the system is implemented at all applicable locations.

**Operations and Support**: Intended to operationally sustain the system in the most effective manner over its life cycle.

A key principle of DAS is that investments are assigned a category, where programs of increasing dollar value and management interest are subject to more stringent oversight. For example, Major Defense Acquisition Programs[26] and Major Automated Information Systems[27] are large, expensive programs subject to the most extensive statutory and regulatory reporting requirements and unless delegated, are reviewed by acquisition boards at the DOD corporate level. Smaller and less risky acquisitions are generally reviewed at the component executive or lower levels. Another key principle is that DAS requires acquisition management under the direction of a milestone decision authority.[28] The milestone decision authority—with support from the program manager and advisory boards,

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[26]A Major Defense Acquisition Program is an acquisition program that is estimated by the Under Secretary of Defense for Acquisition, Technology, and Logistics to require an eventual total expenditure for research, development, and test and evaluation of more than $365 million (fiscal year 2000 constant dollars) or, for procurement, of more than $2 billion (fiscal year 2000 constant dollars).

[27]A Major Automated Information System is a program or initiative that is so designated by the Assistant Secretary of Defense (Networks and Information Integration)/Chief Information Officer or that is estimated to require program costs in any single year in excess of $32 million (fiscal year 2000 constant dollars), total program costs in excess of $126 million (fiscal year 2000 constant dollars), or total life-cycle costs in excess of $378 million (fiscal year 2000 constant dollars).

[28]According to DOD, the milestone decision authority is the designated individual who has overall responsibility for an investment. This person has the authority to approve an investment's progression in the acquisition process and is responsible for reporting cost, schedule, and performance results. For example, the milestone decision authority for a Major Defense Acquisition Program, when not delegated to the component level, is the Under Secretary of Defense for Acquisition, Technology, and Logistics, and the milestone decision authority for a Major Automated Information System is the Assistant Secretary of Defense (Networks and Information Integration)/Chief Information Officer or a designee.

such as the Defense Acquisition Board[29] and the IT Acquisition Board[30]—determines the project's baseline cost, schedule, and performance commitments. The Under Secretary of Defense for Acquisition, Technology, and Logistics has primary responsibility for defining and implementing DAS.

DOD relies on its components to execute these investment management policies and procedures. To implement DOD's JCIDS process, the Air Force has designated the Joint Staff Functional Capabilities Board to review and approve operational capabilities. The Joint Staff Functional Capabilities Board seeks to establish a common understanding of how a capability will be used, who will use it, when it is needed, and why it is needed to achieve a desired effect. Each capability is assessed based on the effects it seeks to generate and the associated operational risk of not having it. In addition, the Capabilities Review and Risk Assessment process is being used to analyze concepts of operation and assess their associated capabilities. This process uses a phased approach to produce a prioritized list of capabilities, capability gaps or shortfalls, and possible capability solutions. To implement the PPBE process, Air Force officials stated that they use their Annual Planning and Programming Guidance manual. Finally, to implement DAS, Air Force has developed guidance that outlines a systematic acquisition framework that mirrors the framework defined by DOD and includes the same three event-based milestones and associated five program life-cycle phases.

## Business Investment Management System

The Business Investment Management System is a calendar-driven approach that is described in terms of governance entities, tiered accountability, and certification reviews and approvals. This system was initiated in 2005, when DOD reassigned responsibility for providing executive leadership for the direction, oversight, and execution of its

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[29]The Defense Acquisition Board—chaired by the Under Secretary of Defense for Acquisition, Technology, and Logistics—conducts reviews for Major Defense Acquisition Programs at major program milestones and documents the decisions resulting from the review in an Acquisition Decision Memorandum.

[30]The IT Acquisition Board—chaired by the Assistant Secretary of Defense (Networks and Information Integration)/Chief Information Officer—conducts reviews for Major Automated Information System at major program milestones and documents the decision(s) resulting from the review in an Acquisition Decision Memorandum.

business systems modernization efforts to several entities. These entities and their responsibilities include the following:

- The Defense Business Systems Management Committee serves as the highest-ranking governance body for business systems modernization activities.

- The Principal Staff Assistants serve as the certification authorities for business system modernizations in their respective core business missions.

- The Investment Review Boards are chartered by the principal staff assistants and are the review and decision-making bodies for business system investments in their respective areas of responsibility.[31] The boards are also responsible for recommending certification for all business system investments costing more than $1 million.

- The component precertification authority is accountable for the component's business system investments and acts as the component's principal point of contact for communication with the Investment Review Boards. The Air Force has designated its CIO to be the precertification authority.

- The Business Transformation Agency is responsible for leading and coordinating business transformation efforts across the department. The agency is organized into seven directorates, one of which is the Defense Business Systems Acquisition Executive—the component acquisition executive for DOD enterprise-level (DOD-wide) business systems and initiatives. This directorate is responsible for developing, coordinating, and integrating enterprise-level projects, programs, systems, and initiatives—including managing resources such as fiscal, personnel, and contracts for assigned systems and programs.

Figure 4 provides a simplified illustration of the relationships among these entities.

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[31]The four Investment Review Boards are (1) financial management, established by the Deputy Under Secretary of Defense for Financial Management; (2) weapon systems life-cycle management and materiel supply and services management; (3) real property and installations life-cycle management, both established by the Under Secretary of Defense (Acquisition, Technology, and Logistics); and (4) human resources management, established by the Under Secretary of Defense for Personnel and Readiness.

**Figure 4: Working Relationships among DOD Business Investment Management System Governance Entities**
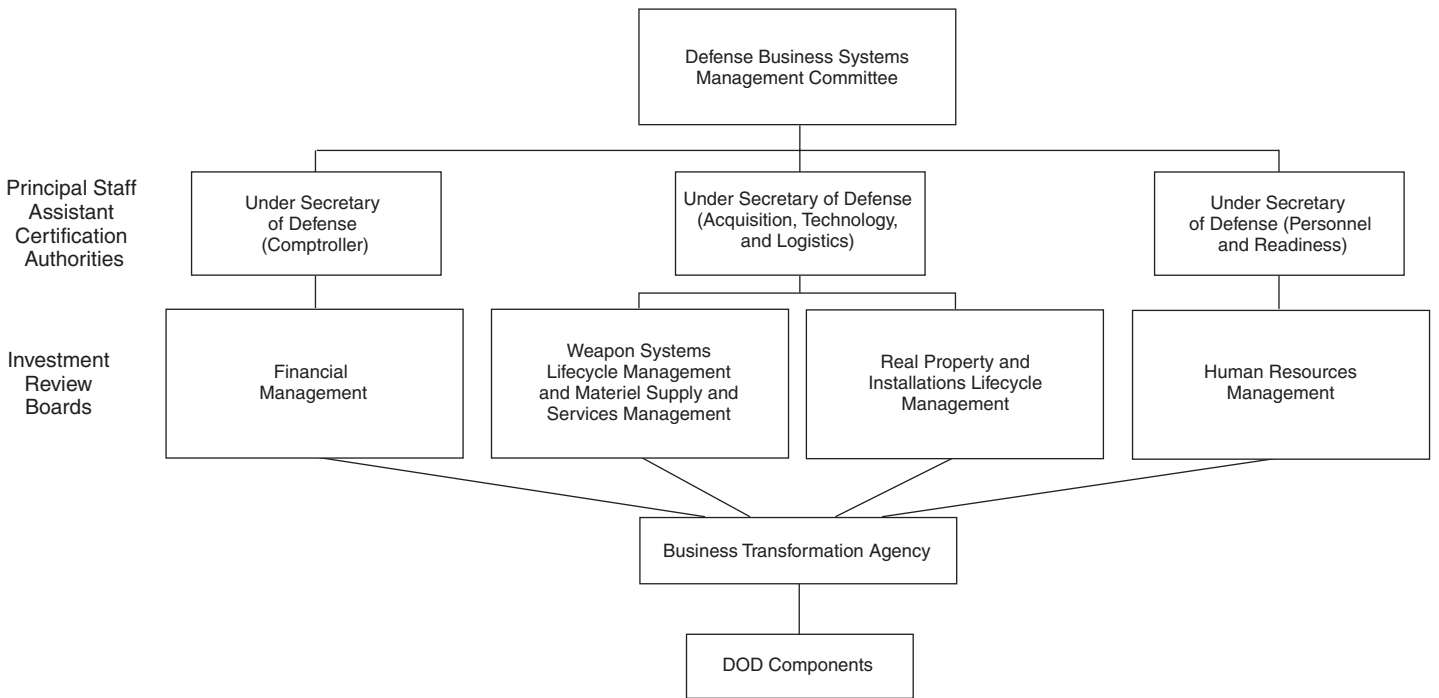


Source: GAO, based on DOD documentation.

According to DOD, in 2005 it also adopted a tiered accountability approach to business transformation. Under this approach, responsibility and accountability for business system investment management is allocated among DOD (i.e., Office of the Secretary of Defense) and the component agencies, based on the amount of development/modernization funding involved and the investment's "tier." DOD is responsible for ensuring that all business systems with a development/modernization investment in excess of $1 million are reviewed by the Investment Review Boards for compliance with the business enterprise architecture, certified by the principal staff assistants, and approved by the Defense Business Systems Management Committee. Components are responsible for certifying development/modernization investments with total costs of $1 million or less. All DOD development and modernization efforts are assigned a tier on the basis of the acquisition category or the size of the financial investment, or both. According to DOD, a system is given a tier designation when it passes through the certification process. Table 1 describes the five investment tiers and identifies the associated reviewing and approving entities for DOD and the Air Force.

**Table 1: DOD and Air Force Business System Investment Tiers**

| Tier | Description | Reviewing/Approving entities |
|------|-------------|------------------------------|
| Tier 1 | Major Automated Information Systems and Major Defense Acquisition Programs. | Certified by Investment Review Boards and Defense Business Systems Management Committee; precertified by Air Force CIO. |
| Tier 2 | Systems exceeding $10 million in total development/modernization costs, but not designated Major Automated Information Systems or Major Defense Acquisition Programs. | Certified by Investment Review Boards and Defense Business Systems Management Committee; precertified by Air Force CIO. |
| Tier 3 | Systems exceeding $1 million and up to $10 million in total development/modernization costs. | Certified by Investment Review Boards and Defense Business Systems Management Committee; precertified by Air Force CIO. |
| Tier 4 | All other business systems (i.e., those systems with development/modernization costs of $1 million or less). | Certified by Air Force CIO. |
| Tier 5 | Systems in operations and maintenance or sustainment. | Approved by Air Force CIO. |

Sources: DOD and Air Force.

DOD's business investment management system includes two types of reviews for business systems: certification and annual reviews. Certification reviews apply to new modernization projects with total costs over $1 million. These reviews focus on program alignment with the business enterprise architecture and must be completed before components obligate funds for programs. The annual reviews apply to all business programs and are undertaken to determine whether the system development effort is meeting its milestones and addressing its Investment Review Board certification conditions.

- **Certification reviews and approvals**: Tier 1 through 3 business system investments in development and modernization are certified at two levels—component-level precertification and DOD-level certification and approval. At the component level, program managers prepare, enter, maintain, and update information about their investments in the Air Force data repository. The component precertification authority validates that the system information is complete and accessible on the Air Force data repository, reviews system compliance with the business enterprise architecture and enterprise transition plan, and verifies the economic viability analysis. This information is then transferred to DOD's IT

Portfolio Repository.[32] The precertification authority asserts the status and validity of the investment information by submitting a component precertification letter to the appropriate Investment Review Board for its review.

- **Annual reviews**: Tier 1 through 4 business system investments are reviewed annually at the component and DOD-levels. At the component level, program managers annually review and update information on all tiers of system investments that are identified in their data repository. For Tier 1 through 3 systems that are in development or being modernized, information is updated on cost, milestone, and risk variances and actions or issues related to certification conditions. The precertification authority then verifies and submits the information for these business system investments for DOD's Investment Review Board review in an annual review assertion letter. The letter addresses system compliance with the DOD business enterprise architecture and the enterprise transition plan and includes investment cost, schedule, and performance information.[33]

At the DOD level, the Investment Review Boards annually review investments for certified Tier 1 through 3 business systems that are in development or are being modernized. These reviews focus on program compliance with the business enterprise architecture, program cost and performance milestones, and progress in meeting certification conditions. The Investment Review Boards can revoke an investment's certification when the system has significantly failed to achieve performance commitments (i.e., capabilities and costs). When this occurs, the component must address the Investment Review Board's concerns and resubmit the investment for certification.

## Air Force's Precertification Process

As stated earlier, DOD relies on its components to execute investment management policies and procedures. Air Force has developed a precertification process, which is intended to ensure that new or existing

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[32]DOD's IT Portfolio Repository is DOD's authoritative repository for certain information about DOD's business systems, such as system names and the responsible DOD components that are required for the certification, approval, and annual reviews of these business system investments.

[33]In addition, each component precertification authority submits a list of system names to the Investment Review Boards on a semiannual basis, to include Tier 4 systems and systems in operations and maintenance that have been reviewed at the component level.

systems undergo proper scrutiny prior to being precertified by the Air Force CIO. First, the certification package is to be prepared by the Program Manager and reviewed by the Major Command (MAJCOM) and functional portfolio managers.

The package is then to be provided to the Air Force Certification Process Manager, who is to review the package for completeness based on certification requirements and transmit the package to the Certification Review Team—which is composed of subject matter experts—to assess compliance with their relevant areas of expertise, such as the business enterprise architecture and information assurance. Once the certification review is complete, the package is to be sent to the Senior Working Group. This group is responsible for reviewing the package and approving or disapproving the package. Finally, the Precertification Authority is to precertify the system for submission to the relevant Investment Review Board.

Table 2 lists decision-making personnel involved in Air Force's investment management process and provides a description of their key responsibilities.

**Table 2: Air Force Investment Management Governance Entities and Responsibilities**

| Entity | Roles and responsibilities | Composition |
|---|---|---|
| Precertification Authority | • Air Force Precertification Authority has the responsibility and authority to precertify any modernization investment in excess of $1 million and certify any modernization investment less than or equal to $1million (Tier 4). | The Secretary of the Air Force has the CIO as the Air Force Business Investment Approval Authority and Precertification Authority. |
| Senior Working Group | • The Senior Working Group functions as the Investment Review Board at the component level. It provides cross-functional review and recommendations to the Air Force Precertification Authority regarding certification and annual review of business system investments.<br>• The Senior Working Group provides guidance for Air Force modernization efforts. It also supports the CIO in ensuring compliance with public law and federal, DOD, and Air Force directives regulating the management and operation of IT investments. | The Senior Working Group members are composed of general officers and senior executive service members from headquarter functional organizations. It is chaired by a representative from the Office of the CIO and has representation from various Air Force departments such as financial management and acquisition. |
| Certification Review Team | • The Certification Review Team is comprised of subject matter experts tasked with reviewing each certification package for compliance with enterprise architecture, funding, information assurance, joint requirements, and the enterprise transition plan. | The review team consists of Subject Matter Experts on Enterprise Architecture, Funding, Information Assurance, Joint Requirements, and the Enterprise Transition Plan. |
| Certification Process Manager | • The Air Force Certification Process Manager is responsible for executing the certification and annual review processes. In support of this effort, the Certification Process Manager tracks certification conditions, and communicates and documents certification decisions. | The Air Force Certification Process Manager has a unit within the Office of the CIO tasked with supporting investment activities. |
| Functional Portfolio Manager | • Functional portfolio managers (functional CIOs) are responsible for managing the Air Force functional portfolios.<br>• Managers are responsible for establishing a cross-functional investment review board to conduct portfolio management activities. | These managers consist of Air Force's various functional portfolios, which include Acquisition, Financial Management, Human Resource Management, and Logistics. |
| Major Command Portfolio Manager | • MAJCOM Portfolio Managers are responsible for managing a MAJCOM portfolio that includes the subject business system.<br>• Managers are responsible for reviewing investment management documentation (e.g., Balanced Scorecard, Functions Gap/Redundancy Assessment, Architecture Alignment) on submitted initiatives, reviewing certification packages, and approving or disapproving the certification package.<br>• Managers are responsible for establishing a cross-mission investment review board, which conducts portfolio management activities across the mission areas. | These managers consist of Air Force's various major commands. These include Air Combat Command, Air Education and Training Command, Air Force Materiel Command, Air Force Reserve Command, Air Force Space Command, Air Force Special Operations Command, Air Mobility Command, Pacific Air Forces, and U.S. Air Forces in Europe. |
| System Program Manager | • The Program Manager is responsible for managing a business system. Program managers are responsible for complete, current, and accurate information contained in the Air Force data repository relevant to their systems. They are also responsible for completing initial certification packages and modifying certification packages to address issues from all levels of review. | These managers are responsible for the development, implementation, and maintenance of their individual systems. |

Source: GAO analysis of Air Force data.

Figure 5 shows the relationship among the key players in Air Force's precertification review and approval process.

**Figure 5: Air Force Precertification Review and Approval Process**
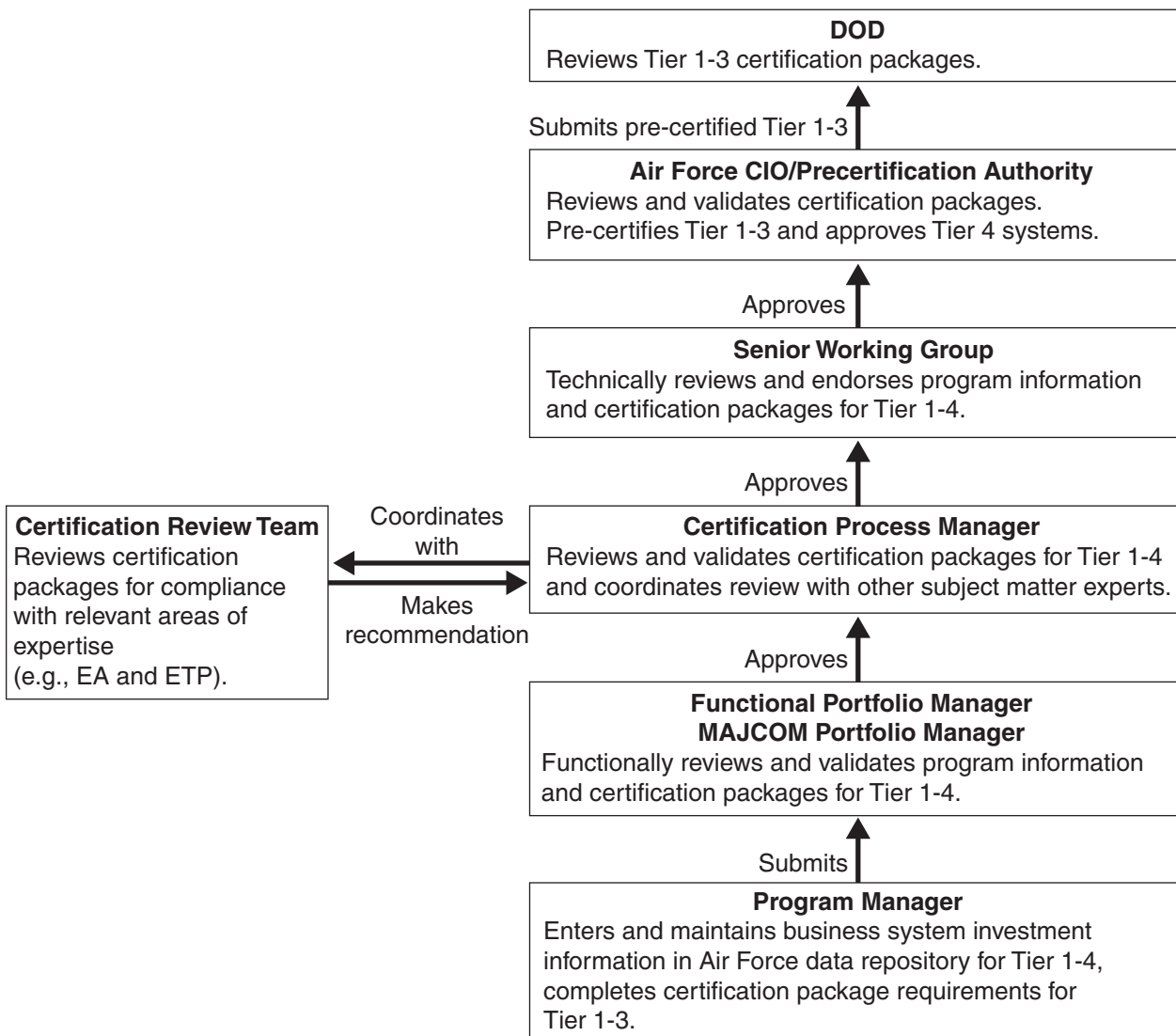


Source: GAO, based on Air Force documentation.

## Air Force Has Established the Structures Needed to Effectively Manage Business System Investments but Has Not Fully Defined Many of the Related Policies and Procedures

DOD relies on its components to execute investment management policies and procedures.[34] However, while Air Force has established the basic management structures needed to effectively manage its IT projects as investments, it has not fully implemented many of the related policies and procedures outlined in our ITIM framework. Relative to its business system investments, Air Force has implemented three of nine practices that call for project-level structures, policies, and procedures, and has not defined any of the five practices that call for portfolio-level policies and procedures. Air Force officials stated that they are aware of the absence of documented policies and procedures, and they are currently working on guidance to address these areas. For example, these officials stated that they have drafted policies and procedures to establish portfolio-level practices and are currently obtaining the necessary approvals. Air Force plans to complete and approve these policies and procedures by December 2007. According to our framework, adequately documenting both the policies and the associated procedures that govern how an organization manages its IT investment portfolio is important because doing so provides the basis for having rigor, discipline, and repeatability in how investments are selected and controlled across the entire organization.

Until Air Force has fully defined policies and procedures for both individual projects and the portfolio of projects, it risks selecting and controlling these business system investments in an inconsistent, incomplete, and ad hoc manner, which in turn could reduce the chances that these investments will meet mission needs in the most effective manner.

## Air Force Has Begun to Build a Foundation for Project-Level Investment Management but Has Not Yet Fully Defined Key Policies and Procedures

At ITIM Stage 2, an organization has attained repeatable and successful IT project-level investment control processes and basic selection processes. Through these processes, the organization can identify project expectation gaps early and take the appropriate steps to address them. ITIM Stage 2 critical processes include (1) defining investment board operations, (2) identifying the business needs for each investment, (3) developing a basic process for selecting new proposals and reselecting ongoing investments,

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[34]These investment management policies and procedures include precertifying Tier 1 through 3 business system investments by the component. These systems are then reviewed and certified by DOD. Tier 4 systems are certified by the components.

(4) developing project-level investment control processes, and (5) collecting information about existing investments to inform investment management decisions. Table 3 describes the purpose of each of these Stage 2 critical processes.

**Table 3: Stage 2 Critical Processes—Building the Investment Foundation**

| Critical process | Purpose |
|---|---|
| Instituting the investment board | To define and establish an appropriate investment management structure and the processes for selecting, controlling, and evaluating investments. |
| Meeting business needs | To ensure that investments support the organization's business needs and meet users' needs. |
| Selecting an investment | To ensure that a well-defined and disciplined process is used to select new proposals and reselect ongoing investments. |
| Providing investment oversight | To review the progress of investments, using predefined criteria and checkpoints, in meeting cost, schedule, risk, and benefit expectations and to take corrective action when these expectations are not being met. |
| Capturing investment information | To make information available to decision makers to evaluate the impacts and opportunities created by proposed (or continuing) investments. |

Source: GAO.

Within these five critical processes are nine key practices required for effective project-level management. Air Force has fully defined the policies and procedures for three of these nine practices. Specifically, Air Force has established a management structure by instituting a business system Investment Review Board, called the Senior Working Group. This group is composed of senior executives from the functional business units, including the Office of the Air Force Chief Information Officer, and the members are responsible for establishing and implementing investment policies. In addition, Air Force has established policies and procedures for capturing information about its IT projects and systems and submitting, updating, and maintaining this information in its data repository. Finally, it has assigned the Certification Process Manager the responsibility of ensuring that specific investment information contained in the Air Force data repository is accurate and complete.

However, the Air Force's policies and procedures associated with the remaining six project-level management practices are missing critical elements needed to effectively carry out essential investment management activities. For example:

- Policies and procedures for directing the Investment Review Board's operations do not define how investments that are in operations and maintenance are to be governed by the Investment Review Board. In

addition, procedures do not specify how the business investment management process is coordinated with other DOD management systems. Without clearly defined guidance and visibility into all investments with an understanding of decisions reached through other management systems, Air Force cannot be assured that consistent investment management decisions are being made.

- Policies and procedures do not define how systems in operations and maintenance will support ongoing and future business needs. This increases the risk that Air Force will continue to maintain legacy investments that no longer support current organizational objectives.

- Policies and procedures for selecting new systems do not specify how the full range of cost, schedule, and performance data are being considered in making selection (i.e., precertification) decisions. Without documenting how factors such as cost, schedule, and performance are considered when making precertification decisions, Air Force cannot ensure that it consistently and objectively selects system investments that best meet the department's needs and priorities.

- Policies and procedures do not include a structured method that defines how the criteria will be evaluated when the precertification authority makes reselection decisions. In addition, policies and procedures do not define an approach to annually reviewing systems in operations and maintenance. Given that Air Force spends millions of dollars annually in operating and maintaining business systems, this is significant. Without an understanding of how the precertification authority is to consider these investments when making reselection decisions, Air Force's ability to make informed and consistent reselection and termination decisions is limited.

- Policies and procedures do not specify how funding decisions are integrated with the process of selecting an investment. Without considering budget constraints and opportunities, Air Force risks making investment decisions that do not effectively consider the relative merits of various projects and systems when funding limitations exist.

- Policies and procedures do not provide for sufficient oversight and visibility into investment management activities. Air Force has predefined criteria for adherence to cost, schedule, and performance milestones, but does not have policies and procedures that guide the implementation of corrective actions when program expectations are not met. Without such policies and procedures, the agency risks investing in systems that are

duplicative, stovepiped, nonintegrated, and unnecessarily costly to manage, maintain, and operate.

Table 4 summarizes our findings relative to Air Force's execution of the nine key practices that call for the policies and procedures needed to manage IT investments at the project level.

**Table 4: Summary of Policies and Procedures for Stage 2 Critical Processes—Building the Investment Foundation**

| Critical process | Key practice | Rating | Summary of evidence |
|---|---|---|---|
| Instituting the investment board | 1. An enterprisewide IT investment board composed of senior executives from IT and business units is responsible for defining and implementing the organization's IT investment governance process. | Executed | Air Force has established an investment board—the Senior Working Group—composed of senior executives from the functional business units, including the office of the Air Force Chief Information Officer. The board is responsible for establishing and implementing policies governing the organization's investment process. |
| | 2. The organization has a documented IT investment process directing each investment board's operations. | Not executed | Air Force has an IT investment process for directing its investment board, which explains the roles and responsibilities of the board and the individuals involved. Air Force assigns the Investment Review Board accountability for systems throughout the investment life cycle, including investments that are in the operations and maintenance phase. However, Air Force's policies and procedures do not define the process by which these systems will be reviewed by the Investment Review Board. In addition, according to our ITIM guidance, the department's investment guidance should specify the manner in which investment-related processes will be coordinated with other organizational plans, processes, and documents. However, Air Force's Investment Review Guide does not specify how the business investment management system is coordinated with other DOD management systems, such as JCIDS, PPBE, and DAS. |
| Meeting business needs | 1. The organization has documented policies and procedures for identifying IT projects or systems that support the organization's ongoing and future business needs. | Not executed | Although Air Force has begun to review systems in operations and maintenance, it does not have policies and procedures for ensuring that these systems support ongoing and future business needs. Air Force guidance dictates that investments undergoing the certification process must demonstrate that they support ongoing and future business needs by complying with the Enterprise Transition Plan and Business Enterprise Architecture. However, Air Force certification guidance does not apply to system investments in operations and maintenance, which account for about 60 percent of Air Force's overall IT budget. |
| Selecting an investment | 1. The organization has documented policies and procedures for selecting a new investment. | Not executed | While the Investment Review Guide defines Air Force's roles and responsibilities for certifying and approving investments and includes predefined criteria, such as meeting cost, schedule, and performance milestones, for selecting investments, it does not contain a structured approach for how precertification decisions are reached. For example, the guidance does not specify how factors, such as cost, schedule, and performance data, are to be used in making precertification decisions. |

| Critical process | Key practice | Rating | Summary of evidence |
|---|---|---|---|
| | 2. The organization has documented policies and procedures for reselecting ongoing investments. | Not executed | Air Force's Investment Review Guide defines Air Force's approach for annually reviewing investments. However, this guidance does not include a structured method that defines how the criteria, such as meeting cost, schedule and performance milestones, will be evaluated when the precertification authority makes reselection decisions. In addition, the Investment Review Guide only addresses systems in development/modernization (Tier 1 through 4) and does not define an approach for annually reviewing systems in operations and maintenance. |
| | 3. The organization has documented policies and procedures for integrating funding with the process of selecting an investment. | Not executed | Air Force policies and procedures do not specify how investment funding and selection are to be integrated nor how the precertification authority is to use funding information to make certification or approval decisions. |
| Providing investment oversight | 1. The organization has documented policies and procedures for management oversight of IT projects and systems. | Not executed | Air Force does not have documented policies and procedures for overseeing the management of IT projects and systems. For example, while Air Force has predefined criteria and checkpoints for meeting cost, schedule, and performance milestones, and requires the development of corrective actions when a project deviates from milestones, it does not have policies and procedures that guide implementation of corrective actions. Further, Air Force may certify a system and impose conditions that must be met in order to obligate system funding. However, there are no policies and procedures that define the process for tracking conditions until they are resolved. |
| Capturing investment information | 1. The organization has documented policies and procedures for identifying and collecting information about IT projects and systems to support the investment management process. | Executed | The Air Force Investment Review Guidance describes the procedures for submitting, updating, and maintaining information in its data repository. |
| | 2. An official is assigned responsibility for ensuring that the information collected during project and systems identification meets the needs of the investment management process. | Executed | The Air Force Investment Review Guidance assigns the Program Manager responsibility to ensure investment information contained in its data repository is accurate and complete. The guidance also assigns the Certification Process Manager with responsibility for verifying these data. |

Source: GAO.

Air Force officials stated that they are aware of the absence of documented procedures in certain areas of project-level management, and plan to issue new policies and procedures addressing these areas by December 2007. However, until Air Force fully documents IT investment management policies and procedures for Stage 2 activities and specifies the linkages between the various related processes, and describes how system investments in operations and maintenance are to be governed, it risks not being able to carry out investment management activities in a

consistent and disciplined manner. Moreover, the Air Force risks selecting investments that will not effectively meet its mission needs.

## Air Force Has Assigned Responsibility but Has Not Defined the Policies and Procedures Associated with Effective Portfolio-Level Management

At Stage 3, an organization has defined critical processes for managing its investments as a portfolio or a set of portfolios.[35] Portfolio management is a conscious, continuous, and proactive approach to allocating limited resources among competing initiatives in light of the investments' relative benefits. Taking a departmentwide perspective enables an organization to consider its investments comprehensively, so that collectively the investments optimally address the organization's missions, strategic goals, and objectives. Managing IT investments as portfolios also allows an organization to determine its priorities and make decisions about which projects to fund on the basis of analyses of the relative organizational value and risks of all projects, including projects that are proposed, under development, and in operation. Although investments may initially be organized into subordinate portfolios—on the basis of, for example, business lines or life-cycle stages—and managed by subordinate investment boards, they should ultimately be aggregated into enterprise-level portfolios.

According to ITIM, Stage 3 involves four critical processes (1) defining the portfolio criteria; (2) creating the portfolio; (3) evaluating (i.e., overseeing) the portfolio; and (4) conducting post-implementation reviews. Within these critical processes are five key practices that call for policies and procedures to ensure effective portfolio management. Table 5 summarizes the purpose of each of the critical processes.

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[35]Investment portfolios are integrated agencywide collections of investments that are assessed and managed collectively on the basis of common criteria.

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**Table 5: Stage 3 Critical Processes—Developing a Complete Investment Portfolio**

| Critical process | Purpose |
|---|---|
| Defining the portfolio criteria | To ensure that the organization develops and maintains portfolio selection criteria that support its mission, organizational strategies, and business priorities. |
| Creating the portfolio | To ensure that investments are analyzed according to the organization's portfolio selection criteria and to ensure that an optimal investment portfolio with manageable risks and returns is selected and funded. |
| Evaluating the portfolio | To review the performance of the organization's investment portfolio(s) at agreed-upon intervals and to adjust the allocation of resources among investments as necessary. |
| Conducting post-implementation reviews | To compare the results of recently implemented investments with the expectations that were set for them and to develop a set of lessons learned from these reviews. |

Source: GAO.

Air Force has begun to establish a governance structure for portfolio-level management, but it has not executed any of the five practices within the Stage 3 critical processes that call for policies and procedures associated with effective portfolio-level management. Specifically, Air Force has assigned the Senior Working Group the responsibility of establishing a governance forum to oversee business system portfolio activities. However, the Senior Working Group has not developed and approved charters outlining the roles and responsibilities to be assigned to subordinate Investment Review Boards that are intended to establish and manage the portfolios.

In addition, Air Force has not fully defined policies and procedures needed to effectively execute portfolio management practices. Specifically, Air Force does not have policies and procedures for defining the portfolio criteria or creating and evaluating the portfolio. In addition, while DOD has policies and procedures for conducting post-implementation reviews for Tier 1 systems as part of the Defense Acquisition System, Air Force has not established policies or procedures for conducting post-implementation reviews for systems in the remaining tiers. Finally, Air Force has not established procedures detailing how lessons learned from these reviews are to be used during investment reviews as the basis for management and process improvements. Table 6 summarizes the rating for each critical process required to manage investments as a portfolio and summarizes the evidence that supports these ratings.

**Table 6: Summary of Policies and Procedures for Stage 3 Critical Processes—Developing a Complete Investment Portfolio**

| Critical process- | Key practice- | Rating- | Summary of evidence |
|---|---|---|---|
| Defining the portfolio criteria | 1. The organization has documented policies and procedures for creating and modifying IT portfolio selection criteria. | Not executed | While Air Force has assigned the Major Command and Functional Investment Review Boards responsibility for creating and modifying portfolio criteria (e.g., prioritization and investment trade-offs) for business system investments, it has not yet finalized draft policies, procedures, or criteria for conducting IT portfolio selection. According to Air Force officials, the policies and procedures are expected to be finalized and approved by December 2007. |
| | 2. Responsibility is assigned to an individual or group for managing the development and modification of the IT portfolio selection criteria. | Not executed | Air Force has assigned responsibility for overseeing portfolio management to the Senior Working Group. However, although Air Force officials stated that subordinate Major Command and Functional Investment Review Boards are to be responsible for managing specific portfolios, it has yet to officially assign responsibility to these groups. |
| Creating the portfolio | 1. The organization has documented policies and procedures for analyzing, selecting, and maintaining the investment portfolios. | Not executed | Air Force is currently revising its instruction on the IT portfolio management process, to include policies and procedures for analyzing, selecting, and maintaining the investment portfolios. However, Air Force officials could not identify a date for when the instruction would be finalized and approved. |
| Evaluating the portfolio | 1. The organization has documented policies and procedures for reviewing, evaluating, and improving the performance of its portfolio(s). | Not executed | While the Major Command and Functional Investment Review Board draft charters state that they are responsible for reviewing factors associated with portfolio management, such as architecture alignment, capability delivery, and risk, there are no policies and procedures indicating how they should use these factors and project indicators—such as cost, schedule, and risk—to review, evaluate, and improve their portfolios. |
| Conducting post-implementation reviews | 1. The organization has documented policies and procedures for conducting post-implementation reviews. | Not executed | While DOD requires post-implementation reviews for Tier 1 systems as part of DAS, Air Force has not developed policies or procedures for conducting such reviews for systems in the remaining tiers. Moreover, there are no policies and procedures directing the Air Force Senior Working Group, which is accountable for Air Force business system investments, to consider information gathered and to develop lessons learned from these post-implementation reviews. |

Source: GAO.

Air Force officials are aware that they need to develop the appropriate portfolio management processes, and in this regard, have drafted some portfolio management guidance, such as the Air Force Operational Support Portfolio Investment Review Process. According to Air Force officials, this guidance is expected to be completed and approved by December 2007. Until policies and procedures for managing business systems investment portfolios are defined and implemented, Air Force is at risk of not consistently selecting the mix of investments that best

supports the department mission needs and ensuring that investment-related lessons learned are shared and applied departmentwide.

## Conclusions

Given the importance of business systems modernization to Air Force's mission, performance, and outcomes, it is vital for the department to adopt and employ an effective institutional approach to managing business system investments. However, while the department acknowledges these shortcomings and the importance of addressing them and has established aspects of such an approach, it is lacking important elements, such as policies and procedures needed for project-level and portfolio-level investment management. This means that Air Force lacks an institutional capability to ensure that it is investing in business systems that best support its strategic needs and that ongoing projects meet cost, schedule, and performance expectations. Until Air Force develops this capability, the department will be impaired in its ability to optimize business mission area performance and accountability.

## Recommendations for Executive Action

To strengthen Air Force's business system investment management capability and address the weaknesses discussed in this report, we recommend that the Secretary of Defense direct the Secretary of the Air Force to ensure that well-defined and disciplined business system investment management policies and procedures are developed and issued. At a minimum, this should include project-level management policies and procedures that address the six key practices areas:

- Specifying how systems that are in operations and maintenance will be reviewed and specifying how Air Force's business investment management system is coordinated with JCIDS, PPBE, and DAS.

- Ensuring that systems in operations and maintenance are aligned with ongoing and future business needs.

- Selecting investments, including specifying how factors, such as cost, schedule, and performance data are to be used in making certification decisions.

- Reselecting ongoing investments, including specifying how factors, such as cost, schedule, and performance data are to be used in making reselection decisions during the annual review process and providing for the reselection of investments that are in operations and maintenance.

- Integrating funding with the process of selecting an investment, including specifying how the precertification authority is using funding information in carrying out decisions on system certification and approvals.

- Overseeing IT projects and systems, including specifying policies and procedures that guide the implementation of corrective actions when program expectations are not met.

These well-defined and disciplined business system investment management policies and procedures should also include portfolio-level management policies and procedures that address the following five areas:

- Creating and modifying IT portfolio selection criteria for business system investments.

- Defining the roles and responsibilities for the development and modification of the IT portfolio selection criteria.

- Analyzing, selecting, and maintaining business system investment portfolios.

- Reviewing, evaluating, and improving the performance of the portfolio(s) by using project indicators, such as cost, schedule, and risk.

- Conducting post-implementation reviews for all investment tiers and directing the investment boards to consider the information gathered to develop lessons learned from these reviews.

## Agency Comments and Our Evaluation

In written comments on a draft of this report, signed by the Deputy Under Secretary of Defense (Business Transformation) and reprinted in appendix II, DOD partially concurred with the report's recommendations. The department further stated that our recommendations and feedback were helpful in guiding its business transformation and related improvement efforts.

Regarding our recommendation that DOD direct Air Force to ensure that well-defined and disciplined business system investment management policies and procedures are developed and issued, DOD stated that Air Force has a well-defined business system investment management process that, while not codified into formal policy, has been documented in investment review guides. Further, it stated that Air Force is committed to formalizing its policies as the processes expand and mature. Our report

recognizes that Air Force has drafted a business system investment management process. However, as our report states, the draft review guide lacks critical elements needed to effectively carry out essential investment management activities. Until Air Force completes and issues IT investment management policies and procedures that fully address these elements, it risks not being able to carry out investment management activities in a consistent and disciplined manner.

Regarding our recommendation that DOD direct Air Force to ensure that the well-defined and disciplined business system investment management policies and procedures also include portfolio-level management policies and procedures, the department stated that DOD Instruction 8115.02 defines the DOD IT portfolio management process, which Air Force is applying in its decisionmaking. However, as our report notes, Air Force has not implemented a process for managing its business system portfolios. Until Air Force defines and implements such a process, it is at risk of not consistently selecting the mix of investments that best supports the Air Force's mission needs and ensuring that investment-related lessons learned are shared and applied departmentwide.

We are sending copies of this report to interested congressional committees; the Director, Office of Management and Budget; the Secretary of Defense; the Deputy Secretary of Defense; the Secretary of Air Force; the Air Force Chief Information Officer, and the Under Secretary of Defense for Acquisition, Technology, and Logistics. Copies of this report will be made available to other interested parties on request. This report will also be available at no charge on our Web site at http://www.gao.gov.

Should you or your staffs have any questions on matters discussed in this report, please contact me at (202) 512-6304 or melvinv@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix III.

Valerie C. Melvin

Valerie C. Melvin

Director, Human Capital and Management
Information Systems Issues

The Honorable Carl Levin
Chairman
The Honorable John McCain
Ranking Member
Committee on Armed Services
United States Senate

The Honorable Daniel Inouye
Chairman
The Honorable Ted Stevens
Ranking Member
Subcommittee on Defense
Committee on Appropriations
United States Senate

The Honorable Ike Skelton
Chairman
The Honorable Duncan Hunter
Ranking Member
Committee on Armed Services
House of Representatives

The Honorable John P. Murtha
Chairman
The Honorable C.W. Bill Young
Ranking Member
Subcommittee on Defense
Committee on Appropriations
House of Representatives

# Appendix I: Objective, Scope, and Methodology

Our objective was to determine whether the investment management approach of the Department of the Air Force (a major Department of Defense (DOD) component) is consistent with leading investment management best practices. Our analysis was based on the best practices contained in GAO's Information Technology Investment Management (ITIM) framework and the framework's associated evaluation methodology, and focused on Air Force's establishment of policies and procedures for business system investments needed to assist organizations in complying with the investment management provisions of the Clinger-Cohen Act of 1996 (Stages 2 and 3).

To address our objective, we asked Air Force to complete a self-assessment of its investment management process and provide the supporting documentation. We then reviewed the results of the department's self-assessment of Stages 2 and 3 organizational commitment practices—meaning those practices related to structures, policies, and procedures—and compared them with our ITIM framework. We focused on Stages 2 and 3 because these stages represent the processes needed to meet the standards of the Clinger-Cohen Act, and they establish the foundation for effective acquisition management. We also validated and updated the results of the self-assessment through document reviews and interviews with officials, such as the Air Force Chief Information Officer and Certification Process Manager. In doing so, we reviewed written policies, procedures, and guidance and other documentation providing evidence of executed practices, including the Air Force Information Technology Investment Review Guide, Air Force Operations of Capabilities Based Acquisition System Instruction, Air Force IT Investment Architecture Compliance Guide, Senior Working Group charter and meeting minutes, the Investment Review Board Concept of Operations and Guidance, and the Business Transformation Guidance.

We compared the evidence collected from our document reviews and interviews with the key practices in ITIM. We rated the key practices as "executed" on the basis of whether the department demonstrated (by providing evidence of performance) that it had met all of the criteria of the key practice. A key practice was rated as "not executed" when we found insufficient evidence of all elements of a practice being fully performed or when we determined that there were significant weaknesses in Air Force's execution of the key practice. In addition, we provided Air Force with the opportunity to produce evidence for the key practices rated as "not executed."

We conducted our work at the Air Force offices in Arlington, Virginia,
from February 2007 through September 2007 in accordance with generally
accepted government auditing standards.

# Appendix II: Comments from the Department of Defense

OFFICE OF THE UNDER SECRETARY OF DEFENSE
3000 DEFENSE PENTAGON
WASHINGTON, DC 20301-3000

ACQUISITION,
TECHNOLOGY
AND LOGISTICS

OCT 1 8 2007

Ms. Valerie C. Melvin
Director, Human Capital and Management Information Systems Issues
U.S. Government Accountability Office
441 G Street, N.W.
Washington, DC 20548

Dear Ms. Melvin:

This is the Department of Defense (DoD) response to the GAO draft report GAO-08-52, "BUSINESS SYSTEMS MODERNIZATION: Air Force Needs to Fully Define Policies and Procedures for Institutionally Managing Investments," dated September 17, 2007 (GAO Code 310635).

The Department partially concurs with GAO's first recommendation. The Air Force has established a well-defined business system investment management process that, while not codified into formal policy, has been documented in its investment review guides. Furthermore, the Air Force is committed to formalizing its policies as the processes expand and mature.

The Department also partially concurs with the second recommendation. DoD Instruction 8115.02 defines the DoD Information Technology (IT) portfolio management process and the Air Force is applying this process in its decision-making. This process is also maturing.

GAO continues to be a valuable and constructive partner in the Department's business transformation efforts. The recommendations and feedback provided will help to further guide DoD's process of continual improvement. We look forward to your participation in our future efforts.

Paul A. Brinkley
Deputy Under Secretary of Defense
(Business Transformation)

GAO DRAFT REPORT DATED SEPTEMBER 17, 2007
GAO-08-52 (GAO CODE 310635)

"BUSINESS SYSTEMS MODERNIZATION: AIR FORCE NEEDS TO FULLY
DEFINE POLICIES AND PROCEDURES FOR INSTITUTIONALLY MANAGING
INVESTMENTS"

DEPARTMENT OF DEFENSE COMMENTS
TO THE GAO RECOMMENDATION

**RECOMMENDATION 1:** The GAO recommended that the Secretary of Defense direct
the Secretary of the Air Force to ensure that well-defined and disciplined business system
investment management policies and procedures are developed and issued. At a
minimum, these should include project-level management policies and procedures that
address:

- How systems that are in operations and maintenance will be reviewed and
  specifying how Air Force's business investment management system is
  coordinated with Joint Capabilities Integration and Development System
  (JCIDS), Planning, Programming, Budgeting and Execution (PPBE), and
  Defense Acquisition System (DAS).
- Ensuring that systems in operations and maintenance are aligned with ongoing
  and future business needs.
- Selecting investments, including specifying how factors, such as cost, schedule,
  and performance data are to be used in making certification decisions.
- Reselecting ongoing investments, including specifying how factors, such as cost,
  schedule, and performance data are to be used in making reselection decisions
  during the annual review process and providing for the reselection of investments
  that are in operations and maintenance.
- Integrating funding with the process of selecting an investment, including
  specifying how the pre-certification authority is using funding information in
  carrying out decisions on system certification and approvals.
- Overseeing Information Technology (IT) projects and systems, including
  specifying policies and procedures that guide the implementation of corrective
  actions when program expectations are not met.

(p. 38/GAO Draft Report)

**DOD RESPONSE:** Partially concur

The Department partially concurs. The Air Force does have a well-defined and
disciplined business system investment management system process documented in
investment review guides. The process is maturing but has not been codified in formal
policies. The documented investment review and architecture guides are in use and

Attachment

distributed throughout the Air Force. The business system investment review process is
expanding to capture investments in the warfighting and enterprise infrastructure
environment mission areas. These processes will be instituted in formal policies.

**RECOMMENDATION 2:** The GAO recommended that the Secretary of Defense direct
the Secretary of the Air Force to ensure that the above well-defined and disciplined
business system investment management policies and procedures also include portfolio-
level management policies and procedures that address:

- Creating and modifying IT portfolio selection criteria for business system
  investments.
- Defining roles and responsibilities for the development and modification of the IT
  portfolio selection criteria.
- Analyzing, selecting, and maintaining business system investment portfolios.
- Reviewing, evaluating, and improving the performance of the portfolio(s) by using
  project indicators, such as cost, schedule, and risk.
- Conduct post-implementation reviews for all investment tiers and directing the
  investment boards to consider the information gathered to develop lessons learned
  from these reviews.

(p. 38/GAO Draft Report)

**DOD RESPONSE:** Partially concur

DoD instruction 8115.02 defines the DoD IT portfolio management process.
This process is maturing and the Air Force is applying portfolio management discipline in
their information technology decision making.

Attachment

# Appendix III: GAO Contact and Staff Acknowledgments

## GAO Contact

Valerie C. Melvin, (202) 512-6304 or melvinv@gao.gov

## Staff Acknowledgments

In addition to the contact person named above, key contributors to this report were Tonia Johnson, Assistant Director; Idris Adjerid; Sharhonda Deloach; Nancy Glover; and Freda Paintsil.

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