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

May 2007

DEFENSE ACQUISITIONS

Greater Synergies Possible for DOD's Intelligence, Surveillance, and Reconnaissance Systems

GAO-07-578

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Highlights

Highlights of GAO-07-578, a report to the Subcommittee on Air and Land Forces, Committee on Armed Services, House of Representatives

Why GAO Did This Study

The Department of Defense (DOD) is experiencing a growing demand for intelligence, surveillance, and reconnaissance (ISR) assets to provide vital information in support of military operations. Over the next 7 years, DOD plans to invest over $28 billion in existing and new airborne ISR acquisition systems. This represents a marked increase over prior ISR investments.

Given the significant investments, GAO was asked to (1) evaluate various ISR platforms for potential synergies and assess their cost and schedule status and the impact of any increases or delays on legacy systems and (2) assess the effectiveness of ISR investment decisions. To assess cost and schedule status, we reviewed programmatic and budget documentation. To evaluate investment decisions, we collected data on system capability, mission, and concept of operation and analyzed them for similarities.

What GAO Recommends

GAO is recommending that DOD (1) develop and implement an integrated enterprise-level investment strategy approach that draws on the results of ongoing studies and (2) report to the defense committees by August 1, 2007, the results of the ISR studies and identify specific plans and actions it intends to get greater jointness in ISR programs. DOD generally believes current initiatives will address our recommendations.

www.gao.gov/cgi-bin/getrpt?GAO-07-578.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Michael Sullivan, sullivanm@gao.gov, at (202) 512-4841.

What GAO Found

DOD plans to invest over $28 billion over the next 7 years to develop, procure, and modernize 20 major airborne intelligence, surveillance and reconnaissance systems. Nearly all of the systems in development have experienced cost growth or schedule delays. These problems have delayed the fielding of a warfighting capability and have resulted in program restructuring, cancellation, or unplanned investments in older legacy ISR systems. For example, problems in developing the Aerial Common Sensor affected three legacy programs, increasing their collective budgets by 185 percent, or nearly $900 million. In many cases, GAO found that the newer ISR programs lacked a solid business case or a knowledge-based acquisition strategy before entering the development process. A good business case requires the manager to match the system requirements with mature technologies and a system design that can be built. This requires sufficient knowledge about the system gained through basic system engineering concepts and practices.

Although it fights jointly, DOD does not always procure new systems jointly. Instead, each service typically develops and procures systems independently. 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. GAO identified development programs where program managers and services are working together to gain these efficiencies and other programs that have less collaborative efforts and could lead to more costly stovepiped solutions. For example, the Navy and Army have collaborated successfully on the Fire Scout, but in contrast, the Air Force and Army have not been as collaborative on the Predator and Warrior systems, as they each currently plan unique solutions to their similar needs.

Developmental ISR Systems and Capabilities Planned

Platforms	Electro-optical/ Infrared Imagery	Radar imagery	Video	Commu-nications signals	Elec-tronic signals	Unmanned (○); piloted, onboard operator (●)
Aerial Common Sensor (ACS)	✓	✓		✓	✓	●
Fire Scout (Army)	✓	✓		✓	✓	○
Warrior	✓	✓	✓	✓		○
E-10A		✓				●
Global Hawk	✓	✓		✓	✓	○
Reaper	✓	✓	✓			○
Space Radar		✓				○
Broad Area Maritime Surveillance	✓	✓		✓	✓	○
Fire Scout (Navy)	✓					○
Multi-mission Maritime Aircraft		✓				●
EPX (formerly Navy ACS)	✓	✓		✓	✓	●

Source: GAO analysis of DOD data.

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Abbreviations

ACS	Aerial Common Sensor
ARIES	Airborne Reconnaissance Integrated Electronics System
ARL	Airborne Reconnaissance Low
ASIP	Airborne Signals Intelligence Payload
BAMS	Broad Area Maritime Surveillance
COMINT	communication intelligence
DOD	Department of Defense
ELINT	electronic intelligence
EO	electro-optical
FMV	full-motion video
GRCS	Guardrail Common Sensor
IR	infrared
ISR	intelligence, surveillance, and reconnaissance
JCIDS	Joint Capabilities Integration and Development System
MASINT	measurement and signature intelligence
MMA	Multi-mission Maritime Aircraft
MP-RTIP	Multi-Platform Radar Technology Insertion Program
OSD	Office of the Secretary of Defense
PA&E	Program Analysis and Evaluation
RJ	Rivet Joint
SAR	synthetic aperture radar
SIGINT	signals intelligence
SR	Space Radar
STARS	Surveillance, Target, Attack, Radar System
UAS	unmanned aerial system
USAF	U. S. Air Force
USD(AT&L)	Under Secretary of Defense for Acquisition, Technology and Logistics
USD(I)	Under Secretary of Defense for Intelligence
VTUAV	Vertical Takeoff and Landing Unmanned Aerial Vehicle

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United States Government Accountability Office
Washington, DC 20548

May 17, 2007

The Honorable Neil Abercrombie
Chairman
The Honorable Jim Saxton
Ranking Member
Subcommittee on Air and Land Forces
Committee on Armed Services
House of Representatives

Over the next 7 years, the Department of Defense (DOD) plans to invest over $28 billion to develop, procure, and modify 20 major airborne intelligence, surveillance, and reconnaissance (ISR) systems and maintain existing systems until the new ones are fielded. This planned investment represents a significant increase over past ISR investments and comes in response to threats that have emerged over the past decade and the high priority commanders have placed on gathering battlefield intelligence.

Given the significant planned investment in ISR and DOD's recent focus on its acquisition strategy, you asked us to review DOD's ISR acquisition strategy. Specifically, we (1) evaluated various ISR platforms for potential synergies and assessed their cost and schedule status and the impact of any increases or delays on legacy systems (2) assessed the effectiveness of ISR investment decisions.

To assess the cost and schedule status of ISR systems, we reviewed programmatic and budget documentation. To evaluate the effectiveness of decisions for planned investments, we collected information on system capability, mission, and concept of operation and analyzed the data for similarities. We also discussed the results of our analyses with officials at the program office; Army, Navy, and Air Force headquarters; the Under Secretary of Defense for Intelligence; and the Joint Chief of Staff for Intelligence. (For more on our scope and methodology, see app. I.) We conducted our work between June 2006 and April 2007 in accordance with generally accepted government auditing standards.

In addition to this report, GAO is conducting two related review efforts for the committee. These efforts will review and report on (1) DOD's process to set requirements for ISR systems and (2) DOD's process for integrating unmanned aerial systems (UAS) into ongoing combat operations in

support of ISR requirements. Two separate reports on these issues will be provided later in 2007.

Results in Brief

Nearly all of the ISR development programs that we reviewed have experienced some cost or schedule growth. Cost and schedule growth in these programs is largely the result of a poor business case or acquisition strategy that failed to capture sufficient knowledge about the product technologies and design before committing to the development and demonstration of a new system. For example, the Global Hawk program—which experienced a 261 percent cost growth—had significant overlap of technology maturation, design, and production. Significant delays in the delivery of some new systems, breaking the investment strategy (for the new and legacy systems to be replaced) established at the start of these acquisition programs, have required DOD to make additional unplanned investments in legacy systems in order to keep them relevant and operational longer than planned. For example, the termination of the Aerial Common Sensor development contract resulted in a 5-year delay and the need to modify three legacy systems to keep them in the field longer than planned. The cost to keep these systems capable is estimated at $1.4 billion between fiscal years 2008 and 2013, an increase of nearly $900 million over previous estimates to do so. These unplanned investments represent opportunity costs that could have been used for other needs within DOD had the original Aerial Common Sensor acquisition strategy been based on more robust design knowledge.

Among the ISR acquisition programs we reviewed, we found specific cases where the military services have successfully collaborated to provide capabilities to the warfighter more efficiently and affordably. For example, the Army and Navy programs on their own initiative collaborated successfully on the Fire Scout to use a single contract to buy common components that can save hundreds of millions of dollars. However, we also found cases where more collaboration is needed to achieve efficiencies in costs and schedule and to close gaps in capabilities. For example, despite similarities in the Air Force's Predator program and the Army's Warrior program, the two services have resisted collaboration, and the Army awarded a separate development contract to the same contractor producing the Predator. Although the Army and Air Force agreed to consider cooperating on the acquisition of the two systems in January 2006, the services continue to struggle to agree on requirements. Through collaboration, the services could leverage knowledge early in the acquisition process and avoid or reduce DOD costs for design, new tooling, and manufacturing, and streamline contracting and acquisition

processes. DOD has numerous ISR studies, either recently completed or ongoing, and a pilot program to investigate portfolio management practices, but there have been no current actions to gain greater jointness in ISR acquisition programs.

While DOD has numerous ISR studies, either recently completed or ongoing and including a pilot program to investigate portfolio management practices, there have been no substantive actions recently implemented to gain greater jointness in ISR acquisition programs.

Therefore, we are recommending that DOD (1) develop and implement an integrated enterprise-level investment strategy approach that draws on the results of ongoing studies like portfolio management and (2) report to the defense committees by August 1, 2007, the results of the ISR studies and identify the specific plans and actions it intends to get greater jointness in ISR programs. DOD agreed with the first recommendation but believes that current initiatives will address it. We believe that many of the ongoing initiatives to achieve a greater integrated investment strategy approach for ISR are steps in the right direction but are concerned that they will not go far enough to address the problems that have occurred in DOD acquisitions for some time now. DOD also agreed to report the interim status on the portfolio management program by the above date but suggested moving the suspense date for reporting on the results of two other pertinent efforts to the end of the calendar year. We believe a full reporting in December 2007 would be useful if it includes DOD's detailed plans. However, we believe an interim reporting to the committees on the results and planned outcomes from completed studies should be provided to the committees by August 2007.

Background

ISR directly supports the planning and conduct of current and future military operations. ISR encompasses multiple activities related to the planning and operation of sensors and assets that collect, process, and disseminate data. Intelligence data can take many forms, including electro-optical (EO) and infrared (IR) images, full-motion video (FMV), images from a synthetic aperture radar (SAR), electronics intelligence (ELINT), communications intelligence (COMINT), and measures and signature intelligence (MASINT). These data can come from a variety of sources, including surveillance and reconnaissance systems that operate in space or on manned or unmanned systems. Data can also come from systems that are ground- or sea-based or from human intelligence teams. Table 1 summarizes the ISR programs that we reviewed, 13 of which are in

development. (A brief description of each of the 20 programs we reviewed is provided in app. II.)

Table 1: Characteristics of ISR Programs Reviewed

	Imagery intelligence				Signals intelligence				
Platform	**EO/IR**	**SAR**	**FMV**	**Wet film**	**COMINT**	**ELINT**	**MASINT**	**Development (D)/Legacy (L)[e]**	**Unmanned (○); piloted, no onboard operator (⊙); piloted, onboard operator (●)**
Army									
Aerial Common Sensor	✓	✓			✓	✓	✓	D	●
Airborne Reconnaissance Low	✓	✓			✓			L	●
Fire Scout	✓	✓			✓	✓		D	○
Guardrail Common Sensor					✓	✓		L	⊙
Warrior[a]	✓	✓	✓		✓			D	○
Air Force									
Airborne Signals Intelligence Payload[b]					✓	✓		D	N/A
E-10A[d]		✓						D	●
Global Hawk	✓	✓			✓	✓		D	○
Joint Surveillance, Target, Attack, Radar System		✓						L	●
Multi-Platform Radar Technology Insertion Program[c]		✓						D	N/A
Predator[a]	✓	✓	✓		✓	✓		L	○
Reaper[a]	✓	✓	✓					D	○
Rivet Joint					✓	✓		L	●
Space Radar		✓						D	○
U-2	✓	✓		✓	✓	✓		L	⊙
Navy									
Broad Area Maritime Surveillance	✓	✓			✓	✓		D	○
EP-3					✓	✓		L	●
Fire Scout	✓							D	○
Multi-mission Maritime Aircraft[a]		✓						D	●
EPX (formerly Navy Aerial Common Sensor)	✓	✓			✓	✓		D	●

Source: GAO analysis of DOD data.

[a]These systems also carry munitions.

[b]This is a payload being developed for deployment on the U-2 and Global Hawk.

[c]This is a payload being developed for deployment on the Global Hawk.

[d]The E-10A program was a technology development program until it was canceled in February 2007.

[e]Development refers to technology or systems development activities.

DOD plans significant investments in airborne ISR systems. For example, between fiscal years 2007 and 2013, DOD plans to invest $28.8 billion in the 20 systems we reviewed. (See table 2.)

Table 2: Planned Investment in Airborne and Space ISR Systems from Fiscal Year 2007 to Fiscal Year 2013

(Dollars in millions)

	Research and development	Procurement	Total
Army			
Aerial Common Sensor	$1,452	$0	**$1,452**
Airborne Reconnaissance Low	23	193	**216**
Fire Scout[a]	0	0	**0**
Guardrail Common Sensor	4	547	**551**
Warrior	958	1,211	**2,169**
Air Force			
Airborne Signals Intelligence Payload	574	0	**574**
E-10A[b]	259	0	**259**
Global Hawk	1,680	4,439	**6,119**
Joint Surveillance, Target, Attack, Radar System	745	945	**1,690**
Multi-Platform Radar Technology Insertion Program	393	0	**393**
Predator	205	2,261	**2,466**
Reaper	222	1,292	**1,514**
Rivet Joint	111	908	**1,019**
Space Radar	266	0	**266**
U-2	1	0	**1**
Navy			
EPX (formerly Navy Aerial Common Sensor)	997	0	**997**
Broad Area Maritime Surveillance	2,319	0	**2,319**
EP-3	250	665	**915**
Fire Scout	117	509	**626**
Multi-mission Maritime Aircraft	5,364	111	**5,475**
Total	**$15,753**	**$13,081**	**$28,834**

Source: GAO analysis based on DOD data.

[a]The Army does not break out Fire Scout costs separately. They are included as part of Future Combat Systems.

[b]The E-10A program was a technology development program until it was canceled in February 2007.

Congress has also recognized the need in acquiring UAS. For example, it added funding between fiscal years 2003 and 2005 to enable the Air Force

to accelerate procurement of the Reaper UAS. Over those 3 years, Congress increased the Reaper budget over $70 million, directing the Air Force to procure a total of 8 additional air vehicles. Similarly, the Navy Fire Scout budget was increased by $17 million in fiscal year 2006 to procure 2 additional air vehicles. In fiscal year 2003, the Global Hawk budget was increased by $90 million, primarily to develop advanced payloads for signals and imagery intelligence capabilities.[1]

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 in development that we reviewed have experienced some cost or schedule growth. [2] Cost and schedule growth in these programs is largely the result of a poor business case or acquisition strategy that failed to capture sufficient knowledge about the product technologies and design before committing to the development and demonstration of a new system. Significant delays in the delivery of some new systems, breaking the investment strategy (for the new and legacy systems to be replaced) established at the start of these acquisition programs, have required DOD to make additional unplanned investments in legacy systems in order to keep them relevant and operational longer than planned. Delays in the Aerial Common Sensor (ACS) aircraft have required DOD to make additional unplanned investments in three Army and Navy legacy aircraft systems in order to keep them relevant and operational longer than planned. These additional investments, totaling about $900 million, represent opportunity costs that could have been used for other needs within DOD.

Cost, Schedule, and Performance Status of Airborne ISR Programs

Of the 13 airborne ISR programs in development, 1 has experienced significant cost growth and 9 have experienced schedule delays that range from 2 months to 60 months. Table 3 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.

[1]The additional funding does not include DOD or service requests for supplemental funding in fiscal year 2007 or 2008.

[2]All of these 13 programs are in technology development, or systems development and demonstration as defined by DOD Instruction 5000.2, Operation of the Defense Acquisition System (May 12, 2003). The purpose of development is to reduce technology risk and to determine the appropriate set of technologies to be integrated into a full system.

Table 3: Causes and Impacts of Cost and Schedule Growth

System	Problem encountered	Impact
E-10A	Uncertain need, immature technology, and funding availability	Program canceled
Aerial Common Sensor	Requirements and design changes	Development contract terminated, 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
Broad Area Maritime Surveillance	Immature technology and funding availability	Schedule delayed 39 months
Multi-mission Maritime Aircraft	Immature technology	None to date
Army Fire Scout	Business case dependent on another major acquisition program (Future Combat Systems)[a]	Schedule delayed 22 months
Navy Fire Scout	Business case dependent on another major acquisition program (Littoral Combat Ship)[a]	Schedule delayed 3 months
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 canceled 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	Immature technology and design	Schedule delayed 2 months

Source: GAO analysis of DOD data.

[a]Due to delays in the Future Combat Systems and Littoral Combat Ship programs, the schedules for the Fire Scout programs were correspondingly delayed. These delays could occur again, even if the specific Fire Scout program was meeting its cost and schedule.

[b]EPX, the Navy's replacement for its EP-3, was not included because it is a new program as of February 2007.

Many of these programs began development without an executable business case and did not have a good acquisition strategy to capture critical system knowledge at the key decision milestones. Our work on best commercial practices has shown that before a company invests in product development, it should develop a sound business case—one that validates user requirements and determines that the concept can be successfully developed with existing resources—to minimize the risks associated with such a commitment. For DOD, an executable business

case provides demonstrated evidence that (1) the warfighter need is valid and that it can best be met with the chosen concept, and (2) the concept can be developed and produced with proven technologies, existing design knowledge, and available funding and time. To implement the business case, programs must develop a realistic acquisition strategy, one that includes critical program knowledge—such as technology maturity, system design, and manufacturing and production processes—at key points in the acquisition. DOD's acquisition policy endorses a knowledge-based approach to acquisition and includes strategies to reduce technology, integration, design, manufacturing, and production risks.[3]

Global Hawk is an example of a program that failed to implement best practices for developing a new weapon system and encountered significant cost and schedule problems. It initially began with an incremental acquisition strategy that approached best practice standards for technology and design maturity. However, after development began the Air Force abandoned this strategy and radically restructured the program to develop and acquire a larger, more advanced aircraft that would have multimission capabilities (both signals intelligence and imagery intelligence sensors on the same aircraft). This new strategy called for concurrent technology development, design, test, integration, and production in a compressed schedule. As a result, the program has been rebaselined four times, the development schedule has been extended by 3 years, and the program has experienced a substantial contract cost overrun. Development costs alone have increased over 260 percent. In addition, unit costs have increased to the point where statutory reporting thresholds were triggered, requiring DOD to recertify the fundamental program need to Congress.[4]

Impact of Delays on Legacy Systems

The ACS and Global Hawk programs' failures to develop an executable acquisition strategy have resulted in significant delays in delivering required capabilities to the warfighter at the time overall investment decisions were made. These delays will have significant implications for

[3]DOD Instruction 5000.2, Operation of the Defense Acquisition System (May 12, 2003).

[4]10 USC § 2433 requires the Secretary concerned to report to Congress when a program's unit cost increases by at least 15 percent over the current baseline estimate or increases by 30 percent over the original baseline estimate and requires the Secretary of Defense to carry out an assessment of the program and provide written certification to Congress when a program's unit cost increases by at least 25 percent over the current estimate or increases by 50 percent over the original baseline estimate.

legacy systems. Specifically, the services must now make difficult decisions about investing in legacy systems to keep them operational until the new systems have been developed and fielded.

Aerial Common Sensor

The Army's termination of the ACS system development and demonstration contract could have significant cost, schedule, and performance impacts on three legacy airborne systems in the ISR portfolio—the Army's Guardrail Common Sensor aircraft (GRCS) and Airborne Reconnaissance Low aircraft (ARL) and the Navy's EP-3 aircraft. The Army and the Navy had planned a phased approach to field ACS and retire the legacy systems from the inventory with a minimal investment in maintaining legacy systems. In the fiscal year 2004 budget, the Army had planned for small investments in GRCS and ARL because it expected to begin replacing them with ACS in 2009. In that same budget, the Navy's request reflected its plan to modify the EP-3.[5] By the time DOD submitted its fiscal year 2008 budget, both services recognized the need to keep legacy systems capable because the ACS development contract was canceled. Therefore, the budget included funding to keep these legacy systems operational for a longer period of time.

Since the termination of the ACS development contract, the program has reverted to a technology development 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 during this time is estimated to be $562 million between fiscal years 2008 and 2013, an increase of $550 million over what had been previously planned. Without these improvements, the systems will not remain capable against modern threats, possibly resulting in a gap in ISR capabilities on the battlefield. In addition, the platforms could not continue to fly during this time frame without increased structural and avionic 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 remaining part of the Army's

[5]The Navy's fiscal year 2004 budget did not include any funding for ACS because it was submitted before the decision to jointly acquire ACS with the Army.

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 will be 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, an increase of 73 percent over the $475 million that was previously planned.

Table 4 summarizes the budgetary impact of the delay in developing and fielding ACS on the legacy systems it was to replace.

Table 4: Fiscal Years 2004 and 2008 President's Budget for the Army's Guardrail Common Sensor and Airborne Reconnaissance Low and the Navy's EP-3

Dollars in millions

Program and appropriation	2004 budget (2004–2009)	2008 budget (2008–2013)	Increase	Percent
GRCS and ARL				
Development	0	$22,700	$22,700	N/A[a]
Procurement	$11,100	539,300	528,200	4,758
Total	**$11,100**	**$562,000**	**$550,900**	**4,963**
EP-3				
Development	0	$215,429	$215,429	N/A[a]
Procurement	474,600	607,700	133,100	28
Total	**$474,600**	**$823,129**	**$348,529**	**73**
Total GRCS, ARL, and EP-3				
Development	0	$238,129	$238,129	N/A[a]
Procurement	485,700	1,147,000	661,300	136
Total	**$485,700**	**$1,385,129**	**$899,429**	**185**

Source: GAO analysis of DOD data.

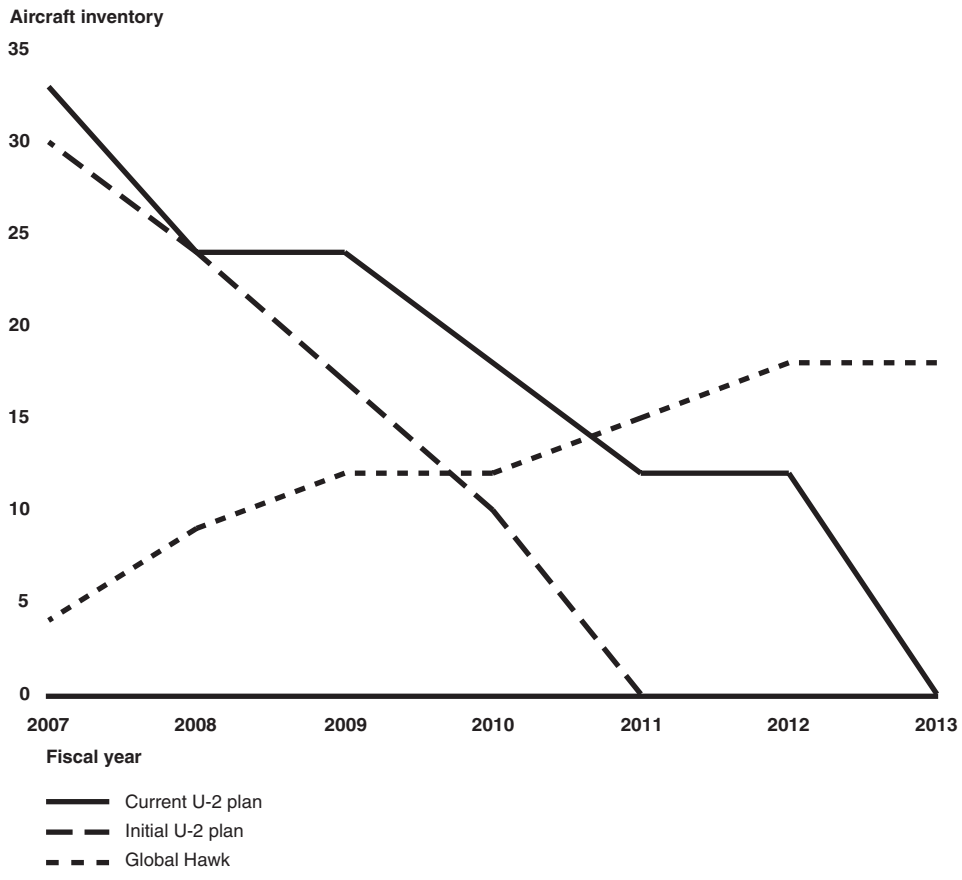
[a]Percent increase from zero is not calculated.

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 plans 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 in the 2005 plan. There are no funds in the budget beyond fiscal year 2006, but Air Force officials stated they intend to fund projects necessary to keep the U-2 capable. Figure 1 shows the rate at which the Air Force had planned to retire the U-2 and the revised retirement plan compared to Global Hawk fielding.

Figure 1: U-2 Retirement and Global Hawk Fielding



Source: GAO analysis of DOD data.

Opportunities Exist for Greater Collaboration across the Services' ISR Programs

Among the ISR acquisition programs we reviewed, we found specific cases where the military services have successfully collaborated and achieved savings of time and resources. The Army estimated that for its Fire Scout program, buying common components with the Navy Fire Scout program would save $200 million in development costs alone and that there were greater opportunities for savings. However, we also found cases where more collaboration is needed to provide greater efficiencies and jointness in developing more affordable new systems and to close gaps in capabilities. These programs include the potential for greater collaboration between the Navy Broad Area Maritime Surveillance (BAMS) and the Air Force Global Hawk programs, and the Air Force Predator and Army Warrior programs.

Army and Navy's Collaboration on Fire Scout Has Achieved Efficiencies

In 2000, the Navy began development of the Fire Scout, a vertical takeoff and landing UAS for use on surface ships. At the same time, the Army began concept development for its Future Combat Systems (FCS) program.[6] The Army Fire Scout was selected for the Future Combat Systems in 2003. Although these programs were not required to work jointly or collaborate, Army Fire Scout program managers contacted their counterparts in the Navy to determine whether efficiencies could be achieved through collaboration.

Officials from the two programs met several times to share information on their respective aircraft's configuration, performance requirements, testing, support, and other issues. Initially the requirements for the two systems were quite different. For example, the Army's UAS had four rotor blades and a larger engine, while Navy's system had three rotor blades and a smaller engine. However, after discussions, the Navy officials determined that the Army's Fire Scout aircraft would meet their needs and decided to switch to the Army's configuration. Both services are buying common components, such as the air vehicle and flight components, under one 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

[6]The Army's Future Combat Systems , a family of systems that will equip the Army's transformational combat brigades, are composed of unmanned ground and air vehicles (including the Fire Scout), networked combat and sustainment systems, and unattended sensors and munitions. FCS is about halfway through its development.

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.

Collaboration on Broad Area Maritime Surveillance Could Yield Similar Efficiencies

In 2000, the Navy identified a mission need for a broad area maritime and littoral ISR capability and on the basis of a 2002 analysis of alternatives, the Navy decided to pursue a manned platform, the Multi-mission Maritime Aircraft (MMA), with an unmanned adjunct, 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 UAS and associated ground controls and equipment.[7] 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. Through collaboration, 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 Occur on Warrior and Predator

Despite similarities in the Predator and Warrior programs, the Air Force and Army have repeatedly resisted collaboration. 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

[7]The Navy acquired two older (RQ-4A) Global Hawk aircraft for the demonstration. These aircraft were configured with radar software that incorporates maritime search and inverse SAR modes.

the warfighter. However, when the Army began in 2001 to define requirements for the Warrior, a system similar to the Predator, it did not fully explore potential synergies and efficiencies with the Air Force program. The Army did not perform an analysis of alternatives to explore other options to a new system; it cited the urgent need of battlefield commanders for the capability. In lieu of an analysis of alternatives, the Army conducted a full and open competition and awarded the contract to the same contractor producing the Predator. Although the requirements for the Warrior were subsequently validated, reviewing officials from the Air Force and the Joint Staff raised concerns about duplication of an existing capability.

Both Congress and the Office of the Secretary of Defense (OSD) have raised concerns about duplication between the two systems. During question and answer sessions at various Congressional hearings, members of Congress sought an explanation of the need for both systems. In addition, OSD commissioned an industrial capabilities study to assess whether the contractor for the Predator and the Warrior had sufficient capacity to produce both systems at the same time. While the study did not find any major production constraints, it concluded that the two systems were 80 percent common. In January 2006, the Army and Air Force agreed to consider cooperating on the acquisition of the two systems. However, progress to date in implementing the agreement has been limited due partly to differences in operating concepts for the two services. Unlike the Air Force, the Army does not use rated pilots; it relies on technicians and automated takeoff and landing equipment. In addition, the Army uses direct-line-of-sight communications, while the Air Force uses beyond-line-of-sight communications. Despite these inherent differences, there are still many areas available for collaboration, including airframes, ground stations, and equipment.[8]

The Air Force and the Army are currently working to identify program synergies in a three-phased approach:

- First, the Air Force will acquire and test two of the more modern Warrior airframes.

[8]The Air Force requires pilots who are formally trained and rated according to Air Force aeronautical standards. These standards include several levels of pilot training, experience, and military flying time. In contrast, the Army uses highly trained enlisted operators. Since most of its unmanned systems have automatic takeoff and landing capability, the Army does not require rated pilots to operate them.

- Second, the two 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.

To date, 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. In the interim, the Air Force has greatly increased the number of Predator aircraft it plans to procure annually to meet the high demand from the warfighter for this capability, increased in part by the war on terror. Instead of buying 7 Predator aircraft per year, as the Air Force had initially planned, it now plans to buy 24 aircraft in both 2007 and 2008, as well as another 22 aircraft as stated in the fiscal year 2007 supplemental request. In total, the Air Force plans to buy 160 Predators between fiscal years 2008 and 2013.[9]

The Air Force is currently seeking authority to become the executive agent for medium- and high-altitude UAS operating above 3,500 feet. As a part of its efforts, in March 2007 the Air Force began a comprehensive study of all existing and planned (airborne and space-based) ISR systems. As executive agent, the Air Force believes it could improve the allocation of UAS, avoid duplication of separate service acquisition efforts by centralizing procurement, standardize downlinks, and control burgeoning bandwidth requirements.[10] However, the Air Force still intends to procure two Warriors for testing, but details of a potential collaboration with the Army remain uncertain.

Timing on the Army and Air Force's collaboration is critical: The longer the services wait to collaborate, the lower the return. The opportunity to achieve synergies in design, manufacturing, and support will greatly

[9]These quantities do not include those to be acquired as a result of additional funding provided by Congress in earlier years or quantities associated with supplemental requests.

[10]Bandwidth refers to the available frequencies to support the flight of a UAS and is needed to support systems that control the flight of certain unmanned aircraft, to transmit data collected by payload sensors, and to interface with air traffic control centers. Because UAS and other weapons or communications systems, including manned aircraft, often operate on the same frequency, certain frequencies can become congested and interference can occur.

diminish as the Warrior matures and more and more Predators are added to the inventory.

DOD Efforts to Improve Collaboration

The environment in which DOD operates has changed significantly since 2001. In recognition of this, the department's 2006 Quadrennial Defense Review described a vision that focuses on defining ISR needs based on the type of intelligence or sensor rather than on the platform that carried the sensor. Specifically, the department's vision for ISR is to establish persistent surveillance over the battlefield and define ISR sensor needs in terms of the type of intelligence needed rather than the air, surface, or space platform in which they operate. Accordingly, the department initiated a number of studies aimed at reviewing ISR requirements and developing solutions either through new development programs or changes in current systems (see app. III for a brief description of these studies). While most of the studies have been completed, as of March 2007, DOD had released the results of only one—the Joint ISR study, which validated the requirement and confirmed the continued need for the Army's ACS program. The results of the other studies have not been released outside of DOD, but according to DOD officials, several were briefed to senior leadership within OSD and the Joint Staff.

One study DOD is undertaking has some promise to better manage the requirements for future ISR capabilities across DOD by applying a joint capability portfolio management concept to acquisition planning. This pilot program is a test case 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. However, the portfolios are largely advisory and will, as a first step, provide input to decisions made through the acquisition and budgeting process. At this point the capability portfolio managers have not been given direct authority to manage fiscal resources and make investment decisions. Without portfolios in which managers have authority and control over resources, DOD is at risk of continuing to develop and acquire systems in a stovepiped manner, and of not knowing whether its systems are being developed within available resources.[11]

[11] 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).

In addition to the various studies previously initiated, two more studies were recently commissioned in February and March of 2007. The Under Secretary of Defense for Acquisition, Technology, and Logistics requested that the Defense Science Board establish a task force to assess whether current and planned ISR systems provide sufficient support for U.S. military forces. The objectives of the study are to (1) determine what improvements are needed for ISR systems, (2) examine the balance and mix of sensors to identify gaps and redundancies, and (3) identify vulnerabilities, potential problems, and consistency with DOD network centered strategy. The Secretary also asked the task force to review the findings of previous studies as part of the assessment. In addition, the Chief of Staff of the Air Force recently began a comprehensive study of all existing and planned airborne and space-based ISR systems to determine their efficiencies and inefficiencies. The effort includes developing a plan to increase interdependence of medium- and high-altitude UAS and establish the Air Force as the executive agent for all UAS in those regimes. A specific date for reporting the results of these two studies has not been established.

Conclusions

Many ISR systems suffer from the same cost, schedule, and performance problems as other DOD acquisition programs by failing to establish a good business case or capture critical product knowledge at key decision points before moving forward in the acquisition process. In some cases, the outcomes have been costly as legacy systems, once planned for an earlier retirement, must now stay in the inventory, requiring additional unplanned investments to keep them relevant and operationally ready until a new capability can be fielded. The funds spent to keep these systems viable represent opportunity costs that could have been used for other DOD priorities. GAO has made numerous recommendations in recent years to improve the acquisition process and get more predictable outcomes in major acquisition programs, and these would apply to the development of ISR systems.

Ideally, because of the warfighter's universal needs for ISR information, determining requirements and planning for ISR acquisition programs should be based on a joint process that occurs at the enterprise level in DOD to ensure economies and efficiencies based on effective joint solutions to the maximum extent possible. DOD has various studies in process that appear to have this as a goal for ISR, but for now it is not routinely happening. The portfolio management pilot program could potentially improve how DOD determines requirements and sets up new acquisition programs for ISR capabilities. However, the portfolios are

largely advisory, and the managers have no direct authority to make investment decisions. Without authority and control over investments there is the risk that nothing will change. At best for now, there are some acquisition programs that through their own initiative have garnered benefits from collaborative efforts. Others still choose a stovepiped approach to provide a unique system for the specific military service's needs.

Recommendations for Executive Action

While DOD has numerous ISR studies, either recently completed or ongoing, there have been no substantive actions recently implemented to gain greater jointness in ISR acquisition programs. Therefore, we recommend that DOD

1. Develop and implement an integrated enterprise-level investment strategy approach that is based on a joint assessment of warfighting needs and a full set of potential and viable alternative solutions, considering cross-service solutions including new acquisitions and modifications to legacy systems within realistic and affordable budget projections for DOD. This strategy should draw on the results of ongoing studies, like the portfolio management pilot program, but should include the necessary authority and controls needed to ensure a single point of accountability for resource decisions.

2. Report to the defense committees by August 1, 2007, the results of the ISR studies and identify the specific plans and actions needed and intended to make joint acquisition decisions in ISR programs and improve the way it plans, buys, organizes, manages, and executes its ISR acquisition programs and operations.

Agency Comments and Our Evaluation

DOD provided us with written comments on a draft of this report. The comments appear in appendix IV.

DOD agreed that it can report the interim status of ongoing ISR studies to the committees by August 1, 2007, but suggested that delaying this reporting until December 31, 2007, would allow the department to include the results of two pertinent studies now ongoing. We believe a full reporting in December 2007 would be useful if it includes DOD's detailed plans on how it will achieve an integrated enterprise-level investment strategy for ISR including planned changes to policy and guidance, organization, and points of authority and responsibility. However, we

believe an interim reporting to the committees on the results and planned outcomes from completed studies should be provided to the committees by August 2007.

DOD agreed with our recommendation to develop and implement an integrated enterprise-level investment strategy for ISR and stated that it thought this process was well under way in existing department processes. However, it non-concurred with having a single point of authority and control for ISR resource decisions and provided a number of arguments as to why sufficient information was not included in the report to support this specific part of the recommendation. We continue to believe that our recommendation for an enterprise-level investment strategy with a single point of accountability for resources decisions is necessary to maximize to the full extent efficiency and effectiveness in acquiring major acquisition systems. The Defense Science Board Summer Study on Transformation reported in February 2006 came to similar conclusions: that the Secretary of Defense should assemble a small direct-reporting cell to create and maintain a metric-based, multiyear plan that specifies what is to be done, when, with what resources, and with what capability output.[12] It concluded the Under Secretary of Defense for Acquisition, Technology, and Logistics needs authority over architectures, resources, and personnel. Our other review efforts of the acquisition and requirements processes continue to show that DOD has not sufficiently improved the process to ensure cross-service redundancies are reduced or eliminated where possible. Therefore, without this single point of authority, limited defense resources are still not optimally used to develop and produce weapon systems. Our comments below address the specific arguments presented in DOD's response to this report.

We believe that many of the ongoing initiatives to achieve a greater integrated investment strategy approach for ISR are steps in the right direction but are concerned that they will not go far enough to address the problems that have occurred in DOD acquisitions for some time now. DOD suggests that the Joint Capabilities Integration and Development System (JCIDS) has been implemented to identify joint warfighting capabilities. We agree that the JCIDS emphasizes a more joint approach to identifying and prioritizing warfighting needs. However, as reported in our March 30, 2007 report, *Best Practices: An Integrated Portfolio Management*

[12]DOD, *Defense Science Board Summer Study on Transformation: A Progress Assessment*, (Washington, D.C.: Feb. 2006).

Approach to Weapon System Investments Could Improve DOD's Acquisition Outcomes, this system is still not working as planned. Despite the provisions of JCIDS, needs continue to be based on investment decision-making processes that do not function together to ensure DOD pursues needs that are not redundant. The Warrior decision is an example where the service chose to ignore the recommendations of the Joint Requirements Oversight Council and proceeded with a unique program.

DOD stated that its Portfolio Management Experiment supports this enterprise-level strategy, but it is still a pilot program and actual changes to the processes have not been identified to show how it will ensure more responsible and joint decision making for major acquisition programs. As pointed out in the report, while this seems like a good first step, portfolios are largely advisory and managers have not been given direct authority to manage fiscal resources and make investment decisions. Without this authority, DOD continues to risk stovepiped solutions that may overlap and not be affordable within available resources. Furthermore, it seems within the last few years the real input from DOD leadership comes at the end of the year, right before the budget is supposed to go to Congress. In December each year a Program Budget document is issued by the Office of the Secretary of Defense that has included radical changes to major acquisition programs but without the transparency as to the detailed analysis and integrated investment planning that should have taken place to make these major investment decisions.

In its response, DOD also states that a number of successes have occurred within the Unmanned Aerial Systems portfolio managed by the Office of Under Secretary of Defense for Acquisition, Technology, and Logistics. While there may be some successful UAS programs, there are also examples of large, important programs that have significantly exceeded cost estimates and delivery dates. We believe that having a UAS portfolio is contrary to the direction of the Quadrennial Defense Review to get away from "platform"-based decisions and move toward "sensor"-based decisions. The Battlespace Awareness Functional Capabilities Board, as part of the JCIDS process, seems to be a more representative grouping of ISR programs than the UAS portfolio. We believe if properly organized based more on "sensor" requirements, then it would not be necessary to have both for ISR investment decision making.

DOD states that we did not consider the department's ongoing efforts to develop UAS and ISR Roadmaps that represent, according to them, enterprise-level strategies. While we did not review these as part of this review, GAO has ongoing work under a different engagement that is

looking at the ISR Roadmap. The initial conclusions from that review were presented to the House Armed Services Subcommittee on Air and Land Forces in testimony on April 19, 2007.[13] GAO testified that the ISR Roadmap was a noteworthy step in examining ISR capabilities but it does not represent a comprehensive vision for the ISR enterprise or define strategy to guide future investments. Furthermore, the ISR Roadmap is managed by the Office of the Under Secretary of Defense for Intelligence, while the UAS Roadmap is managed by the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics. This difference emphasizes the need for a single point for ISR investment decisions within OSD.

Finally, DOD states that the report does not recognize ground component requirements and operating concepts for multiple joint missions and that it did not recognize the benefits of acquisition programs with unique requirements or the benefits of competition. We believe the report, as it relates to the decision to buy a unique platform for the Warrior, did recognize the difference in how the two services planned to operate the platforms. However, we do not believe that it necessarily excuses DOD to buy two different platforms to satisfy the warfighter's expressed ISR requirement. Furthermore, we believe it has been the unique stovepiped solutions of the military services that have over time created unnecessary duplication and inefficient use of limited defense funding. As to competition, GAO has consistently expressed its belief that with proper controls and oversight competition is beneficial to price, reliability, performance, and contractor responsiveness in buying major weapon systems.

We are sending copies of this report to the Secretary of Defense and interested congressional committees. We will also make copies available at no charge on the GAO Web site at http://www.gao.gov.

If you have any questions about this report or need additional information, please contact me at (202) 512-4841 or sullivanm@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report were

[13]GAO, *Intelligence, Surveillance, and Reconnaissance: Preliminary Observations on DOD's Approach to Managing Requirements for New Systems, Existing Assets, and Systems Development*, GAO-07-596T (Washington, D.C.: Apr. 19, 2007).

Michael Hazard, Assistant Director; Dayna Foster; Rae Ann Sapp; Michael Aiken; and Karen Sloan.

Michael J. Sullivan
Director
Acquisition and Sourcing Management

Appendix I: Objectives, Scope, and Methodology

This report examines the Department of Defense (DOD) development and acquisition of airborne intelligence, surveillance, and reconnaissance (ISR) systems. The primary focus of this work is to identify practices and policies that lead to successful fielding of weapon systems to the warfighter at the right time and for the right price. Specifically, our objectives were to (1) evaluate various ISR platforms for potential synergies and assess their cost and schedule status and the impact of any increases or delays on legacy systems and (2) evaluate the effectiveness of ISR investment decisions. Our work was conducted between June 2006 and April 2007 in accordance with generally accepted government auditing standards.

We selected 20 major airborne ISR programs in technology or systems development, already fielded but undergoing significant upgrade, or operating in the field but due to be replaced by a system in development and one space-based program in technology development.[1] We considered a program in development to be major if DOD designated it as a major defense acquisition program or would be likely do so at Milestone B.[2] We considered systems already operating in the field as major if they played a role in current operations.

For the systems we selected, we obtained information on current or projected operational capabilities, acquisition plans, cost estimates, schedules, and estimated budgets. We analyzed the data to determine whether pairs of similar systems shared common operating concepts, capabilities, physical configurations, or primary contractors. We reviewed acquisition plans for programs in development to determine whether they had established sound business cases or if not, where the business case was weak. We reviewed cost and schedule estimates to determine whether they had increased and, where possible, identified reasons for the increases. For systems in development that experienced a schedule delay, we determined whether the delay had an impact on the legacy system to be replaced and, where possible, determined the cost or capability impact of the delay. We assessed the reliability and validity of agency official-

[1]The Joint Staff identifies 31 core ISR systems; our review included 14 of them. We added two programs that are developing payloads for ISR systems and 4 more systems that were in development but were not part of the core group as of August 2006, when we established our list.

[2]Milestone B is the initiation of an acquisition program as defined by DOD Instruction 5000.2, Operation of the Defense Acquisition System (May 12, 2003).

provided and third-party data by discussing the data with officials from multiple agencies at varying levels of responsibility. We also discussed the results of our reviews and analyses with program office officials; Army, Navy, and Air Force acquisition and requirements officials; the Office of the Under Secretary of Defense for Intelligence; and the Office of the Joint Chief of Staff for Intelligence.

Appendix II: System Descriptions

Aerial Common Sensor

The Army is planning to develop the Aerial Common Sensor (ACS) as an airborne ISR and target acquisition system and is designing it to provide timely intelligence data on threat forces to the land component commander. The platform will be a piloted business jet and will carry a suite of sensors to collect information on electronics and communications signals, optical and infrared images, measures and signatures, and synthetic aperture radar (SAR) images. Four onboard intelligence analysts will operate the mission equipment, but with the appropriate connectivity, the system can perform its mission with just the flight crew. The ACS will replace the Guardrail Common Sensor and the Airborne Reconnaissance Low airborne systems and will coexist with current systems until it is phased in and current systems retire. The Army has not established a date for initial operating capacity. ACS was to have replaced the Navy EP-3 as well. However, the Navy recently decided to pursue its own development program and expects to enter system development in 2010.

Airborne Reconnaissance Low

Airborne Reconnaissance Low (ARL) is composed of communications intelligence and imagery intelligence sensors and onboard operators in a piloted aircraft. The current inventory includes two configurations; one with a complete communications sensor package capable of intercepting and locating radio emissions and providing reports to appropriate commanders and intelligence-processing centers on the ground. The more capable version combines communications and electro-optical (EO) sensors and SAR with moving target indicator onto one aircraft. The ARL will eventually be replaced by ACS.

Airborne Signals Intelligence Payload

The Airborne Signals Intelligence Payload (ASIP) is a signals intelligence (SIGINT) sensor being developed for use on multiple Air Force platforms. It is a part of Air Force efforts to modernize its SIGINT processes by developing an Air Force-wide capability for performing SIGINT. ASIP sensors will be developed for use on the legacy U-2 and Rivet Joint manned aircraft. It will also be used on legacy and developmental unmanned aerial systems (UAS) to include the MQ-1 (Predator) and RQ-4B Global Hawk. The details about its capabilities are classified.

Broad Area Maritime Surveillance Aircraft System

The Broad Area Maritime Surveillance (BAMS) UAS is scheduled to begin systems development in October 2007. The BAMS system will be land-based and provide a high-altitude, persistent ISR capability to the fleet and joint forces commander. BAMS will conduct continuous maritime and littoral surveillance of targets. As part of the Navy's maritime patrol and

reconnaissance force, it will operate independently or in conjunction with the Multi-mission Maritime Aircraft (MMA) and EP-3/EPX signals intelligence platform. Because the BAMS has not yet begun system development, vehicle design and sensor payload decisions have not been finalized, but will include active imaging radar, passive optical imaging, and limited signals collection capability. Its projected initial operational capability is 2013.

E-10A

The E-10A Program originally consisted of three primary elements: the aircraft, the radar, and the battle management command and control system. The aircraft proposed for the E-1OA was the Boeing 767 jet aircraft. The radar was to be the Multi-Platform Radar Technology Insertion Program, an advanced radar that provides capability for cruise missile defense through air moving target indicator as well as enhanced ground moving target indicator. The program was reduced from a technology development program to a demonstration effort. The demonstration effort was focused on assessing the newer radar, which will also be used on the Global Hawk UAS. However, the Air Force recently canceled the demonstration effort.

EP-3

The EP-3E Airborne Reconnaissance Integrated Electronics System (ARIES) II is the Navy's only land-based SIGINT reconnaissance aircraft. It is a legacy aircraft based on the Navy's Orion P-3 airframe and provides fleet and theater commanders worldwide with near-real-time tactical SIGINT. It uses sensitive receivers and high-gain dish antennas to perform its mission. The Navy had planned to replace this aircraft with the Army ACS because the EP-3 airframe is aging and has a limited life span. Drawdown of the EP-3E aircraft was scheduled to begin in the 2012 time frame but may be extended. Delays in ACS development contributed to the Navy's recent decision to pursue its own replacement for the EP-3.

EPX

The EPX is the Navy's replacement for its aging EP-3. In late summer 2006, after a study on joint ISR requirements had been completed, the Navy and Army concluded that there were significant requirements differences between the two services. As a result, the Chief of Naval Operations directed the Navy to recapitalize the EP-3 to provide multi-intelligence capability. While requirements for the EPX have not been fully established, it will be a multi-intelligence platform and will include communications and electronics intelligence capability, optics, and radar. EPX is part of the maritime patrol and MMA and BAMS.

Fire Scout (Army)

The Army Fire Scout is being developed as one of the UAS within the Future Combat Systems. As part of this system of systems, the Fire Scout is designed to support air-ground operations and reconnaissance, surveillance, and target acquisition missions. It will employ SAR with moving target indicator, EO sensors and a laser rangefinder/designator, a tactical signals intelligence package, and the joint tactical radio system communications suite. The Fire Scout is designed to take off and land in unimproved areas to directly support brigade combat team operations. Its initial operating capability is tied to the Future Combat Systems, which is planned for December 2014.

Fire Scout (Navy)

The Navy Fire Scout, or the vertical takeoff and landing unmanned aerial vehicle system, (VTUAV), entered systems development in February 2000. The Fire Scout is designed to provide ISR as well as targeting data and damage assessments to tactical users. It is capable of autonomous vertical takeoff and landing on aircraft carriers as well as unprepared landing zones. The Fire Scout includes EO/IR sensors, a laser designator system, and a common automatic recovery system. The modular payload approach also includes the tactical control system, tactical common datalink, and a mine detection system. Its initial operating capability is planned for October 2008.

Joint Surveillance, Target, Attack, Radar System

Joint Surveillance, Target, Attack, Radar System (STARS) is a joint Air Force and Army wide area surveillance attack radar system designed to detect, track, and classify and support the attack of moving and stationary targets. Joint STARS is a legacy platform first used in the 1991 Gulf War. It has been used extensively in support of Operations Enduring and Iraqi Freedom. The Joint STARS fleet of aircraft is currently being modified with new communication and navigation equipment, and the Air Force is developing advanced mission capabilities and identifying low-cost emerging technologies for future use. In addition, the Air Force intends to replace Joint STARS engines to make the platform more reliable and reduce operating and support costs. Finally, the Air Force had originally intended to place Multi-Platform Radar Technology Insertion Program (MP-RTIP) on Joint STARS but decided not to when it chose to go forward with the E-10A, which was subsequently canceled.

Global Hawk

The Global Hawk is a high-altitude, long-endurance UAS designed to provide near-real-time high-resolution ISR imagery. It employs a SAR, ground moving target indicator, and EO/IR sensors. After a successful

technology demonstration, the Global Hawk entered development and limited production in March 2001. Production of the initial seven (RQ-4A) aircraft is complete. The larger, more capable version (RQ-4B) includes an advanced signals intelligence payload and improved radar technologies. Initial operational capability is planned for September 2007.

Guardrail Common Sensor

Guardrail Common Sensor (GRCS) is an airborne signals intelligence collection location and exploitation system in the current inventory that provides near-real-time signals intelligence and targeting information to tactical commanders. The system integrates a communications intelligence sensor and precision geolocation of signals. The platform is a small, piloted aircraft with no onboard analysts. The Army plans on eventually replacing GRCS with the ACS.

Multi-mission Maritime Aircraft

The Navy's MMA is part of the broad area maritime family of systems. The MMA was initially planned to interoperate with the BAMS UAS and the ACS. The MMA is intended to replace the Navy's P-3C Orion system. Its primary role will be that of anti-submarine and anti-surface warfare, and it will have some ISR capability. The Navy plans for the aircraft to achieve initial operational capability in 2013.

Multi-Platform Radar Technology Insertion Program

The MP-RTIP is a family of scalable, advanced radars that are being developed for the RQ-4B Global Hawk and the E-10A. The Air Force funded the sensor development under the E-10A budget line as a separate item. The radar is currently in system development and demonstration. However, in February 2007, the Air Force removed funding for the E-10A radar development program starting in fiscal year 2008. The Air Force still intends to develop the radar for the Global Hawk and begin fielding the sensor by 2011.

Predator

The Predator is a medium-altitude long-endurance UAS. The Predator began as an advanced concept technology demonstration program and has been operational since 1995. Originally designed as a persistent ISR platform, it was modified in 2001 to carry two Hellfire missiles. The Predator employs EO/IR sensors, laser designator, day/night cameras that produce full motion video of the battlefield, and can be configured to carry SAR. Used as an armed reconnaissance system, the Predator also has a multi-spectral targeting system with Hellfire missile targeting capability. The Air Force has begun an effort to develop and integrate signals

intelligence capability on the Predator. To accelerate this effort, the Air Force increased this budget by a factor of almost 6 in fiscal year 2008.

Reaper

The Reaper (formerly Predator B) is a multirole medium- to high-altitude endurance UAS. Its primary mission is a persistent hunter-killer for small ground mobile or fixed targets. Its secondary mission is to gather ISR data. It will use EO/IR sensors, laser rangefinder/designator, and SAR, and will carry ordnance such as the Joint Direct Attack Munitions and Hellfire missiles. The Reaper entered systems development in February 2004. Its initial operating capability is planned for 2009. The Air Force has begun to examine the feasibility of incorporating signals intelligence capability on the Reaper.

Rivet Joint

Rivet Joint (RJ) is a reconnaissance aircraft in the current inventory that supports theater- and national-level consumers with near-real-time on-scene intelligence collection, analysis, and dissemination capabilities. The aircraft is an extensively modified C-135 with a suite of onboard sensors, which allows the mission crew to detect, identify, and geolocate signals throughout the electromagnetic spectrum. The mission crew can then forward gathered information in a variety of formats to a wide range of consumers via the system's extensive communications suite. The interior seats 34 people, including the cockpit crew, electronic warfare officers, intelligence operators, and in-flight maintenance technicians. The first versions of the system were deployed in 1964, but have undergone extensive upgrades to both the platform and mission equipment. The Air Force does not have any plans to replace the system.

Space Radar

Space Radar (SR) is an Air Force-led, joint DOD, and intelligence community program to develop a satellite to find, identify, and monitor moving or stationary targets under all weather conditions on a nearly continuous basis across large swaths of the earth's surface. As envisioned, SR would generate volumes of radar imagery for transmission to ground-, ship-, air-, and space-based systems. Initial capability is planned for 2017.

U-2

The U-2 provides continuous day-and-night, high-altitude, all-weather surveillance and reconnaissance in direct support of U.S. and allied ground forces. It is a single-engine and single-seat ISR aircraft. The U-2 is capable of collecting multisensor, photo, EO/IR, and radar imagery as well as collecting SIGINT data. It can downlink all data except wet film. The Air

Force proposed to begin retiring the U-2 in 2007. However, Congress disagreed with the decision and prevented retirement in 2007. Congress also directed the Air Force to first certify that the capability was no longer required. In March 2007, the Air Force revised the schedule from removing the U-2 from the inventory and proposes doing so at a slower rate than before beginning in fiscal year 2008. The Air Force is not requesting funding for the U-2 past 2007, but it is not clear whether the Air Force has provided the certification that Congress requested.

Warrior

The extended range, multipurpose Warrior UAS began systems development in April 2005. It will operate with manned aviation assets such as the Apache helicopter and perform missions including reconnaissance, surveillance, and target acquisition/attack. It is being developed to satisfy the Army's requirement for a UAS that is dedicated to the direct operational control of its field commanders. The Warrior is designed with an automatic takeoff and landing system, full motion video capability, tactical signals intelligence payload, multirole tactical common data link, EO sensors, SAR/ moving target indicator, Ethernet communications capability, and redundant avionics. Its initial operational capability is planned for 2010.

Appendix III: ISR Studies Under Way or Recently Completed

Program Decision Memorandum III, dated December 2005 directed that several studies be undertaken.[1] Those studies included the following.

Joint ISR Replacement Study

The Army and Navy, in coordination with the Air Force, Joint Staff, Under Secretary of Defense for Policy, Under Secretary of Defense for Intelligence (USD(I)), and Program Analysis and Evaluation (PA&E), were directed to conduct a study of joint multi-intelligence airborne ISR needs, focusing on trade-offs among manned and unmanned airborne platforms and how those trade-offs translate into requirements for recapitalizing the Army, Navy, and Air Force legacy systems. The participants were directed to identify any resources in addition to the fiscal year 2006 President's budget program of record to sustain the Army and Navy aircraft until they can be replaced. The study was completed in late summer of 2006 and concluded that the requirements for the ACS were still valid.

U-2 Retirement Study

The Strategic Command, in coordination with the Air Force; Navy; Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)); USD(I); and PA&E were directed to review the Air Force's Global Hawk acquisition and U-2 retirement plan and determine if high-attitude, long-endurance, multi-intelligence ISR requirements will be satisfied during the transition. The findings were briefed within the Office of the Secretary of Defense (OSD) in early fall 2006.

Airborne ISR Requirements

USD(I), in conjunction with the Joint Staff, services, and PA&E was directed to develop a methodology to migrate to a capability-centric focus, instead of a platform-centric focus, for determining combatant commander and joint task force airborne ISR requirements. Results were briefed within OSD in early fall 2006.

These studies were recently commissioned:

Optimization of ISR Capabilities

On March 5, 2007, the Air Force Chief of Staff announced the start of a comprehensive study of all existing and planned ISR systems—both airborne and spaced-based—to consider the efficiencies and inefficiencies

[1]Several other studies were commissioned but information related to them is classified and cannot be summarized here.

in the theater and global warfighting templates. As part of this broad effort, he advocated that the Air Force immediately become the executive agent for medium- and high-altitude UAS. The expected benefits from the study and executive agent concept include improving distribution of intelligence assets across all theaters and components, avoiding duplication of acquisition efforts, standardizing UAS operations and downlinks, and controlling ballooning bandwidth requirements. The results of the study will include a comprehensive plan to optimize ISR capabilities, due in late April 2007.

Task Force on Integrating Sensor-Collected Intelligence

In February 2007, the Under Secretary of Defense for Acquisition, Technology, and Logistics requested that the Defense Science Board establish a task force to assess whether current and planned ISR systems provide sufficient support for U.S. military forces.[2] The primary objective is to determine what improvements are needed in carrying out the tasks associated with ISR systems. A second objective is to examine the mix and balance of ISR sensors to identify gaps and redundancies. The task force was also asked to examine current and planned systems for vulnerabilities, new opportunities and potential problems, and consistency with department strategy for networked operations. Finally, the memorandum also asked the task force to review the results of a number of studies, initiated by OSD and completed in the fall of 2006, following the completion of the 2006 Quadrennial Defense Review. Several of these studies are summarized in this appendix. The tasking memorandum did not include time frames for completion of the study or for reporting the results.

[2]The Defense Science Board is composed of members designated from civilian life by the Under Secretary of Defense for Acquisition, Technology, and Logistics and advises the Secretary of Defense; the Deputy Secretary of Defense; the Under Secretary of Defense for Acquisition, Technology, and Logistics; and the Chairman of the Joint Chiefs of Staff on scientific, technical, manufacturing, acquisition process, and other matters of special interest to DOD.

Appendix IV: Comments from the Department of Defense

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
6000 DEFENSE PENTAGON
WASHINGTON, DC 20301-6000

NETWORKS AND INFORMATION INTEGRATION

Mr. Michael J. Sullivan
Director, Acquisition and Sourcing Management
U.S. Government Accountability Office
441 G. Street NW
Washington DC 20548

Dear Mr. Sullivan:

Thank you for the opportunity to comment on draft report "DEFENSE ACQUISITIONS: Greater Synergies Possible for DoD's Intelligence, Surveillance and Reconnaissance Systems" (GAO-07-578) dated April 5, 2007.

The Department agrees with the first recommendation to develop and implement an integrated enterprise-level investment strategy, but believes this process is well underway in existing Department processes. The Department non-concurs that the GAO has provided sufficient analysis and evidence to recommend a single point of authority and controls for ISR resource decisions and does not agree with that portion of the recommendation.

The Department agrees that it can report interim status on the progress of the ISR Portfolio Management Pilot program to the committees by August 1, 2007. There are two pertinent efforts, "Optimization of ISR Capabilities" and "Task Force on Integrating Sensor-Collected Intelligence," that will not complete work in time to provide input to the defense committees. The Department recommends a suspense date of December 31, 2007 to permit integration of study findings.

It is unfortunate that an exit brief with the Department did not occur prior to release of this draft report. The Department strives to be transparent when working with the GAO and would like the GAO to ensure that an exit interview takes place for any future reports.

Sincerely,

John R. Landon
Deputy Assistant Secretary of Defense
(C3ISR & IT Acquisition)

Enclosures:
1. DoD Factual Comments
2. DoD Response to Recommendations

DoD Response to Recommendations From
GAO Draft Report (Apr 5, 2007)
GAO CODE 120559/GAO-07-578
"DEFENSE ACQUISITIONS: Greater Synergies Possible for DoD's Intelligence, Surveillance and Reconnaissance Systems"

RECOMMENDATION 1: Develop and implement an integrated enterprise-level investment strategy approach that is based on a joint assessment of war-fighting needs and a full set of potential and viable alternative solutions, considering cross-service solutions including new acquisitions and modifications to legacy systems within realistic and affordable budget projections for DOD. This strategy should draw on the results of ongoing studies, like the portfolio management pilot program, but should include the necessary authority and controls needed to ensure a single point of accountability for resource decisions.

RESPONSE TO RECOMMENDATION 1: The Department agrees with your recommendation to develop and implement an integrated enterprise-level investment strategy, but believes this process is well underway in existing DoD processes. However, the Department does not believe that GAO has provided sufficient analysis and evidence to support the recommendation to establish a single point of accountability for resource decisions. Specifically,

- The Department agrees that integrating an ISR enterprise level investment strategy based on a Joint assessment and ongoing studies is critical, but this work is already underway as noted in the GAO report, and OSD makes portfolio adjustments as necessary through Program Budget Decision and Program Decision Memorandum actions.
    - The Department's current Joint Capabilities Integration and Development System (JCIDS) process has been implemented to identify joint war-fighting capabilities.
        - The draft report does not offer observations regarding this process.
    - The Department's Capability Portfolio Management Experiment supports this approach in that:
        - It emphasizes resource decisions based on trade-offs within a given portfolio, as determined by the OSD portfolio manager.
        - Portfolio managers review capabilities across their functional enterprise, prioritize these capabilities according to war-fighter needs, and

recommend to Department leadership key trade-offs-within the portfolio, not within each organization, which would allow the effective use of resources.

- The process to accomplish portfolio realignment is through OSD decision memorandum; there is no intent to delegate this authority to a Service or other government agency.

- The Office of the Undersecretary of Defense for Acquisition, Technology, and Logistics (OUSD AT&L) has been very successful managing unmanned aerial system (UAS) development and acquisition with this portfolio model. With support from the Military Services, the Department has coordinated development and procurement of several Military Service specific UAS programs to meet joint Military Service requirements, including Raven B (Army, Marine Corps, Air Force, and Special Operations Command); Shadow (Army and Marine Corps); Fire Scout (Navy and Army). Currently efforts are underway to further increase cooperation between the Air Force and Army in the Predator and Warrior Programs. Air Force recently utilized Army tooling to produce the first two Air Force Block X airframes (Warrior common) and previously, the Air Force permitted the Army to use tooling to produce the Army extended range I-GNATS and Warrior-As (both MQ-1 Predator airframes). Additionally, the Air Force loaned significant spares and sensors to the Army to support combat operations.

- The report does not offer sufficient evidence that a single point of authority, beyond those currently belonging to the DEPSECDEF and SECDEF, is required for resource decisions.

  - The report concluded that these programs should consider developing a business case and critical system knowledge (pg 7); and the report acknowledges the Department currently has a directive addressing this approach (pg 8; DoD Instruction 5000.2, Operation of Defense Acquisition System, May 2002).

  - Oversight of these processes currently falls under the Department's single acquisition authority.

- The report did not comment on the efforts currently underway within the Department on consolidating ISR development efforts found in the UAV Roadmap and other ISR roadmaps. The Department is utilizing an enterprise-level strategy for Unmanned Systems technology which supports several mission areas including the ISR mission area. This roadmap identifies war-fighter needs for multiple mission areas including missions falling in the ISR domain. The roadmap also identifies technology trends and developments for areas such as processors,

communications, platforms, and payloads. Finally, integrated capability and mission roadmaps are provided to identify technology and schedule options for meeting the various war-fighter mission needs. This technology roadmap is being expanded in 2007 to incorporate all Unmanned Systems in a single roadmap, to better support integrated war-fighter needs independent of individual Military Service or system capability. The current and future roadmap, UAS and Unmanned Systems Roadmap, also support the USD(I) ISR mission roadmap as many individual Military Service ISR systems transition to Unmanned Systems.

- The report does not recognize ground component requirements and CONOPS for multiple joint missions. This is made clear on page 14 of the report: "Although limited progress has been made, the services continue to have different concepts of operation and requirements more than a year after discussions began."

- The report did not recognize the benefits of acquisition programs with unique requirements and the benefit of competition.

RECOMMENDATION 2: Report to the defense committees by August 1, 2007, the results of the ISR studies and identify the specific plans and actions needed and intended to make joint acquisition decisions in ISR programs and improve the way it plans, buys, organizes, manages, and executives its ISR acquisition programs and operations.

RESPONSE TO RECOMMENDATION 2: Concur. The Department can report interim status to the committees on the progress of the ISR Portfolio Management Pilot program by August 1, 2007. There are two pertinent efforts, "Optimization of ISR Capabilities" sponsored by the Air Force and the Defense Science Board's "Task Force on Integrating Sensor-Collected Intelligence" that are not scheduled to complete work in time to provide input to the defense committees. The Department recommends moving the suspense date to December 31, 2007 to ensure adequate analysis and integration of study findings.

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