



Testimony

Before the Subcommittee on Air and Land Forces, Committee on Armed Services, House of Representatives

For Release on Delivery  
Expected at 10:00 a.m. EDT  
Thursday, April 19, 2007

**INTELLIGENCE,  
SURVEILLANCE, AND  
RECONNAISSANCE**

**Preliminary Observations  
on DOD's Approach to  
Managing Requirements for  
New Systems, Existing  
Assets, and Systems  
Development**

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# Report Documentation Page

*Form Approved*  
*OMB No. 0704-0188*

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE <b>19 APR 2007</b>	2. REPORT TYPE	3. DATES COVERED <b>00-00-2007 to 00-00-2007</b>			
4. TITLE AND SUBTITLE <b>Intelligence, Surveillance, and Reconnaissance. Preliminary Observations of DOD's Approach to Managing Requirements for New Systems, Existing Assets, and Systems Development</b>		5a. CONTRACT NUMBER			
		5b. GRANT NUMBER			
		5c. PROGRAM ELEMENT NUMBER			
6. AUTHOR(S)		5d. PROJECT NUMBER			
		5e. TASK NUMBER			
		5f. WORK UNIT NUMBER			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>U.S. Government Accountability Office, 441 G Street NW, Washington, DC, 20548</b>		8. PERFORMING ORGANIZATION REPORT NUMBER			
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S)			
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)			
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES <b>27</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			



Highlights of [GAO-07-596T](#), testimony before the Subcommittee on Air and Land Forces, Committee on Armed Services, House of Representatives

## Why GAO Did This Study

As operations overseas continue, DOD is experiencing a growing demand for intelligence, surveillance, and reconnaissance (ISR) assets to provide valuable information in support of military operations. While the 2006 Quadrennial Review emphasized the need for the ISR community to improve the integration and management of ISR assets, DOD plans to make significant investments in ISR capabilities for the future. Congress has been interested in DOD's approach for managing and integrating existing assets while acquiring new systems.

This testimony addresses preliminary observations based on GAO's ongoing work regarding (1) the status of DOD initiatives intended to improve the management and integration of ISR requirements and challenges DOD faces in implementing its initiatives, (2) DOD's approach to managing current ISR assets to support military operations, and (3) the status of selected ISR programs in development and the potential for synergies between them.

GAO's ongoing work included document review, interviews with officials at relevant organizations, observations of some U.S. Central Command operations, and review of 13 airborne ISR development programs.

[www.gao.gov/cgi-bin/getrpt?GAO-07-596T](http://www.gao.gov/cgi-bin/getrpt?GAO-07-596T).

To view the full product, including the scope and methodology, click on the link above. For more information, contact David D'Agostino at (202) 512-5431 or [dagostinod@gao.gov](mailto:dagostinod@gao.gov), Sharon Pickup at (202) 512-9619 or [pickups@gao.gov](mailto:pickups@gao.gov), or Michael Sullivan at (202) 512-4841 or [sullivanm@gao.gov](mailto:sullivanm@gao.gov)

# INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE

## Preliminary Observations on DOD's Approach to Managing Requirements for New Systems, Existing Assets, and Systems Development

### What GAO Found

DOD's important first steps to formulate a strategy for improving the integration of future ISR requirements include developing an ISR Integration Roadmap and designating ISR as a test case for its joint capability portfolio management concept. DOD developed a statutorily required ISR Roadmap that catalogues current ISR capabilities. GAO's preliminary work, however, has shown that the Roadmap does not (1) identify future requirements, (2) identify funding priorities, or (3) measure progress. Also, the Roadmap does not yet clarify what ISR requirements are already filled or possibly saturated, identify critical gaps for future focus, or define requirements for meeting the goal of global persistent surveillance. DOD's second initiative to improve the integration of the services' ISR programs is assigning management of ISR issues as a test case of its joint capability portfolio management concept. The intent of the test case is to explore whether managing groups of ISR capabilities across DOD will enable interoperability of future capabilities and reduce redundancies and gaps. Although in its early stages, GAO identified challenges, such as the extent to which the services will adopt suggestions from portfolio managers.

DOD's approach to managing its current ISR assets limits its ability to optimize its use of these assets. U. S. Strategic Command is charged with making recommendations to the Secretary of Defense on how best to allocate to combatant commanders theater-level assets used to support operational requirements. While it has visibility into the major ISR programs supporting theater-level requirements, it does not currently have visibility into all ISR assets. Also, the commander responsible for ongoing joint air operations does not currently have visibility over how tactical assets are being tasked. Nor do tactical units have visibility into how theater-level and ISR assets embedded in other units are being tasked. Further, DOD lacks metrics and feedback to evaluate its ISR missions. Without better visibility and performance evaluation, DOD does not have all the information it needs to validate the demand for ISR assets, to optimize the capability offered by these assets, to achieve a joint approach to employing its ISR assets, and to acquire new systems that best support warfighting needs.

Opportunities exist for different services to collaborate on the development of similar weapon systems as a means for creating a more efficient and affordable way of providing new capabilities to the warfighter. We have identified development programs where program managers and services are working together to gain these efficiencies and where less collaborative efforts could lead to more costly stovepiped solutions. Additionally, most of the 13 airborne ISR development programs that we reviewed had either cost growth or schedule delays. These problems resulted from not following a knowledge-based approach to weapon system development as provided for in Defense policy. In some cases, delay in delivering new systems to the warfighter led to unplanned investments to keep legacy systems relevant.

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Mr. Chairman and Members of the Subcommittee:

We appreciate the opportunity to discuss GAO's work for this Subcommittee on the Department of Defense's (DOD) management and acquisition of intelligence, surveillance, and reconnaissance assets, including unmanned aircraft systems. As you know, intelligence, surveillance, and reconnaissance (ISR) activities are central to ongoing military operations. Effective ISR can provide early warning of enemy threats and precision targeting, as well as enable U.S. military forces to increase effectiveness, coordination, and lethality. Battlefield commanders rank the need for ISR systems and the information they produce as high on their priority lists, a fact that is reflected in DOD's planned investment in ISR. The demand for ISR assets at every level of command is growing, and DOD is making investments in a number of ISR systems, including unmanned aircraft systems, manned platforms, and space-borne, maritime, and terrestrial systems. Although the United States has significant ISR capabilities, their effectiveness has been hampered by gaps in capabilities, growing competition for assets, unavailability when needed, and systems that do not fully complement one another. The 2001 and 2006 Quadrennial Defense Reviews emphasized the increasingly important role intelligence capabilities—including manned and unmanned airborne and space capabilities—play in supporting military operations and acknowledged that the ISR community as a whole must move toward a collaborative enterprise to achieve more responsive support for civilian decision makers and commanders engaged in planning and executing operations. The 2006 Quadrennial Defense Review also called for a shift from military service-focused acquisition systems and concepts of operation to a more joint approach to acquiring and employing defense assets. Further, as GAO has emphasized, resources for investments in ISR capabilities are likely to be constrained by the fiscal challenges of the federal budget.

Since we testified before this Subcommittee last year on one component of DOD's ISR enterprise—unmanned aircraft systems—demand for ISR support has continued to grow, and DOD is planning to invest in new systems with expanded and new capabilities. Meanwhile, growing out of the 2006 Quadrennial Defense Review's recommendations, DOD has undertaken a number of studies designed to determine future ISR requirements and established a new organization to help integrate current assets to improve its processes for supporting combat operations. In addition, DOD has updated its ISR Integration Roadmap. Today, you asked us to discuss our preliminary observations on DOD's management of ISR requirements, distribution of current assets, and planned acquisitions based on ongoing work we are conducting for this Subcommittee.

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Specifically, we will highlight (1) the status of DOD initiatives aimed at improving the management and integration of ISR requirements and challenges the department faces in implementing the initiatives, (2) DOD's approach to managing current ISR assets to support military operations, and (3) the status of selected ISR programs in development and the potential for synergies between them. We will be continuing our work on the management of ISR requirements, the support of ISR assets for combat operations, and the acquisition of ISR capabilities, and we plan to issue reports based on this work later this year.

To understand the status of initiatives within DOD to improve the management and integration of ISR requirements, we analyzed DOD's ISR Integration Roadmap and updates. We also reviewed documentation on ISR requirements generation and validation that we obtained from DOD's Joint Capabilities Integration and Development System as well as previous studies related to DOD's management of ISR assets. In addition, we discussed DOD's ISR capabilities management initiatives and challenges with senior officials from the Office of the Under Secretary of Defense for Intelligence; the Joint Staff; the Battlespace Awareness Functional Capabilities Board; the National Security Space Office; the Air Force; the Army; the Navy; the U.S. Strategic Command's Joint Functional Component Command for Intelligence, Surveillance, and Reconnaissance; the U.S. Central Command; the U.S. Special Operations Command; and the Defense Intelligence Agency.

To assess the effectiveness of DOD's approach to managing current ISR assets in support of ongoing combat operations, we interviewed officials and reviewed documentation from the Unmanned Aircraft Systems Planning Task Force within the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics; the Joint Staff; each of the military services; U.S. Central Command and associated Army and Air Force component commands; the Joint Functional Component Command for Intelligence, Surveillance, and Reconnaissance; and other organizations. We also reviewed documentation and interviewed officials at U.S. Central Command, Central Command Air Forces, and the Combined Air Operations Center to better understand how ISR assets are assigned to specific missions. To understand how requests for ISR support are generated and satisfied at the tactical level, we spoke with units who recently returned from, or are currently supporting, ongoing operations in Iraq and Afghanistan as well as units within the services such as the Marine Corps' Tactical Fusion Center that are involved in determining if tactical assets are available to satisfy those requests or if the requests need to be forwarded for theater-level support. To

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understand DOD's ongoing efforts to study its process for tasking ISR assets, we reviewed documentation and interviewed an official from the Battlespace Awareness Functional Capabilities Board.

Additionally, we discussed the use of unmanned aircraft systems in military operations with U.S. Central Command officials and units who recently returned or are currently supporting operations in Iraq and Afghanistan.

To assess the status of selected ISR programs and the potential for synergies between them, we obtained and analyzed programmatic and budget documents for each of the systems we reviewed. We also discussed the status of each program with officials at the program office level and with officials from the Army, Navy, and Air Force. In addition, we discussed the potential for synergies among programs with officials from the Joint Chief of Staff for Intelligence.

We conducted our ongoing work from June 2006 to April 2007 in accordance with generally accepted government auditing standards.

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## Summary

DOD has taken some important first steps to formulate a strategy for improving the integration of future ISR requirements—the development of its ISR Integration Roadmap and the inclusion of ISR systems across DOD in a test case for the joint capability portfolio management concept. In response to a statutory requirement, DOD developed the ISR Integration Roadmap to guide the development and integration of DOD ISR capabilities. Our preliminary work has shown, however, that while DOD's ISR Integration Roadmap sets out some strategic objectives, such as attaining global persistent surveillance, it does not clearly (1) identify future ISR requirements and how DOD plans to achieve them, (2) identify funding priorities, or (3) establish mechanisms to ensure that services' investment plans reflect the overall strategy and to measure DOD's progress toward strategic goals for the ISR enterprise. The ISR Integration Roadmap also does not define requirements for global persistent surveillance, clarify what ISR requirements are already filled, identify critical gaps as areas for future focus, or otherwise represent an enterprise-level architecture of what the ISR enterprise is to be. DOD's second initiative is its application of the joint capability portfolio management concept to ISR systems across DOD as a test of the concept. Through the capability portfolio management concept, DOD seeks to develop and manage ISR capabilities across the entire department — rather than by military service or individual program—and by doing so, enable interoperability of future capabilities and reduce redundancies and gaps. While implementation of the portfolio management concept is in its

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early stages, our preliminary assessment identified challenges. For example, the portfolio managers do not currently have the authority to direct services' investments in ISR capabilities, and DOD leadership is monitoring the portfolio management test cases to determine whether such authority is needed. Therefore, the extent to which the services will change their investment plans to adopt suggestions from portfolio managers to maximize the effectiveness of the overall enterprise is not clear. In addition, DOD has undertaken some data-driven analyses of the capabilities and costs of different systems that could provide portfolio managers with a basis for making trade-offs among competing investment options. We identified some limitations to the analysis that DOD performed. Still, if expanded to be more comprehensive and integrated, this analytical approach could inform portfolio managers and decision makers and enable DOD to develop and field the ISR capabilities that most efficiently and effectively fill gaps and reduce redundancies.

DOD's approach to managing its current ISR assets, including unmanned aircraft systems, limits its ability to optimize the use of these assets. While the Joint Functional Component Command for Intelligence, Surveillance, and Reconnaissance (JFCC-ISR), which is charged with recommending to the Secretary of Defense how theater-level assets should be allocated to support operational requirements of combatant commanders, has visibility into the DOD ISR programs supporting theater-level requirements, it does not currently have visibility into all ISR assets. JFCC-ISR is working to increase its knowledge of these assets so that it can consider all assets in the allocation process. Similarly, during ongoing operations, the commander responsible for planning, coordinating, and monitoring joint air operations does not currently have visibility over how tactical assets are being tasked, which could result in unnecessary duplicative taskings and limit DOD's ability to leverage all available ISR assets. In addition, DOD lacks sufficient metrics and feedback for evaluating the performance of its ISR assets. DOD currently assesses its ISR missions with limited quantitative metrics such as the number of targets planned versus the number collected against. DOD officials acknowledge more needs to be done and there is an ongoing effort within DOD to develop improved metrics and identify qualitative as well as quantitative ISR metrics, but progress has been limited and no milestones have been established. Further, although DOD guidance calls for an evaluation of the effectiveness of ISR support in meeting warfighter requirements, DOD officials acknowledge that this feedback is not consistently occurring, due mainly to the fast pace of operations in theater. Without sufficient visibility over the full range of available ISR assets and feedback and metrics for evaluating ISR missions, DOD may not be in the best position to validate

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the true demand for ISR assets, ensure it is optimizing the use of existing assets, or acquire new systems that best support warfighting needs.

The services are not required to jointly develop new weapon systems but can attain economies and efficiencies when this happens. Short of a joint development program, there are still opportunities for similar weapon systems being developed by different services to gain synergies that can result in providing new capabilities to the warfighter more efficiently and affordably. We have identified development programs where program managers and services are working together to gain these efficiencies and where less collaborative efforts could lead to more costly stovepiped solutions that are redundant. Additionally, of the 13 airborne ISR programs that we reviewed, most have encountered either cost growth or schedule delays. These problems are typically the result of not following a knowledge-based approach to weapon system development as provided for in DOD policy. In some cases, the resultant delay in delivering the new capability to the warfighter has led to unplanned investments to keep legacy systems relevant and operational until the new capability is finally delivered.

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## Background

The term “intelligence, surveillance and reconnaissance,” or “ISR,” encompasses multiple activities related to the planning and operation of sensors and assets that collect, process, and disseminate data in support of current and future military operations. Intelligence data can take many forms, including optical, radar, or infrared images or electronic signals. This data can come from a variety of sources, including surveillance and reconnaissance systems ranging from satellites, to manned aircraft like the U-2, unmanned aircraft systems like the Air Force’s Global Hawk and Predator and the Army’s Hunter, to other ground, air, sea, or space-based equipment, to human intelligence teams. DOD ISR activities support the missions of the Department of Defense and the Director of National Intelligence, as well as the missions of other government agencies. ISR activities directly support current and future operations and military forces rely on the collection, analysis, and dissemination of intelligence in the planning and conduct of their operations and activities.

Many defense organizations play a role in identifying ISR requirements, managing current assets, and developing new capabilities. DOD established the Under Secretary of Defense for Intelligence (USD(I)) to coordinate policy and strategic oversight of defense intelligence, security, and counterintelligence to meet combatant commander requirements. Other defense intelligence agencies, such as the National Security Agency,



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the National Reconnaissance Office, and the National Geospatial-Intelligence Agency have key roles in supporting defense and national security missions.

Combatant commanders may identify their needs for ISR capabilities to support their missions through the Chairman of the Joint Chiefs of Staff. For example, the U.S. Central Command is charged with identifying the ISR capabilities required to support his theater of operations. Generally, the individual military services or other DOD agencies are responsible for managing the acquisition of new DOD ISR systems.

In 2003, DOD altered its unified command plan to give the U.S. Strategic Command (USSTRATCOM) responsibility for planning, integrating, and coordinating ISR in support of strategic and global operations. To execute this responsibility, USSTRATCOM established the Joint Functional Component Command-ISR in March 2005 and designated the Director of the Defense Intelligence Agency as the commander. The Joint Functional Component Command-ISR is charged with developing strategies for distributing, or allocating, existing ISR assets among combatant commanders and ensuring the integration and synchronization of DOD, national, and allied ISR capabilities and collection efforts. In the case of ongoing operations, the Joint Force Air Component Commander generally tasks theater-level ISR assets made available for support of the Joint Force Commander's operational objectives.

Implemented in 2003, the Joint Capabilities Integration and Development System (JCIDS) is DOD's principal process for identifying, assessing, and prioritizing proposals to improve existing capabilities and develop new capabilities. The JCIDS process is designed to facilitate coordination among DOD components in assessing proposals for new capabilities to ensure that they enable joint forces to meet the full range of military operations and challenges. Under the JCIDS collaborative review process, proposals for new intelligence capabilities that support DOD or national intelligence requirements must be reviewed by the Joint Requirements Oversight Council, which consists of the Vice Chairman of the Joint Chiefs of Staff and a four-star officer designated by each of the military services. Eight Functional Capabilities Boards assist the Joint Requirements Oversight Council in evaluating proposals and making recommendations on approval.<sup>1</sup> The Battlespace Awareness Functional Capabilities Board

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<sup>1</sup>The other Functional Capabilities Boards are Command and Control, Focused Logistics, Force Management, Force Protection, Force Application, Net-Centric, and Joint Training.

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(BA/FCB) is responsible for reviewing proposals to develop and acquire new ISR capabilities.

Under section 426 of title 10 of the U.S. Code, DOD is required to establish an ISR Integration Council to serve as a forum for the services and the defense intelligence agencies to discuss their ISR integration efforts in order to ensure unity of effort and preclude unnecessary duplication of effort. Led by the Undersecretary of Defense for Intelligence, the council is statutorily made up of senior intelligence officers from each of the armed services and U.S. Special Operations Command, the directors of the defense intelligence agencies, and the Joint Staff Director for Operations.<sup>2</sup> DOD is also required under section 426 to develop a comprehensive plan—known as the ISR Integration Roadmap—to guide the development and integration of DOD ISR capabilities from 2004 through 2018. DOD published the first iteration of the ISR Integration Roadmap in May 2005 and updated the Roadmap in January 2007. The details of the ISR Integration Roadmap are classified, but the management issues and initiatives it contains are not classified.

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## DOD Is Undertaking Important Initiatives, But the Extent to Which These Will Guide Future Investments to Achieve Better Integration of ISR Assets Is Not Clear

Over the past few years, DOD has taken some important steps to enable it to take a department-wide view of ISR capabilities. These steps are important in DOD's efforts to formulate a strategy for meeting future ISR requirements in a more integrated manner by considering how existing and future assets will fit together to provide needed information to support combatant commanders and national decision makers. Specifically, DOD has developed and is updating a statutorily required ISR Integration Roadmap that charts current programs and has begun testing portfolio management principles to manage the requirements for future ISR capabilities. However, these two initiatives are in the early stages of implementation and have some limitations, and it is unclear whether these initiatives will be enough to improve integration of DOD ISR assets and guide DOD ISR investment decisions.

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### ISR Integration Roadmap

DOD's ISR Integration Roadmap is a noteworthy step for DOD in examining the ISR capabilities that DOD currently has available and in

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<sup>2</sup> The Under Secretary of Defense for Intelligence has voluntarily expanded membership of the council to include representatives of several additional Joint Staff and Office of the Secretary of Defense offices, a representative of U.S. Joint Forces Command, and the Commander of U.S. Strategic Command.

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development, although the Roadmap does not represent a comprehensive vision for the ISR enterprise or define strategy to guide future investments. First published in May 2005 in response to a statutory requirement and updated in January 2007, DOD's ISR Integration Roadmap comprises a catalogue of detailed information on all the ISR assets being used and developed across DOD, including ISR capabilities related to collection, communication, exploitation, and analysis. DOD's recent update took the ISR Integration Roadmap a step farther than its 2005 version because it incorporated information from the QDR and the National Intelligence Strategy. For example, the updated version includes a list of the ISR-related QDR decisions aimed at achieving future joint force characteristics and building on progress to date, such as increasing investment in unmanned aircraft systems and balancing air- and space-borne ISR capabilities. In addition, the recent ISR Integration Roadmap included changes in funding and ISR program information driven by the fiscal year 2007 President's Budget.

We believe that, given the vast scope of ISR capabilities, which operate in a variety of mediums and encompass a range of intelligence disciplines, the ISR Integration Roadmap represents a significant step toward providing DOD leadership and the Congress with the information needed to assess the strengths and weaknesses of current ISR capabilities. However, while the Roadmap sets out some strategic goals objectives for the defense ISR enterprise,<sup>3</sup> such as recapitalizing ISR capabilities, it does not yet constitute an enterprise-level architecture or represent an investment strategy. The Roadmap does not clearly show how the ISR systems—existing and future—will fit together in a vision for common architecture to most efficiently meet priority ISR requirements or provide a basis for making trade-offs among competing programs. Specifically, the Roadmap does not (1) identify overall ISR requirements and how DOD plans to achieve them, (2) identify funding priorities, and (3) establish mechanisms to enforce an investment strategy or measure progress. Moreover, the Roadmap does not clarify what requirements for future ISR systems are already filled, or possibly saturated, identify the critical capability gaps that need to be filled by future systems, or identify focus areas for future requirements. For example, although the Roadmap sets

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<sup>3</sup> The Defense ISR Enterprise consists of the intelligence components of DOD operating cohesively to fulfill the Secretary of Defense's obligation to meet DOD's intelligence needs and a significant set of government-wide intelligence needs (as tasked by the Director of National Intelligence.)

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the objective of attaining global persistent surveillance,<sup>4</sup> it has not yet defined the requirements for persistent surveillance or how to use current assets to attain it. We have previously testified on the need for better planning for other ISR-related development programs. For example, DOD has continued to request funding to support the services' plans to develop new unmanned aircraft system capabilities in the absence of overall plans to guide development and investment decisions. DOD officials acknowledged that the ISR Integration Roadmap has limitations and said that these limitations will be addressed in future revisions. As the department moves forward with its ISR Integration Roadmap, we believe it could provide a basis for DOD to determine the mix of future capabilities that provides the best value with regard to their place in an overarching ISR architecture.

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## Battlespace Awareness Capability Portfolio Management

DOD is attempting to better manage the requirements for future ISR capabilities across DOD by applying a joint capability portfolio management concept to ISR assets. In September 2006, the Deputy Secretary of Defense decided to bring ISR systems across DOD together into a capability portfolio as part of a test case for the joint capability portfolio management concept. The capability portfolio containing these ISR systems is known as the battlespace awareness capability portfolio, and it is one of the four test cases for exploring this management concept.<sup>5</sup> The intent of the ISR portfolio management test case is to enable DOD to develop and manage ISR capabilities across the entire department—rather than by military service or individual program—and by doing so, to improve the interoperability of future capabilities, minimize capability redundancies and gaps, and maximize capability effectiveness. The Under Secretary of Defense for Intelligence is the lead office for battlespace awareness capability portfolio management. The ISR Integration Council acts as the governance body for the ISR portfolio management effort. In addition, the Under Secretary of Defense for Intelligence works closely

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<sup>4</sup> DOD defines persistent surveillance as the integrated management of a diverse set of collection and processing capabilities, operated to detect and understand the activity of interest with sufficient sensor dwell, revisit rate, and required quality to expeditiously assess adversary actions, predict adversary plans, deny sanctuary to an adversary, and assess results of U.S./coalition actions.

<sup>5</sup> Under this concept, a group of military capabilities, such as ISR capabilities, is managed as a joint portfolio rather than separately by each service. The other test cases are Joint Command and Control, Joint Net-Centric Operations, and Joint Logistics.

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with the Battlespace Awareness Functional Capabilities Board,<sup>6</sup> which is a Joint Staff organization that provides analytic support for the Joint Requirements Oversight Council's discussions and decisions on ISR capability needs, joint concepts, and programmatic issues.

Battlespace awareness capability managers reviewed and prioritized ISR assets to inform budget development for the first time with the fiscal year 2008 budget, and the portfolio management concept is still being tested. Therefore, it is too early to assess its effectiveness in integrating ISR programs to meet future requirements. However, our preliminary work has shown that the concept faces implementation challenges, among them clarifying the responsibilities and authorities of the capability portfolio managers in relation to the services in order to make trade-offs among competing service priorities. For example, the ISR Integration Council held discussions on service resource allocation decisions in an effort to achieve consensus among the services, combatant commanders, and other stakeholders. The Council proposed recommendations for rebalancing the services' investments in their respective ISR portfolios during the fiscal year 2008 budget. However, the ISR Integration Council did not have the authority to compel services to change their budget plans. According to defense officials, there were some disagreements between the ISR Integration Council's recommendations and the services on funding levels for ISR systems. These issues were elevated to the Deputy Secretary of Defense for final decision. DOD leaders are monitoring the implementation of the capability portfolio test cases to determine whether portfolio managers should have the authority to direct changes to service plans. However, without authority to direct the military services to adopt any of its suggestions, it is unclear the extent to which the ISR Integration Council can influence service plans.

The Battlespace Awareness Functional Capabilities Board is charged with reviewing service proposals for new ISR capabilities and the Under Secretary of Defense for Intelligence assists in this effort. The documentation that the board reviews provides analysis of the capability required and includes cost information related to the proposed approach for generating the capability. However, it is not clear to what extent these proposals are based on a comprehensive analysis that includes data on

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<sup>6</sup> The principal members of the Battlespace Awareness Functional Capabilities Board are representatives from the services, the combatant commands, the Joint Staff, OUSD(AT&L), the Director, PA&E, and OASD(NII)/DOD Chief Information Officer.

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cost/performance evaluations and consideration of national-level capabilities.

Our preliminary work identified an example of the kind of data-driven analysis of alternative investment strategies that we believe could be useful to battlespace awareness capability portfolio managers for analyzing competing ISR programs and developing an investment strategy for the future. In 2004, the National Security Space Office<sup>7</sup> completed a limited architecture analysis of ISR assets using cost and performance data. Specifically, the National Security Space Office analyzed how much additional ISR capability would be provided by various ISR system mixes for given levels of additional investment. The intent of the study was to provide insight into the most efficient mix of current and planned ISR systems. While the analysis was a useful demonstration of an approach to inform decision makers, it had several limitations. For example, the analysis did not include all national and tactical ISR systems, mainly focusing on space and air. The analysis also assumed that the additional infrastructure needed to support integration of information from additional ISR systems would be available, while the costs associated with such additional infrastructure, which are difficult to estimate, were not included in the analysis. Further, the analysis was limited in that it only considered ISR capabilities for levels of increased investment, not for levels of decreased investment; thus, it did not consider what the most efficient mix of ISR systems would be if limited resources forced decision makers to decrease funding for ISR programs. Moreover, the analysis represented a one-time effort and has not been repeated. Still, we believe that, if expanded to be more comprehensive and integrated, this type of data-driven analytical approach could inform decision makers on the implications of various options for providing the most effective mix of ISR capabilities that DOD can afford. Without an enterprise-level architecture and an ongoing and comprehensive data-driven analysis of the most efficient solutions, it is not clear to us how DOD can be assured that it is developing and fielding the ISR capabilities that most efficiently and effectively fill gaps and reduce redundancies.

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<sup>7</sup> The National Security Space Office (NSSO) falls under the office of DOD's Executive Agent for Space—the Under Secretary of the Air Force. Its mission is to provide unity of effort and strategic focus to national security space issues. The mission of the NSSO's ISR Functional Integration Office, which conducted this analysis, is to create and sustain the nation's integrated ISR architecture to provide a basis for informed decision making across the national security enterprise.

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## Future GAO Work Will Continue to Focus on DOD's Approach for Developing ISR Capabilities

While our preliminary work has focused on the new processes that DOD has established to address what it has acknowledged are weaknesses in its planning for integrated future capabilities, our future work will investigate DOD's processes for integrating requirements and developing an investment strategy. Among the issues that we plan to address are the extent to which:

- DOD's ISR Integration Roadmap, or other DOD initiatives, establish a framework for developing an overarching joint ISR architecture and an investment strategy;
- DOD's review processes enable it to identify gaps and redundancies in ISR requirements; and
- DOD has considered comprehensive analyses of new ISR capabilities, to include consideration of all available ISR assets and cost/performance evaluations.

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## DOD Lacks Adequate Visibility and Metrics to Optimize ISR Assets

Given the substantial investment DOD is making in ISR assets and the increasing demand for them, effective management of these assets has become critical. Currently, DOD's approach to allocation and tasking do not provide full visibility for managing its current ISR assets. Although DOD has established a process for allocating available ISR assets to the combatant commanders to meet theater needs, including unmanned aircraft systems, it does not have visibility over all ISR assets, which would improve its ability to allocate assets. Additionally, DOD's process for tasking ISR assets does not currently allow for visibility at all levels into how ISR assets are being used on a daily basis. Furthermore, DOD does not have metrics and feedback for systematically measuring the effectiveness of ISR missions. Without better visibility and performance evaluation, DOD does not have all the information it needs to validate the demand for ISR assets, to ensure it is optimizing the use of existing assets, and to acquire new systems that best support warfighting needs.

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## DOD's Approach to Allocating and Tasking ISR Does Not Consider All ISR Assets

DOD uses an annual process for allocating or distributing available ISR assets to the combatant commanders to meet theater-level needs, including unmanned aircraft systems. That process is managed by USSTRATCOM's Joint Functional Component Command-ISR (JFCC-ISR), which is tasked with making recommendations to the Secretary of Defense on how best to allocate ISR resources for theater use across the combatant commands. Once ISR assets have been allocated, those assets

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are available to the theater commanders to be assigned, or tasked, against specific requests for ISR support, in support of ongoing operations.

JFCC-ISR's ability to fulfill its mission of integrating DOD, national and allied partner ISR capabilities to support the warfighter depends on the extent to which it has awareness and visibility over all ISR assets including DOD, national and allied. However, although the JFCC-ISR has been assigned the mission of integrating national and DOD ISR capabilities, it does not currently have visibility into all assets that could be brought to bear to support combatant commanders' needs. Currently, JFCC-ISR has visibility into DOD ISR assets available to support theater-level requirements, but does not have the same level of visibility into other ISR assets such as national and allied. According to JFCC-ISR officials, although they are working to develop better visibility over all ISR assets by working with other defense and national intelligence agencies, they lack full visibility into these ISR assets. JFCC-ISR officials estimate it has 80-90 percent visibility into DOD ISR assets but does not have the same level of visibility into other ISR assets available to support theater-level requirements. Without an approach to its allocation process that allows visibility over all ISR capabilities and access to all relevant information, it is not clear to us that the JFCC-ISR has the tools it needs in order to fulfill its mission, in particular to leverage all available ISR assets and to optimize the effectiveness of those assets.

Greater visibility of assets is also needed during ongoing operations to improve DOD's process for tasking, or assigning ISR assets to specific missions. Specifically, greater visibility of assets is needed at the theater level. The theater combatant commander's Joint Force Air Component Commander is responsible for planning, coordinating, and monitoring joint air operations to focus the impact of air capabilities and for assuring their effective and efficient use in achieving the combatant commander's objectives. However, while the Air Component Commander has visibility into how all theater-level ISR assets, like the Air Force's Predator, are being used, it does not currently have visibility into how ISR assets, embedded in and controlled by tactical units, such as the Army's Hunter, are being used on a daily basis. Greater visibility is also needed at the tactical level to allow units a greater awareness of where other ISR assets, including both theater-level and those assets embedded in other units, are operating and what they are being used to do. Our preliminary work shows that as a result of this lack of visibility, the potential exists for unnecessary duplication, or multiple ISR aircraft to be tasked to operate in the same area and against the same requirement. However, some level of duplication may be necessary when driven by system capabilities and



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mission requirements. Our work has also shown that by leveraging the capabilities of different ISR assets using techniques such as cross-cueing,<sup>8</sup> the Air Component Commander has been able to use the different types of capabilities brought by different theater-level manned and unmanned assets to maximize the intelligence collected. For example, a manned Joint Surveillance, Target Acquisition, and Reconnaissance system could be used to sense movement in an area and then an unmanned system such as a Predator could be called in to collect imagery to confirm suspected activity. With greater visibility at all levels into the tasking of all ISR assets, including those tactical assets controlled by the military services, there is an opportunity for DOD to gain greater synergies and optimize the use of its ISR assets, reduce the potential for unnecessary duplicative taskings, and determine whether additional perceived demand for these assets is well-founded. This visibility would also allow tactical units, when appropriate,<sup>9</sup> to leverage other assets operating in their area to maximize the information captured and avoid unnecessary duplicative taskings. Without this visibility, DOD is not likely to optimize the capability offered by these assets or achieve the joint approach to employing its ISR assets called for in the Quadrennial Defense Review.

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## DOD Lacks Metrics and Feedback for Systematically Tracking the Effectiveness of Its ISR Missions

The growing demand for ISR assets is an indication of their value in supporting combat forces, but DOD does not have sufficient metrics for evaluating the effectiveness of ISR missions and is not getting consistent feedback on whether the warfighters' needs were met. For example, DOD currently assesses its ISR missions with limited quantitative metrics such as the number of targets planned versus the number collected against. We recommended in a December 2005 report that DOD ensure its performance measurement system measures how effectively unmanned aircraft systems perform their missions, identify performance indicator information that needs to be collected, and systematically collect identified performance information.<sup>10</sup> DOD officials acknowledged shortcomings of its metrics, and DOD is developing qualitative as well as

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<sup>8</sup> Cross-cueing is the collaborative effort of utilizing capabilities offered by multiple ISR platforms to fulfill a mission.

<sup>9</sup> Some missions, such as special operations, are classified and it is not always appropriate to share specifics of the missions.

<sup>10</sup> GAO, *Unmanned Aircraft Systems: DOD Needs to More Effectively Promote Interoperability and Improve Performance Assessments*, [GAO-06-49](#) (Washington, D.C.: Dec. 13, 2005).

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quantitative ISR metrics, but progress has been limited and no milestones have been established. Additionally, although DOD guidance calls for an evaluation of how effective ISR support is in meeting the warfighters' requirements, DOD officials acknowledge that this feedback is not consistently occurring mainly because of the fast pace of operations in theater. For example, while there is real-time communication among unmanned aircraft system operators, requesters, and intelligence personnel during an operation to ensure that the needed information is captured, and agency officials indicate this communication is beneficial to providing real-time feedback, there is little to no feedback after the operation to determine whether the warfighters' needs were met by the ISR mission. Without developing metrics and systematically gathering feedback that enables it to assess the extent to which ISR missions are successful in supporting warfighter needs, DOD is not in a position to validate the true demand for ISR assets, determine whether it is allocating and tasking its ISR assets in the most effective manner, or acquire new systems that best support warfighting needs.

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## ISR Development Programs Have Opportunities for Greater Synergies and Have Experienced Some Cost and Schedule Growth That Impact Legacy Systems

Without a comprehensive and integrated approach to managing current ISR assets and balancing demands for the ISR capabilities required for the future, some of DOD's current ISR acquisitions are not benefiting from collaboration among the services that could save time and money. Among the ISR acquisition programs we reviewed, we found specific cases where the military services' successful collaboration resulted in savings of time and resources. We also found cases where more collaboration is needed to provide greater efficiencies in developing more affordable new systems to close gaps in capabilities. Most of the 13 airborne ISR programs that we reviewed have experienced some cost and/or schedule growth. One program experienced significant cost growth and 9 programs have experienced schedule delays that range from 2 months to 60 months. These problems were caused largely by acquisition strategies that failed to capture sufficient knowledge about the product technologies and design before committing to the development or demonstration of a new system. Resultant delays in the delivery of some new systems have required DOD to make investments in legacy systems in order to keep them relevant and operational until they can be replaced by new systems.

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## Opportunities Exist for Greater Collaboration across the Services' ISR Programs

While the Office of Secretary of Defense has historically endorsed the concept of joint acquisitions because of the potential synergies and resultant benefits, the military services have not always embraced joint acquisitions and often prefer separately managed programs to satisfy their individual needs. As a result, opportunities to gain efficiencies through common engineering, design, and manufacturing efforts are not presented when a new acquisition program begins. However, we found the military services sometimes initiate collaborative approaches on their own to achieve some of the economies and efficiencies of a joint program. In one case, we also found the services resisted seeking synergies that could benefit both programs and lead to potential savings in development and procurement costs. The following three examples illustrate programs that are collaborating, have taken initial steps to begin collaborating, and have resisted collaborating. The ultimate extent of collaboration as well as outcomes of these programs still remains to be seen.

### Successful Collaboration on Fire Scout

The Army began developing its Future Combat Systems—a family of systems that included a vertical takeoff and landing unmanned aircraft system called Fire Scout—in 2000. Program managers from the Army Fire Scout contacted their counterparts in the Navy Fire Scout program to share information and see if there could be any synergies between the two programs. This was done on their own initiative as acquisition policy does not require joint or collaborative programs. Army and Navy officials met several times to discuss configuration, performance requirements, testing, support, and other issues. Initially the requirements for the two systems were quite different. The Army's unmanned aircraft system had four blades and a larger engine, while Navy's system had three rotor blades and a smaller engine. After discussions, the Navy decided to switch to the Army's configuration. The Army is buying common components, such as the air vehicle and flight components, under the Navy contract.

An Army program management official estimated that the savings to the Army in research and development alone would be about \$200 million. As both programs mature, the official believes additional synergies and savings could be realized through contract price breaks on quantities and shared test assets, such as air vehicles, support equipment, and test components. Jointly acquiring common hardware under one contract will also reduce procurement administrative lead time and permit common design, tooling, and testing. Finally, future payload development such as communications, sensors, and data links could be procured jointly.

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Opportunity to Collaborate on Broad Area Maritime Surveillance (BAMS)

The Navy identified a mission need for a broad area maritime and littoral ISR capability in 2000. Based on a 2002 analysis of alternatives, the Navy decided to pursue a manned platform Multi-mission Maritime Aircraft (MMA) with an unmanned adjunct, the BAMS. The Navy subsequently performed an analysis of alternatives for the BAMS program, which identified several potential alternatives; foremost among them was the Global Hawk system. As a risk reduction effort, the Navy funded the Global Hawk Maritime Demonstration program in 2003. Working through the existing Air Force contract, the Navy procured two Global Hawk unmanned aircraft and associated ground controls and equipment. The demonstration program was expected to leverage the existing Global Hawk system to develop tactics, training, and techniques for maritime mission applications.

The BAMS program is at a critical juncture. It released a request for proposals in February 2007 and plans to proceed with system development and demonstration in October 2007. If the Global Hawk (or another existing system like the Air Force Reaper) is selected, there are opportunities for the Navy to work with the Air Force and take advantage of its knowledge on the existing platform. By adopting the collaborative techniques used by the Fire Scout officials, the Navy could leverage knowledge early in the acquisition process and avoid or reduce costs for design, new tooling, and manufacturing, and streamline contracting and acquisition processes.

Collaboration Slow to Happen on Warrior and Predator

In contrast to the Fire Scout experience, the Air Force and Army repeatedly resisted collaborating on their Predator and Warrior unmanned aircraft programs. The Air Force's Predator is a legacy program that has been operational since 1995. Its persistent surveillance/full motion video capability continues to be a valued asset to the warfighter. When the Army began in 2001 to define requirements for the Warrior, a system similar to the Predator, it did not explore potential synergies and efficiencies with the Air Force program. Both the Air Force and the Joint Staff responsible for reviewing Warrior's requirements and acquisition documentation raised concerns about duplication of an existing capability. Despite these concerns, the Army did not perform an analysis of alternatives, citing the urgent need of battlefield commanders for this capability.<sup>11</sup> The Army

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<sup>11</sup> The Army asserted that its need was urgent and it could not get sufficient support from Predator because of the system's limited assets.

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awarded a separate development contract to the same contractor producing the Predator.

Responding to direction from the Quadrennial Defense Review and the Secretary of Defense, the Army and Air Force agreed to consider cooperating on the acquisition of the two systems in January 2006. However, the effort has stalled because the services have different concepts of operation and requirements. For example, the Army does not agree with the Air Force's requirement for rated pilots. The Air Force and the Army are currently working to identify program synergies in a phased approach. Initially, the Air Force will acquire two of the more modern Warrior airframes and test them. Later, the services will compare their requirements for ground control stations and automated takeoff and landing. Finally, the Army and Air Force plan to compare concepts of operation and training requirements for additional synergies. However, so far the Army has coordinated the proposed approach through the Vice Chief of Staff level, but the agreement has not yet been approved by the Department of Army. The Air Force is still working to resolve comments and concerns at lower organizational levels. If this stalls, these programs could be more costly and redundant.

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**Some ISR Development Programs Have Experienced Problems That Have Led to Cost Growth, Delays, and Additional Investments in Legacy Systems**

Nearly all of the 13 airborne ISR programs<sup>12</sup> we reviewed have experienced changes in cost or schedule. This can be attributed to a variety of causes. Many programs began development without a solid business case or a realistic acquisition strategy. As a result of the schedule delays in some programs, the services will have to make investments in legacy systems to keep them in the inventory longer than planned. These investments represent opportunity costs that could have been used for other needs within DOD.

**Cost, Schedule, and Performance Status of Airborne ISR Programs**

Programs must build a business case that provides demonstrated evidence that (1) the warfighter need exists and that it can best be met with the chosen concept, and (2) the concept can be developed and produced

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<sup>12</sup> These 13 programs are post Milestone A and are in technology development or systems development and demonstration. A project enters technology development at Milestone A, when the decision maker has approved the technology development strategy. The purpose of this phase of development is to reduce technology risk and to determine the appropriate set of technologies to be integrated into a full system.

within existing resources—technologies, design, funding, and time. Establishing a business case calls for a realistic assessment of risks and costs; doing otherwise undermines the intent of the business case and invites failure. Once the business case is done, programs must develop a realistic acquisition strategy, which requires having critical program knowledge at key points in the acquisition. This includes knowledge about technology maturity, system design, and manufacturing and production processes. DOD’s acquisition policy endorses this knowledge-based approach to acquisition. This policy includes strategies to reduce technology, integration, design, manufacturing, and production risks.

Table 1 summarizes ISR programs that have encountered problems either in development or as they prepared to begin the system development and demonstration phase of an acquisition program.<sup>13</sup> Results of these problems included cost and schedule growth, program restructuring, cancellation, and unplanned investments in the legacy systems that were being replaced.

**Table 1: Causes and Impacts of Cost and Schedule Growth**

System	Problem encountered	Impact
E-10A	Uncertain need and immature technology	Program cancelled.
Aerial Common Sensor	Requirements and design changes	Development stopped; program being restructured; schedule delayed 60 months; and increased investments in legacy systems.
Global Hawk	Concurrent acquisition; immature technology; and requirements and design changes	Cost growth (261 percent in development); schedule delayed 36 months; program restructured; potential increased investments in legacy system.
Reaper	Concurrent acquisition and immature technology	Cost growth (13 percent in development) and schedule delayed 7 months.
BAMS	Immature technology	Schedule delayed 39 months.
MMA	Immature technology	None to date.
Army Fire Scout	Acquisition dependent on another major acquisition program (Future Combat Systems)	Schedule delayed 22 months.
Navy Fire Scout	Acquisition dependent on another major acquisition program (Littoral Combat Ship)	Schedule delayed 3 months.

<sup>13</sup> The EPX, the Navy’s replacement for its EP-3, is not included in the table because it is a new program as of February 2007 and has not had a cost increase or schedule delay.

System	Problem encountered	Impact
Space Radar	Immature technology and requirements change	Cost growth (18 percent in development); schedule delayed 8 months; and program restructured.
Multi-Platform Radar Technology Insertion Program	Acquisition strategy and funding dependent on other major acquisition programs (E-10A cancelled and Global Hawk continues)	Requirements changed and program restructured.
Warrior	Concurrent acquisition strategy and immature technology	Cost growth (21 percent in development); schedule delayed 9 months.
Airborne Signals Intelligence Payload (sensor)	Immature technology and design	Schedule delayed 2 months.

Source: GAO analysis of DOD data.

## Impact of Delays on Legacy Systems

Following are detailed examples of programs that failed to either develop a good business case or an executable acquisition strategy and that had problems. The outcome was that the services either had to or may have to make additional investments in the legacy systems to keep them relevant and in the operational inventory until the new system has completed development and is fielded.

### Aerial Common Sensor (ACS)

The Army's termination of the ACS system development and demonstration contract could have significant schedule, cost, and performance impacts on three legacy systems in the ISR portfolio—the Army's Guardrail Common Sensor (GRCS) and Airborne Reconnaissance Low (ARL), and the Navy's EP-3. The Army and the Navy had planned a phased approach to field the ACS and retire the legacy systems from the inventory with a minimal investment in maintaining legacy systems. Delays in ACS development will now require the Army and Navy to make investments in the legacy systems at the same time that they develop new replacement systems. In addition, any delay in either the development of new systems or modification of legacy systems could result in an ISR capability gap on the battlefield.

- The GRCS and ARL were to be replaced by ACS beginning in fiscal year 2009. Since the termination of the ACS development contract, the ACS program has reverted to a predevelopment stage as the Army restructures the program. ACS is scheduled to restart system development and demonstration in 2009, 5 years later than the initial development decision. Although the Army has not established a new date for initial operating capacity, that date is also likely to slip by 5 years to fiscal year 2014. The cost to keep GRCS and ARL mission equipment viable and the platforms airworthy is estimated to be \$562

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million between fiscal years 2008 and 2013. Without these improvements, the systems will not remain capable against modern threats which could result in a gap in ISR capabilities on the battlefield. In addition, the airframes could not continue to fly during this time frame without some structural modifications.

- The Navy had planned to replace its EP-3 with ACS and begin fielding the new system in fiscal year 2012. After the Army terminated the ACS development contract, the Navy considered staying with the Army in its development effort. However, according to Navy officials, the Chief of Naval Operations directed the Navy to proceed with a separate development effort, designated the EPX. The Navy now plans to proceed with system development and demonstration in the fourth quarter of fiscal year 2010. The Navy has not established a date to begin fielding the new system, but that is not likely to take place before 2017. This translates into a 5-year slip in retiring the oldest EP-3 systems and will make modifications to those systems necessary so that they can remain in the field until the Navy achieves full operating capacity for its EPX. The Navy plans to invest \$823 million between fiscal years 2008 and 2013 to modify the EP-3.

### **Global Hawk**

The Air Force plans to replace the U-2 with the Global Hawk but delays in the Global Hawk program have contributed to the need to keep the U-2 in the inventory longer than anticipated. In December 2005, the Air Force had planned to begin retiring the U-2 in fiscal year 2007 and complete the retirement by fiscal year 2012. Although the next configuration of the Global Hawk (with limited signals intelligence capability) is scheduled for delivery in fiscal year 2009, it will not have the same capability as the U-2. The version of the Global Hawk that is planned to include a more robust signals intelligence capability is scheduled to begin deliveries in 2012. The Air Force is now developing a plan to fully retire the U-2s a year later in 2013 and at a slower rate than the 2005 plan. There are no funds in the budget beyond fiscal year 2006 but the Air Force intends to fund projects necessary to keep the U-2 capable.

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Mr. Chairman, this concludes our prepared statement. We would be happy to answer any questions that you or members of the Subcommittee may have.



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## Contacts and Staff Acknowledgments

For future questions about this statement, please contact Davi D'Agostino at (202) 512-5431, Sharon Pickup at (202) 512-9619, or Michael Sullivan at (202) 512-4841. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Other individuals making key contributions to this statement include Margaret Morgan, Patricia Lentini, Michael Hazard, Assistant Directors; Gabrielle A. Carrington, Susan Tindall, Dayna Foster, Catherine H. Brown, Frank Cristinzio, LaShawnda Lindsey, Elisha Matvay, Rae Ann Sapp, Michael Aiken, and Grace Coleman.

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## Related GAO Products

*Unmanned Aircraft Systems: Improved Planning and Acquisition Strategies Can Help Address Operational Challenges.* GAO-06-610T. Washington, D.C.: April 6, 2006.

*Unmanned Aerial Vehicles: Improved Strategic and Acquisition Planning Can Help Address Emerging Challenges.* GAO-05-0395T. Washington, D.C.: March 9, 2005.

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