

**GAO**

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Before the Committee on Armed  
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## DEFENSE ACQUISITIONS

# DOD Must Balance Its Needs with Available Resources and Follow an Incremental Approach to Acquiring Weapon Systems

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**GAO**

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# Report Documentation Page

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## Why GAO Did This Study

Since 1990, GAO has consistently designated the Department of Defense's (DOD) management of its major weapon acquisitions as a high-risk area. A broad consensus exists that weapon system problems are serious, but efforts at reform have had limited impact. Last year, GAO reported that DOD's portfolio of weapon programs experienced cost growth of \$295 billion from first estimates, were delayed by an average of 21 months, and delivered fewer quantities and capabilities to the warfighter than originally planned.

At a time when DOD faces increased fiscal pressures from ongoing operations in Iraq and Afghanistan, and the federal budget is strained by a growing number of priorities, it is critical that the department effectively manage its substantial investment in weapon system programs. Every dollar wasted or used inefficiently on acquiring weapon systems means that less money is available for the government's other important budgetary demands.

This testimony describes the systemic problems that contribute to the cost, schedule, and performance problems in weapon system programs, recent actions that DOD has taken to address these problems, proposed reform legislation that the committee recently introduced, and additional steps needed to improve future performance of acquisition programs. The testimony is drawn from GAO's body of work on DOD's acquisition, requirements, and funding processes.

View [GAO-09-431T](#) or [key components](#). For more information, contact Michael J. Sullivan at (202) 512-4841 or [sullivanm@gao.gov](mailto:sullivanm@gao.gov).

## DEFENSE ACQUISITIONS

### DOD Must Balance its Needs with Available Resources and Follow an Incremental Approach to Acquiring Weapons Systems

#### What GAO Found

For several years, GAO's work has highlighted a number of strategic- and program-level causes for cost, schedule, and performance problems in DOD's weapon system programs. At the strategic level, DOD's processes for identifying warfighter needs, allocating resources, and developing and procuring weapon systems, which together define the department's overall weapon system investment strategy, are fragmented. As a result, DOD fails to balance the competing needs of the services with those of the joint warfighter and commits to more programs than resources can support. At the program level, DOD allows programs to begin development without a full understanding of requirements and the resources needed to execute them. The lack of early systems engineering, acceptance of unreliable cost estimates based on overly optimistic assumptions, failure to commit full funding, and the addition of new requirements well into the acquisition cycle all contribute to poor outcomes. Moreover, DOD officials are rarely held accountable for poor decisions or poor program outcomes.

Recognizing the need for more discipline in weapon systems acquisition and to implement Congressional direction, DOD recently revised its policy and introduced several initiatives. The revised policy, if implemented properly, could provide a foundation for developing individual acquisition programs with sound, knowledge-based business cases. The policy recommends the completion of key systems engineering activities, establishes early milestone reviews, requires competitive prototyping, and establishes review boards to manage potential requirements changes to ongoing programs.

The committee's proposed reform legislation should lead to further improvements in outcomes. Improved systems engineering, early preliminary design reviews, and strengthened independent cost estimates and technology readiness assessments should make the critical front end of the acquisition process more disciplined. Establishing a termination criterion for critical cost breaches could help prevent the acceptance of unrealistic cost estimates at program initiation. Having greater combatant command involvement in determining requirements and greater consultation between the requirements, budget, and acquisition processes could help improve the department's efforts to balance its portfolio of weapon system programs.

Legislation and policy revisions may lead to improvements but cannot work effectively without changes to the overall acquisition environment and the incentives that drive it. Resisting the urge to achieve revolutionary but unachievable capabilities, allowing technologies to mature in the technology base before bringing them onto programs, ensuring requirements are well-defined and doable, and instituting shorter development cycles would all make it easier to estimate costs accurately, and then predict funding needs and allocate resources effectively. These measures will only succeed if the department balances its portfolio and adopts an incremental approach to developing and procuring weapon systems.

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Mr. Chairman and Members of the Committee:

I am pleased to be here today to discuss the Department of Defense's (DOD) management of its major weapon system acquisitions—an area that has been on GAO's high-risk list since 1990. Prior to and since that time, Congress and DOD have continually explored ways to improve acquisition outcomes without significant results. While the technological sophistication of DOD weapon systems is unparalleled, major weapon programs continue to cost more, take longer to complete, and deliver fewer quantities and capabilities than originally planned. Last year we reported that the cumulative cost growth in DOD's portfolio of 95 major defense acquisition programs was \$295 billion from first estimates and the average delay in delivering promised capabilities to the warfighter was 21 months. Clearly, some problems are to be expected in developing weapon systems given the technical risks and complexities involved. However, all too often we have found that cost and schedule problems are rooted in poor planning, execution, and oversight.

Investment in weapon systems is now at its highest level in two decades, and DOD plans to spend more than \$357 billion over the next 5 years on major defense acquisition programs. Effective management of this substantial investment is critical as competition for funding has increased dramatically within the department and across the government. DOD faces a number of fiscal pressures: the ongoing military campaigns in Afghanistan and Iraq, rising personnel costs, and the rebuilding and modernization of the force. In addition, the economic and fiscal crises now facing the nation have required unprecedented spending by the federal government, and budget deficits are projected to remain high for many years to come. At a time when the federal budget is strained by spending needs for a growing number of national priorities, it is imperative that DOD get the best value for every dollar it invests in weapon system programs. Every dollar wasted during the development and acquisition of weapon systems is money not available for other priorities within DOD and elsewhere in the government.

Today, I will discuss (1) the systemic problems that have contributed to cost, schedule, and performance problems in DOD's acquisition of major weapon systems; (2) recent actions the department has taken to address these problems; (3) our observations on the committee's proposed acquisition reform legislation; and (4) steps that Congress and the department need to take to improve the future performance of acquisition programs. The statement includes findings from our July 2008 report on a knowledge-based funding approach and February 2009 report on potential

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changes to DOD's acquisition management framework.<sup>1</sup> It also draws from our extensive body of work on DOD's acquisition of weapon systems. A list of our key products is provided at the end of this statement. This work was conducted in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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## Fragmented Investment Decision Making, Unexecutable Programs, and Lack of Accountability Underlie Poor Acquisition Outcomes

Over the past several years our work has highlighted a number of underlying systemic causes for cost growth and schedule delays at both the strategic and program levels. At the strategic level, DOD's processes for identifying warfighter needs, allocating resources, and developing and procuring weapon systems—which together define DOD's overall weapon system investment strategy—are fragmented. As a result, DOD fails to effectively address joint warfighting needs and commits to more programs than it has resources for, thus creating unhealthy competition for funding. At the program level, a military service typically establishes and DOD approves a business case containing requirements that are not fully understood and cost and schedule estimates that are based on overly optimistic assumptions rather than on sufficient knowledge. Once a program begins, it too often moves forward with inadequate technology, design, testing, and manufacturing knowledge, making it impossible to successfully execute the program within established cost, schedule, and performance targets. Furthermore, DOD officials are rarely held accountable for poor decisions or poor program outcomes.

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## DOD Lacks an Integrated Approach to Balance Weapon System Investments

At the strategic level, DOD largely continues to define warfighting needs and make investment decisions on a service-by-service and individual platform basis, using fragmented decision-making processes. This approach makes it difficult for the department to achieve a balanced mix of weapon systems that are affordable and feasible and that provide the best military value to the joint warfighter. In contrast, we have found that successful commercial enterprises use an integrated portfolio

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<sup>1</sup>GAO, Defense Acquisitions: A Knowledge-Based Funding Approach Could Improve Major Weapon System Program Outcomes, [GAO-08-619](#) (Washington, D.C.: July 2, 2008), and Defense Acquisitions: Perspectives on Potential Changes to DOD's Acquisition Management Framework, [GAO-09-295R](#) (Washington, D.C.: Feb. 27, 2009).

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management approach to focus early investment decisions on products collectively at the enterprise level and ensure that there is a sound basis to justify the commitment of resources.<sup>2</sup> By following a disciplined, integrated process—during which the relative pros and cons of competing product proposals are assessed based on strategic objectives, customer needs, and available resources, and where tough decisions about which investments to pursue and not to pursue are made—companies minimize duplication between business units, move away from organizational stovepipes, and effectively support each new development program they commit to. To be effective, integrated portfolio management must have strong, committed leadership; empowered portfolio managers; and accountability at all levels of the organization.

DOD determines its capability needs through the Joint Capabilities and Integration Development System (JCIDS). While JCIDS provides a framework for reviewing and validating needs, it does not adequately prioritize those needs from a joint, departmentwide perspective; lacks the agility to meet changing warfighter demands; and validates almost all of the capability proposals that are submitted. We recently reviewed JCIDS documentation related to new capability proposals and found that most—almost 70 percent—were sponsored by the military services with little involvement from the joint community, including the combatant commands, which are responsible for planning and carrying out military operations.<sup>3</sup> Because DOD also lacks an analytic approach to determining the relative importance of the capabilities needed for joint warfighting, all proposals appear to be treated as equal priorities within the JCIDS process. By continuing to rely on capability needs defined primarily by the services, DOD may be losing opportunities for improving joint warfighting capabilities and reducing the duplication of capabilities in some areas. The JCIDS process has also proven to be lengthy and cumbersome—taking on average up to 10 months to validate a need—thus undermining the department’s efforts to effectively respond to the needs of the warfighter, especially those needs that are near term. Furthermore, the vast majority of capability proposals that enter the JCIDS process are validated or approved without accounting for the resources or technologies that will be

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<sup>2</sup> 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).

<sup>3</sup> GAO, Defense Acquisitions: DOD’s Requirements Determination Process Has Not Been Effective in Prioritizing Joint Capabilities, [GAO-08-1060](#) (Washington, D.C.: Sept. 25, 2008).

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needed to acquire the desired capabilities. Ultimately, the process produces more demand for new weapon system programs than available resources can support.

The funding of proposed programs takes place through a separate process, the department's Planning, Programming, Budgeting, and Execution (PPBE) system, which is not synchronized with JCIDS. While JCIDS is a continuous, need-driven process that unfolds in response to capability proposals as they are submitted by sponsors, PPBE is a calendar-driven process comprising phases occurring over a 2-year cycle, which can lead to resource decisions for proposed programs that may occur several years later. In addition, because PPBE is structured by military service and defense programs and not by the joint capability areas being used in JCIDS, it is difficult to link resources to capabilities. The PPBE process also largely allocates resources based on historical trends rather than on a strategic basis. Service shares of the overall budget have remained relatively static for decades, even though DOD's strategic environment and warfighting needs have changed dramatically in recent years. Because DOD's programming and budgeting reviews occur at the back end of the PPBE process—after the services have developed their budgets—it is difficult and disruptive to make changes, such as terminating programs to pay for new, higher-priority programs.

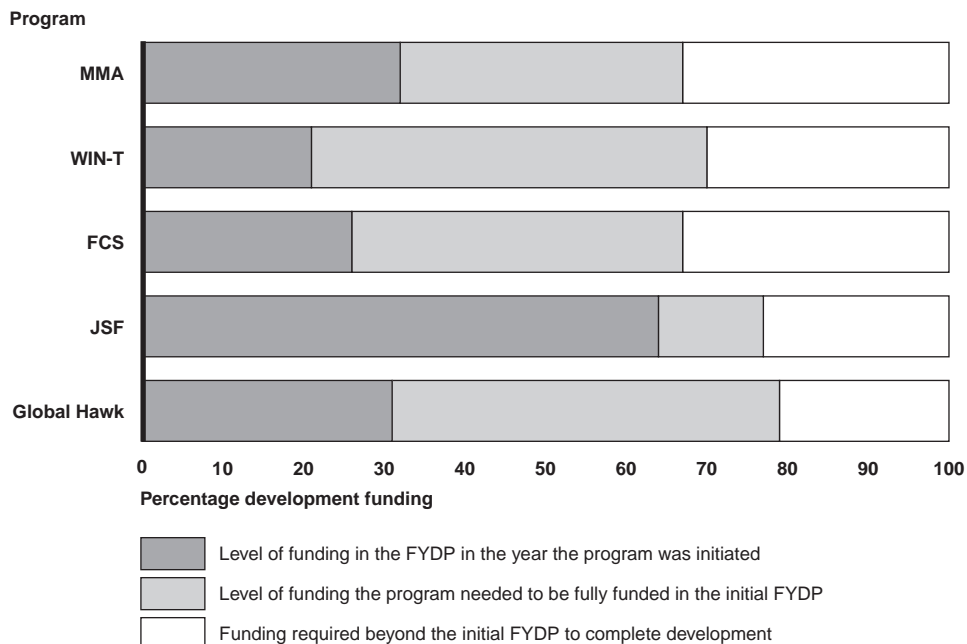
We recently reviewed the impact of the PPBE process on major defense acquisition programs and found that the process does not produce an accurate picture of the department's resource needs for weapon system programs, in large part because it allows too many programs to go forward with unreliable cost estimates and without a commitment to fully fund them.<sup>4</sup> The cost of many of the programs we reviewed exceeded the funding levels planned for and reflected in the Future Years Defense Program (FYDP)—the department's long-term investment strategy (see fig. 1). DOD's failure to balance its needs with available resources promotes an unhealthy competition for funding that encourages sponsors of weapon system programs to pursue overly ambitious capabilities and underestimate costs to appear affordable. Rather than limit the number and size of programs or adjust requirements, DOD opts to push the real costs of programs to the future. With too many programs under way for the available resources and high cost growth occurring in many programs, the department must make up for funding shortfalls by shifting funds from

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<sup>4</sup> [GAO-08-619](#).

one program to pay for another, reducing system capabilities, cutting procurement quantities, or in rare cases terminating programs. Such actions not only create instability in DOD’s weapon system portfolio, they further obscure the true future costs of current commitments, making it difficult to make informed investment decisions.

**Figure 1: Funding Shortfalls at the Start of Development for Five Major Weapon System Programs<sup>a</sup>**



Source: DOD (data); GAO (analysis and presentation).

<sup>a</sup>Multi-Mission Maritime Aircraft (MMA), Warfighter Information Network—Tactical (WIN-T), Future Combat Systems (FCS), Joint Strike Fighter (JSF), and Global Hawk.

### Initiating Programs with Inadequate Knowledge of Requirements and Resources Often Results in Poor Outcomes

At the program level, the key cause of poor outcomes is the approval of programs with business cases that contain inadequate knowledge about requirements and the resources—funding, time, technologies, and people—needed to execute them. Our work in best practices has found that an executable business case for a program demonstrated evidence that (1) the identified needs are real and necessary and that they can best be met with the chosen concept and (2) the chosen concept can be developed and produced within existing resources. Over the past several years, we have found no evidence of the widespread adoption of such an

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approach for major acquisition programs in the department. Our annual assessments of major weapon systems have consistently found that the vast majority of programs began system development without mature technologies and moved into system demonstration without design stability.

The chief reason for these problems is the encouragement within the acquisition environment of overly ambitious and lengthy product developments—sometimes referred to as revolutionary or big bang acquisition programs—that embody too many technical unknowns and not enough knowledge about the performance and production risks they entail. The knowledge gaps are largely the result of a lack of early and disciplined systems engineering analysis of a weapon system’s requirements prior to beginning system development. Systems engineering translates customer needs into specific product requirements for which requisite technological, software, engineering, and production capabilities can be identified through requirements analysis, design, and testing. Early systems engineering provides the knowledge a product developer needs to identify and resolve performance and resource gaps before product development begins by either reducing requirements, deferring them to the future, or increasing the estimated cost for the weapon system’s development. Because the government often does not perform the proper up-front requirements analysis to determine whether the program will meet its needs, significant contract cost increases can and do occur as the scope of the requirements changes or becomes better understood by the government and contractor. Not only does DOD not conduct disciplined systems engineering prior to the beginning of system development, it has allowed new requirements to be added well into the acquisition cycle. We have reported on the negative impact that poor systems engineering practices have had on several programs, such as the Global Hawk Unmanned Aircraft System, F-22A, Expeditionary Fighting Vehicle, and Joint Air-to-Surface Standoff Missile.<sup>5</sup>

With high levels of uncertainty about requirements, technologies, and design, program cost estimates and related funding needs are often understated, effectively setting programs up for cost and schedule growth. We recently assessed the service and independent cost estimates for 20

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<sup>5</sup> GAO, Best Practices: Increased Focus on Requirements and Oversight Needed to Improve DOD’s Acquisition Environment and Weapon System Quality, [GAO-08-294](#) (Washington, D.C.: Feb. 1, 2008).

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major weapon system programs and found that while the independent estimates were somewhat higher, both estimates were too low in most cases.<sup>6</sup> In some of the programs we reviewed, cost estimates have been off by billions of dollars. For example, the initial service estimate for the development of the Marines' Expeditionary Fighting Vehicle was about \$1.1 billion. The department's Cost Analysis and Improvement Group (CAIG) estimated the development cost of the program to be \$1.4 billion, but development costs for the program are now expected to be close to \$3.6 billion. In the case of the Future Combat System (FCS), the Army's initial estimate for the development cost was about \$20 billion, while CAIG's estimate was \$27 billion. The department began the program using the program office's estimate of \$20 billion, but development costs for the FCS are now estimated to be \$28 billion and the program is still dealing with significant technical risk. Estimates this far off the mark do not provide the necessary foundation for sufficient funding commitments and realistic long-term planning.

The programs we reviewed frequently lacked the knowledge needed to develop realistic cost estimates. For example, program Cost Analysis Requirements Description documents—used to build the program cost estimate—often lack sufficient detail about planned program content for developing sound cost estimates. Without this knowledge, cost estimators must rely heavily on parametric analysis and assumptions about system requirements, technologies, design maturity, and the time and funding needed. A cost estimate is then usually presented to decision makers as a single, or point, estimate that is expected to represent the most likely cost of the program but provides no information about the range of risk and uncertainty or level of confidence associated with the estimate.

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**Lack of Accountability for Making Weapon System Decisions Hinders Achieving Successful Outcomes**

DOD's requirements, resource allocation, and acquisition processes are led by different organizations, thus making it difficult to hold any one person or organization accountable for saying no to a proposed program or for ensuring that the department's portfolio of programs is balanced. DOD's 2006 Defense Acquisition Performance Assessment study observed that these processes are not connected organizationally at any level below the Deputy Secretary of Defense and concluded that this weak structure induces instability and inhibits accountability. Furthermore, a former Under Secretary of Defense for Acquisitions, Technology and Logistics has

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<sup>6</sup> [GAO-08-619](#).

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stated that weapon system investment decisions are a shared responsibility in the department and, therefore, no one individual is accountable for these decisions. Frequent turnover in leadership positions in the department exacerbates the problem. The average tenure, for example, of the Under Secretary of Defense for Acquisition, Technology and Logistics over the past 22 years has been only about 20 months.<sup>7</sup>

When DOD's strategic processes fail to balance needs with resources and allow unsound, unexecutable programs to move forward, program managers cannot be held accountable when the programs they are handed already have a low probability of success. Program managers are also not empowered to make go or no-go decisions, have little control over funding, cannot veto new requirements, and have little authority over staffing. At the same time, program managers frequently change during a program's development, making it difficult to hold them accountable for the business cases that they are entrusted to manage and deliver.

The government's lack of control over and accountability for decision making is further complicated by DOD's growing reliance on technical, business, and procurement expertise supplied by contractors. This reliance may reach the point where the foundation upon which decisions are based may be largely crafted by individuals who are not employed by the government, who are not bound by the same rules governing their conduct, and who are not required to disclose any financial or other personal interests they may have that conflict with the responsibilities they have performing contract tasks for DOD. For example, while the total planned commitments to major acquisition programs have doubled over recent years, the size of the department's systems engineering workforce has remained relatively stable, leading program offices to rely more on contractors for systems engineering support. Further, in systems development, DOD typically uses cost-reimbursement contracts in which it generally pays the reasonable, allocable, and allowable costs incurred for the contractor's best efforts, to the extent provided by the contract. The use of these contracts may contribute to the perpetuation of an acquisition environment that lacks incentives for contractors to follow best practices and keep costs and schedules in check.

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<sup>7</sup> The position of Under Secretary of Defense for Acquisition was established in 1986 and the title was subsequently changed to the Under Secretary of Defense for Acquisition, Technology and Logistics in 2000. Since 1986, there have been 11 under secretaries.

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## Recent DOD Policy Changes Could Improve Future Performance of Weapon System Programs

The department understands many of the problems that affect acquisition programs and has recently taken steps to remedy them. It has revised its acquisition policy and introduced several initiatives based in part on direction from Congress and recommendations from GAO that could provide a foundation for establishing sound, knowledge-based business cases for individual acquisition programs. However, to improve outcomes, DOD must ensure that its policy changes are consistently implemented and reflected in decisions on individual programs—not only new program starts but also ongoing programs as well. In the past, inconsistent implementation of existing policy has hindered DOD’s efforts to execute acquisition programs effectively. Moreover, while policy improvements are necessary, they may be insufficient unless the broader strategic issues associated with the department’s fragmented approach to managing its portfolio of weapon system investments are also addressed.

In December 2008, DOD revised its policy governing major defense acquisition programs in ways intended to provide key department leaders with the knowledge needed to make informed decisions before a program starts and to maintain disciplined development once it begins. The revised policy recommends the completion of key systems engineering activities before the start of development, includes a requirement for early prototyping, establishes review boards to identify and mitigate technical risks and evaluate the impact of potential requirements changes on ongoing programs, and incorporates program manager agreements to increase leadership stability and management accountability. The policy also establishes early milestone reviews for programs going through the pre-systems acquisition phase. In the past, DOD’s acquisition policy may have encouraged programs to rush into systems development without sufficient knowledge, in part, because no formal milestone reviews were required before system development. If implemented, these policy changes could help programs replace risk with knowledge, thereby increasing the chances of developing weapon systems within cost and schedule targets while meeting user needs. Some aspects of the policy were first pilot-tested on selected programs, such as the Joint Light Tactical Vehicle program, and indications are that these programs are in the process of acquiring the requisite knowledge before the start of systems development. Some key elements of the department’s new acquisition policy include

- a new materiel development decision as a starting point for all programs regardless of where they are intended to enter the acquisition process,
- a more robust Analysis of Alternatives (AOA) to assess potential materiel solutions that address a capability need validated through JCIDS,

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- a cost estimate for the proposed solution identified by the AOA,
  - early program support reviews by systems engineering teams,
  - competitive prototyping of the proposed system or key system elements as part of the technology development phase,
  - certifications for entry into the technology development and system development phases (as required by congressional legislation),
  - preliminary design review that may be conducted before the start of systems development, and
  - configuration steering boards to review all requirements and technical changes that have potential to affect cost and schedule.

As part of its strategy for enhancing the roles of program managers in major weapon system acquisitions, the department has established a policy that requires formal agreements among program managers, their acquisition executives, and the user community setting forth common program goals. These agreements are intended to be binding and to detail the progress the program is expected to make during the year and the resources the program will be provided to reach these goals. DOD also requires program managers to sign tenure agreements so that their tenure will correspond to the next major milestone review closest to 4 years. The department acknowledges that any actions taken to improve accountability must be based on a foundation whereby program managers can launch and manage programs toward successful performance, rather than focusing on maintaining support and funding for individual programs. DOD acquisition leaders have also stated that any improvements to program managers' performance depend on the department's ability to promote requirements and resource stability over weapon system investments.

Over the past few years, DOD has also been testing portfolio management approaches in selected capability areas—command and control, net-centric operations, battlespace awareness, and logistics—to facilitate more strategic choices for resource allocation across programs. The department recently formalized the concept of capability portfolio management, issuing a directive in 2008 that established policy and assigned responsibilities for portfolio management. The directive established nine joint capability area portfolios, each to be managed by civilian and military co-leads. While the portfolios have no independent decision-making authority over requirements determination and resource allocation, according to some DOD officials, they provided key input and recommendations in this year's budget process. However, without portfolios in which managers have authority and control over resources, the department is at risk of continuing to develop and acquire systems in a

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stovepiped manner and of not knowing if its systems are being developed within available resources.

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## Observations on Proposed Acquisition Reform Legislation

Overall, we believe that the legislative initiatives being proposed by the committee have the potential, if implemented, to lead to significant improvements in DOD's management of weapon system programs. Several of the initiatives—including the increased emphasis on systems engineering and developmental testing, the requirement for earlier preliminary design reviews, and the strengthening of independent cost estimates and technology readiness assessments—could instill more discipline into the front end of the acquisition process when it is critical for programs to gain knowledge. Establishing a termination criterion for Nunn-McCurdy cost breaches could help prevent the acceptance of unrealistic cost estimates as a foundation for starting programs.<sup>8</sup> Having greater involvement by the combatant commands in determining requirements and requiring greater consultation between the requirements, budget, and acquisition processes could help improve the department's efforts to balance its portfolio of weapon system programs. In addition, several of the proposals as currently drafted will codify what DOD policy already calls for, but are not being implemented consistently in weapon programs.

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### Section 101: Systems Engineering Capabilities

*Requires DOD to (1) assess the extent to which the department has in place the systems engineering capabilities needed to ensure that key acquisition decisions are supported by a rigorous systems analysis and systems engineering process and (2) establish organizations and develop skilled employees to fill any gaps in such capabilities.*

The lack of disciplined systems engineering analysis conducted prior to starting system development has been a key factor contributing to poor acquisition outcomes. Systems engineering activities—requirements analysis, design, and testing—are needed to ensure that a weapon system program's requirements are achievable and designable given available resources, such as technologies. In recent years, DOD has taken steps to improve its systems engineering capabilities by establishing a Systems and

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<sup>8</sup> 10 U.S.C. § 2433 (a) (5) requires the Secretary of Defense to report to Congress when a program's acquisition unit cost increases by at least 25 percent over the current baseline estimate or increases by at least 50 percent over the original baseline estimate.

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Software Engineering Center of Excellence and publishing guidance to assist the acquisition workforce in the development of systems engineering plans, education, and training. However, as the National Research Council recently reported, DOD's systems engineering capabilities have declined over time and shifted increasingly to outside contractors.<sup>9</sup> A comprehensive assessment to determine what systems engineering capabilities are in place and what capabilities are needed, as recommended in the proposed legislation, is a critical first step in enhancing the function of systems engineering in DOD acquisitions. At the same time, it will be important for DOD to implement steps to ensure systems engineering is applied in the right way and at the right time.

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## Section 102: Developmental Testing

*Requires DOD to reestablish the position of Director of Developmental Test and Evaluation and requires the services to assess and address any shortcomings in their developmental testing organizations and personnel.*

Robust developmental testing efforts are an integral part of the systems development process. They help to identify, evaluate, and reduce technical risks, and indicate whether the design solution is on track to satisfy the desired capabilities. As the Defense Science Board reported in 2008, developmental testing in weapon system programs needs to be improved.<sup>10</sup> We believe that developmental testing would be strengthened by a formal elevation of its role in the acquisition process and the reestablishment of a Director of Developmental Test and Evaluation position. Furthermore, requiring the Director to prepare an annual report for Congress summarizing DOD's developmental test and evaluation activities would provide more accountability. We also agree that the military services should be required to assess their respective developmental testing entities and address any shortcomings. This action would help ensure that the services have the knowledge and capacity for effective developmental test efforts.

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<sup>9</sup> National Research Council, Pre-Milestone A and Early-Phase Systems Engineering: A Retrospective Review and Benefits for Future Air Force Systems Acquisition (Washington, D.C.: February 2008).

<sup>10</sup> Defense Science Board, *Report on Developmental Test & Evaluation* (Washington, D.C.: May 2008).

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## Section 103: Technological Maturity Assessments

*Makes it the responsibility of the Director of Defense Research and Engineering (DDR&E) to periodically review and assess the technological maturity of critical technologies used in major defense acquisition programs.*

Ensuring that programs have mature technology before starting systems development is critical to avoiding cost and schedule problems, yet for many years we have reported that a majority of programs go forward with immature technologies and experience significant cost growth. Legislation enacted by Congress in 2006, requiring DOD to certify that the technology in a program has been demonstrated in a relevant environment before it receives approval to start system development, has begun to help address this problem. Since the legislation was enacted, DOD has asked the DDR&E to conduct independent reviews of technology readiness assessments for system development milestone decisions. Although DDR&E reviews are advisory in nature, we have seen reviews that have pushed programs to do more to demonstrate technology maturity. The improvements that this proposed legislation, as currently written, is intended to bring about may already be occurring in DOD. Congress, however, may wish to consider requiring the DDR&E to conduct technology readiness reviews not just periodically, but for all major defense acquisition programs, and whether or not DDR&E has the capacity and resources to effectively conduct technology assessments.

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## Section 104: Independent Cost Assessment

*Establish a Director of Independent Cost Assessment to ensure that cost estimates for major defense acquisition programs are fair, reliable, and unbiased.*

Within DOD, the Cost Analysis Improvement Group (CAIG) is the organization responsible for conducting independent costs estimates for major defense acquisition programs. The CAIG reports to the department's Director of Program Analysis and Evaluation, but its principal customer is the Under Secretary of Defense for Acquisition, Technology and Logistics. We believe that establishing an independent assessment office that reports directly to the Secretary or Deputy Secretary of Defense and to Congress—similar to the Office of the Director of Operation Test and Evaluation—would more fully integrate cost estimating with the acquisition management framework and provide an increased level of accountability. We see no reason why CAIG should not form the basis of the proposed organization. Congress may also wish to consider appointing the Director for a time-certain term and making the Director responsible for prescribing cost-estimating policy and guidance and for preparing an

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annual report summarizing cost estimates for major acquisition programs. Ultimately, however, improved cost estimating will only occur if there is a better foundation for planning and acquiring weapon system programs—one that promotes well-defined requirements, is knowledge-based and informed by disciplined systems engineering, requires mature technology, and adheres to shorter development cycle times.

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### Section 105: Role of Combatant Commanders

*Requires the Joint Requirements Oversight Council (JROC) to seek and consider input from the commanders of the combatant commands in identifying joint military requirements.*

Requirements determination in DOD, particularly for major weapon system programs, continues to be driven largely by the military services. Studies by the Defense Science Board, Center for Strategic and International Studies, and others have revealed that although the combatant commands—which are responsible for planning and executing military missions—are the principal joint warfighting customer in DOD, they have played a limited role in determining requirements. Currently, the JROC is doing more to seek out and consider input from the combatant commands through regular trips and meetings to discuss capability needs and resourcing issues. However, many of the combatant commands do not believe that their needs, which are reflected through the Integrated Priority List process, are sufficiently addressed through the department’s JCIDS process. For the combatant commands to meet this proposed legislative mandate and have more influence in establishing requirements, DOD should consider providing the combatant commands with additional resources to establish robust analytical capabilities for identifying and assessing their capability needs. Ultimately, the department must better prioritize and balance the needs of the military services, combatant commands, and other defense components, and be more agile in responding to near-term capability needs.

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### Section 201: Trade-offs of Cost, Schedule, and Performance

*Requires consultation between the budget, requirements, and acquisition processes to ensure the consideration of trade-offs between cost, schedule, and performance early in the process of developing major weapon systems.*

As currently structured, DOD’s budget, requirements, and acquisition processes do not operate in an integrated manner. The function and timing of the processes are not sufficiently synchronized, and the decision makers for each process are motivated by different incentives. These

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weaknesses have contributed to the development of a portfolio with more programs than available resources can support and programs that launch into system development without executable business cases. We have recommended that the department establish an enterprisewide portfolio management approach to weapon system investment decisions that integrates the determination of joint warfighting needs with the allocation of resources, and cuts across the services by functional or capability area.<sup>11</sup> To ensure the success of such an approach, we believe that the department should establish a single point of accountability with the authority, responsibility, and tools to implement portfolio management effectively.

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## Section 202: Preliminary Design Review

*Require the completion of a Preliminary Design Review (PDR) and a formal post-PDR assessment before a major defense acquisition program receives approval to start system development.*

We have found that a key deliverable in a knowledge-based acquisition process is the preliminary design of the proposed solution based on a robust systems engineering assessment prior to making a large financial commitment to system development. Early systems engineering provides the knowledge needed by a developer to identify and resolve gaps, such as overly optimistic requirements that cannot be met with current resources, before product development begins. Consequently, DOD would have more confidence that a particular system could successfully proceed into a detailed system development phase and meet stated performance requirements within cost, schedule, risk, and other relevant constraints. The recently revised DOD acquisition policy places an increased emphasis on programs planning for preliminary design review prior to the start of system development but does not go as far as making it a requirement to do so. We support any effort to add controls to the acquisition process to ensure that timely and robust systems engineering is conducted before major investment decisions, such as the approval to start system development, are made.

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## Section 203: Life-Cycle Competition

*Require DOD to adopt measures recommended by the 2008 Defense Science Board Task Force on Defense Industrial Structure for Transformation—such as competitive prototyping, dual sourcing, open*

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<sup>11</sup> [GAO-07-388](#).

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*architectures, periodic competitions for subsystem upgrades, and licensing of additional suppliers—to maximize competition throughout the life of a program.*

We have reported in the past on the problem of diminishing competition and the potential benefits of more competition.<sup>12</sup> In discussing the environment that leads to poor acquisition outcomes, we have noted that changes within the defense supplier base have added pressure to this environment. We noted that in 2006, a DOD-commissioned study found that the number of fully competent prime contractors competing for programs had fallen from more than 20 in 1985 to only 6, and that this has limited DOD's ability to maximize competition in order to reduce costs and encourage innovation. However, avenues exist for reducing costs through competition. For example, we reported that although continuing an alternate engine program for the Joint Strike Fighter would cost significantly more in development costs than a sole-source program, it could, in the long run, reduce overall life cycle costs and bring other benefits.

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## Section 204: Nunn-McCurdy Breaches

*Requires that a major defense acquisition program that experiences a critical Nunn-McCurdy cost breach be terminated unless the Secretary of Defense certifies that (1) continuing the program is essential to national security and the program can be modified to proceed in a cost-effective manner and (2) the program receives a new milestone approval prior to the award of any new or modified contract extending the scope of the program.*

In order for DOD to improve its program outcomes, realistic cost estimates must be required when programs are approved for development initiation. DOD often underestimates costs in large part because of a lack of knowledge and overly optimistic assumptions about requirements and critical technologies. This underestimation is also influenced by DOD's continuing failure to balance its needs with available resources, which promotes unhealthy competition among programs and encourages programs to overpromise on performance capabilities and underestimate cost. This false optimism is reinforced by an acquisition environment in

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<sup>12</sup> GAO, Defense Acquisitions: Better Weapon Program Outcomes Require Discipline, Accountability, and Fundamental Changes in the Acquisition Environment, [GAO-08-782T](#) (Washington, D.C.: June 3, 2008).

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which there are few ramifications for cost growth and delays. Only in very rare instances have programs been terminated for poor performance. When DOD consistently allows unsound, unexecutable programs to begin with few negative ramifications for poor outcomes, accountability suffers. As section 204 proposes, the strengthening of the Nunn-McCurdy provision—by including the potential termination of programs that experience critical cost growth—could facilitate a change in DOD’s behavior by preventing the acceptance of unrealistic cost estimates as a foundation for program initiation and placing more accountability on senior DOD leadership for justifying program continuation. Programs may thus be forced to be more candid and up front about potential costs, risks, and funding needs, and the likelihood of delivering a successful capability to the warfighter at the cost and in the time promised may grow.

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**Section 205: Organizational Conflicts of Interest**

*Prohibits systems engineering contractors from participating in the development or construction of major weapon systems on which they are advising DOD, and requires tightened oversight of organizational conflicts of interest by contractors in the acquisition of major weapon systems.*

The defense industry has undergone significant consolidation in recent years which has resulted in a few large, vertically integrated prime contractors. This consolidation creates the potential for organizational conflicts of interest where, for example, one business unit of a large company may be asked to provide systems engineering work on a system being produced by another unit of the same company. As the Defense Science Board has recognized, these conflicts of interest may lead to impaired objectivity, which may not be mitigated effectively through techniques such as erecting a firewall between the employees of the two units. While the Federal Acquisition Regulation currently covers some cases of potential organizational conflicts of interest involving the systems engineering function, there may be a need for additional coverage in this area. In general, we would support efforts to enhance the oversight of potential organizational conflicts of interest, particularly in the current environment of a heavily consolidated defense industry.

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**Section 206: Acquisition Excellence**

*Establishes an annual awards program to recognize individuals and teams that make significant contributions to the improved cost, schedule, and performance of defense acquisition programs*

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We support the creation of an annual awards program to recognize individuals and teams for improving the cost, schedule, and performance of defense acquisition programs. We have reported that meaningful and lasting reform will not be achieved until the right incentives are established and accountability is bolstered at all levels of the acquisition process. The need for incentives emerged as a significant issue in our recent discussions with acquisition experts examining potential changes to the acquisition processes enumerated in last year's defense authorization act. The discussions revealed that those changes may not achieve the desired improvement in acquisition outcomes unless they are accompanied by changes in the overall acquisition environment and culture, and the incentives they provide for success.

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## Concluding Observations on What Remains to Be Done

A broad consensus exists that weapon system problems are serious and that their resolution is overdue. With the federal budget under increasing strain from the nation's economic crisis, the time for change is now. DOD is off to a good start with the recent revisions to its acquisition policy, which, if implemented properly, should provide a foundation for establishing sound, knowledge-based business cases before launching into development and for maintaining discipline after initiation. The new policy will not work effectively, however, without changes to the overall acquisition environment. Resisting the urge to achieve the revolutionary but unachievable capability, allowing technologies to mature in the science and technology base before bringing them onto programs, ensuring that requirements are well-defined and doable, and instituting shorter development cycles would all make it easier to estimate costs accurately, and then predict funding needs and allocate resources effectively. But these measures will succeed only if the department uses an incremental approach. Constraining development cycle times to 5 or 6 years will force more manageable commitments, make costs and schedules more predictable, and facilitate the delivery of capabilities in a timely manner.

Acquisition problems are also likely to continue until DOD's approach to managing its weapon system portfolio (1) prioritizes needs with available resources, thus eliminating unhealthy competition for funding and the incentives for making programs look affordable when they are not; (2) facilitates better decisions about which programs to pursue and which not to pursue given existing and expected funding; and (3) balances the near-term needs of the joint warfighter with the long-term need to modernize the force. Achieving this affordable portfolio will require strong

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leadership and accountability. Establishing a single point of accountability could help the department align competing needs with available resources.

The department has tough decisions to make about its weapon systems and portfolio, and stakeholders, including military services, industry, and Congress, have to play a constructive role in the process toward change. Reform will not be achieved until DOD changes its acquisition environment and the incentives that drive the behavior of its decision makers, the military services, program managers, and the defense industry.

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Mr. Chairman, this concludes my prepared statement. I would be happy to answer any questions you may have at this time.

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## Contacts and Acknowledgements

For further information about this statement, please contact Michael J. Sullivan (202) 512-4841 or [sullivanm@gao.gov](mailto:sullivanm@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement. Individuals who made key contributions to this statement include John Oppenheim, Charlie Shivers, Dayna Foster, Matt Lea, Susan Neill, Ron Schwenn, and Bruce Thomas.

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# Related GAO Products

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*Defense Acquisitions: Perspectives on Potential Changes to DOD's Acquisition Management Framework.* [GAO-09-295R](#). Washington, D.C.: February 27, 2009.

*Defense Management: Actions Needed to Overcome Long-standing Challenges with Weapon Systems Acquisition and Service Contract Management.* [GAO-09-362T](#). Washington, D.C.: February 11, 2009.

*Defense Acquisitions: Fundamental Changes Are Needed to Improve Weapon Program Outcomes.* [GAO-08-1159T](#). Washington, D.C.: September 25, 2008.

*Defense Acquisitions: DOD's Requirements Determination Process Has Not Been Effective in Prioritizing Joint Capabilities.* [GAO-08-1060](#). Washington, D.C.: September 25, 2008.

*Defense Acquisitions: A Knowledge-Based Funding Approach Could Improve Major Weapon System Program Outcomes.* [GAO-08-619](#). Washington, D.C.: July 2, 2008.

*Defense Acquisitions: Better Weapon Program Outcomes Require Discipline, Accountability, and Fundamental Changes in the Acquisition Environment.* [GAO-08-782T](#). Washington, D.C.: June 3, 2008.

*Defense Acquisitions: Assessments of Selected Weapon Programs.* [GAO-08-467SP](#). Washington, D.C.: March 31, 2008.

*Best Practices: Increased Focus on Requirements and Oversight Needed to Improve DOD's Acquisition Environment and Weapon System Quality.* [GAO-08-294](#). Washington, D.C.: February 1, 2008.

*Cost Assessment Guide: Best Practices for Estimating and Managing Program Costs.* [GAO-07-1134SP](#). Washington, D.C.: July 2007.

*Defense Acquisitions: Assessments of Selected Weapon Programs.* [GAO-07-406SP](#). Washington, D.C.: March 30, 2007.

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

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*Defense Acquisitions: Major Weapon Systems Continue to Experience Cost and Schedule Problems under DOD's Revised Policy.* [GAO-06-368](#). Washington, D.C.: April 13, 2006.

*DOD Acquisition Outcomes: A Case for Change.* [GAO-06-257T](#). Washington, D.C.: November 15, 2005.

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*Best Practices: Capturing Design and Manufacturing Knowledge Early Improves Acquisition Outcomes.* [GAO-02-701](#). Washington, D.C.: July 15, 2002.

*Defense Acquisitions: DOD Faces Challenges in Implementing Best Practices.* [GAO-02-469T](#). Washington, D.C.: February 27, 2002.

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