



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

November 2008

UNMANNED AIRCRAFT SYSTEMS

Additional Actions Needed to Improve Management and Integration of DOD Efforts to Support Warfighter Needs



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Why GAO Did This Study

The Department of Defense's (DOD) use of unmanned aircraft systems (UAS) continues to increase. In 2000, DOD components had fewer than 50 unmanned aircraft in their inventory. By May 2008, they had more than 6,000. However, DOD faces challenges, such as UAS acquisition and the integration of UAS into joint combat operations. GAO has made a series of recommendations to address challenges, including the need for a UAS strategic plan. To improve upon the management and use of UAS, DOD has implemented several actions, such as establishing new task forces. GAO was asked to (1) identify key DOD efforts to improve the management and operational use of UAS and (2) assess the extent to which these efforts constitute an overarching organizational framework to guide and oversee UAS efforts. GAO reviewed DOD documents such as directives and memorandums, and interviewed agency officials.

What GAO Recommends

GAO recommends DOD designate a single entity accountable for integrating efforts related to UAS; define roles, responsibilities, and relationships among UAS-related entities; and develop a UAS strategic plan to align and integrate efforts and funding with long-term goals. DOD partially concurred with one recommendation and did not concur with two recommendations, citing actions it has already taken. GAO recognizes DOD's efforts to date, but continues to believe additional actions are needed.

To view the full product, including the scope and methodology, click on [GAO-09-175](#). For more information, contact Sharon Pickup at (202) 512-9619 or pickups@gao.gov.

UNMANNED AIRCRAFT SYSTEMS

Additional Actions Needed to Improve Management and Integration of DOD Efforts to Support Warfighter Needs

What GAO Found

Over the past several years, the Office of the Secretary of Defense, the Joint Staff, and the military services have undertaken several initiatives to improve the management of UAS programs and the operational use of these systems. Specifically, DOD has established new entities and refocused the mission of an existing organization. DOD has also initiated several studies to determine UAS needs and help inform future UAS acquisition decisions. In addition, DOD issued the *Unmanned Systems Roadmap 2007-2032* (Roadmap), which it characterizes as a comprehensive plan for the evolution and transition of unmanned systems technology, including UAS. Also, in select cases the military services are developing and fielding common UAS programs and proceeding to develop more common concepts of operations.

DOD has taken steps to improve the management and operational use of UAS, but its approach lacks key elements of an overarching organizational framework needed to fully integrate efforts, sustain progress, and resolve challenges. First, DOD has increased management attention on UAS and commenced at least seven separate initiatives since September 2006 to address challenges presented by the rapid integration of UAS into the military services' force structure, yet no single office or entity, supported by an implementation team, is accountable for integrating these key management efforts. Although these efforts are intended to complement one another, the priorities for each initiative have not been fully integrated with a DOD-wide approach to resolve UAS challenges and determine how UAS will meet the department's intelligence, surveillance, and reconnaissance or other mission needs. Second, DOD has not defined the roles, responsibilities, and relationships among the various UAS-related organizations to provide for effective communication of efforts within DOD and among external stakeholders. For example, DOD has not clarified how it will coordinate the efforts of its task forces addressing UAS issues. Third, DOD has not developed a comprehensive and integrated strategic plan to align departmental and service efforts to improve the management and operational use of UAS with long-term implementation goals, priorities, time lines, and other departmental planning efforts. DOD issued the Roadmap in 2007 to guide the development of unmanned systems to meet joint warfighter needs, but the Roadmap lacks key elements of a sound strategic plan, such as a focus on how to accomplish DOD's goals and objectives for UAS, milestones to track progress, identification of performance gaps, and clear linkages between proposed UAS investments and long-term planning goals. GAO's prior work has shown that a framework that includes an accountable implementation team, an established communications strategy, and a comprehensive and integrated strategic plan can serve as a basis for organizations that seek to transform their cultures in response to governance challenges and to sustain progress over time. In the absence of an approach that establishes clear accountability and a strategic plan to guide UAS development and investment decisions, DOD will continue to be challenged to fully integrate departmental and service efforts to resolve problems in the management and operational use of UAS.

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Abbreviations

DOD Department of Defense
ISR intelligence, surveillance, and reconnaissance
UAS unmanned aircraft systems

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United States Government Accountability Office
Washington, DC 20548

November 14, 2008

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

Battlefield commanders have experienced a high level of mission success in ongoing operations with transformational capabilities such as unmanned aircraft systems (UAS). Beyond a traditional intelligence, surveillance, and reconnaissance (ISR) role, UAS have also been outfitted with missiles to strike targets, with equipment to designate targets for manned aircraft by laser, and with sensors to locate the position of improvised explosive devices and fleeing insurgents, among other tasks. Because of a greater demand for UAS, the Department of Defense (DOD) has increased funding and sought additional funds for these programs. DOD plans to spend more than \$17 billion from fiscal years 2008 through 2013 to invest in systems with expanded and new capabilities. In addition, DOD recently reprogrammed about \$1.3 billion in fiscal year 2008 funds with congressional approval to increase ISR capabilities, including UAS, to support ongoing operations.

Although DOD has experienced a high level of mission success with UAS in ongoing operations, the dramatic increase in the demand for, and use of, these assets has posed challenges for DOD, including the development and acquisition of UAS programs and the integration of UAS into combat operations. For example, some UAS were not designed to meet joint service requirements or interoperability communications standards and, as a result, cannot easily exchange data, even within the same military service. Additionally, certain electromagnetic spectrum frequencies that are required for wireless communications are congested because a large number of UAS and other weapons or communications systems use them simultaneously. Furthermore, DOD has been unable to fully optimize the use of its UAS assets in combat operations because it lacks an approach to allocating and tasking them that considers the availability of all assets in determining how best to meet warfighter needs. Moreover, DOD has been unable to fully evaluate the success of its UAS missions because it lacks a complete set of performance metrics. DOD is taking steps to address these

challenges, such as developing UAS interoperability standards and metrics to assess UAS performance.

In March 2007, the Air Force requested that it be designated the executive agent¹ for medium- and high-altitude UAS as a way to address challenges, including avoiding duplication of acquisition efforts among different military services; standardizing UAS operations, training, and procedures; and improving the distribution of UAS intelligence information across all DOD components. The House Committee on Armed Services also expressed concerns about the department's approach to overseeing UAS programs, including the lack of an executive agent to guide development and investment decisions in UAS and to coordinate these efforts with related manned ISR programs. The committee directed the Secretary of Defense to complete a review of UAS-related competencies and determine whether the designation of one military department as executive agent for UAS would best serve to eliminate duplication of effort, enhance interoperability, and achieve commonality with existing ISR systems.² DOD decided not to designate any one service as an executive agent for UAS and instead took alternative actions. For example, DOD rechartered the Office of Secretary of Defense's UAS Planning Task Force to lead a departmentwide effort to coordinate UAS issues and to develop a plan to enhance operations, enable interdependencies, and streamline the acquisition of UAS.

This report responds to a request by the Subcommittee on Air and Land Forces, House Committee on Armed Services, that we evaluate several aspects of DOD's UAS, including DOD's approach for managing and overseeing UAS programs and its ability to support current and planned UAS inventories. Specifically, the objectives of this review were to (1) identify key departmental and service efforts to improve the management and operational use of UAS and (2) assess the extent to which DOD's efforts constitute an overarching organizational framework to guide and oversee UAS efforts. We plan to continue our work in this area and will report separately on additional UAS issues.

¹ According to DOD Directive 5101.1, *DOD Executive Agent* (Sept. 3, 2002), a DOD executive agent is the head of a DOD component to whom the Secretary of Defense or the Deputy Secretary of Defense has assigned specific responsibilities, functions, and authorities to provide defined levels of support for operational missions or administrative or other designated activities that involve two or more DOD components.

² H.R. Rep. No. 110-146, Title IX, at 372 (2007).

To identify key departmental and military service efforts to improve the management and operational use of UAS, we obtained and analyzed available internal DOD documentation, including briefings, directives, memorandums, and plans that describe specific initiatives that DOD and the military services have implemented relating to UAS. We interviewed officials with the Office of the Secretary of Defense, the Joint Staff, DOD's unified combatant commands, and the military services to better understand DOD's decision-making processes for implementing these initiatives. We also interviewed officials who are leading and participating in key initiatives to obtain information about their goals, progress made to date, and any unresolved challenges. We analyzed DOD plans for UAS studies and interviewed relevant officials to determine how DOD intends to use the study results to inform current and future UAS plans. To assess the extent to which DOD's efforts constitute an overarching organizational framework to guide and oversee UAS efforts, we obtained and analyzed documents that describe the roles, responsibilities, and relationships of the offices and entities that are responsible for improving the management and operational use of UAS. These documents include directives and memorandums, plans, draft and finalized organizational charters, and UAS program management and budget materials. We identified elements of an overarching organizational framework based on our prior work and the Government Performance and Result Act of 1993 to determine the extent to which DOD's UAS oversight structure incorporates these key elements.³ We interviewed officials with the Office of the Secretary of Defense, the Joint Staff, and the military services responsible for managing or overseeing UAS issues to obtain their views on the extent to which DOD's efforts constitute an integrated approach. We conducted this performance audit from September 2007 through November 2008 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our

³ See, for example, GAO, *Defense Business Transformation: Achieving Success Requires a Chief Management Officer to Provide Focus and Sustained Leadership*, [GAO-07-1072](#) (Washington, D.C.: Sept. 5, 2007); *Highlights of a GAO Forum: Mergers and Transformation: Lessons Learned for a Department of Homeland Security Other Federal Agencies*, [GAO-03-293SP](#) (Washington, D.C.: Nov. 14, 2002); and *Highlights of a GAO Roundtable: The Chief Operating Officer Concept: A Potential Strategy to Address Federal Governance Challenges*, [GAO-03-192SP](#) (Washington, D.C.: Oct. 4, 2002).

audit objectives. A more detailed discussion of our scope and methodology is provided in appendix I.

Results in Brief

Over the past several years, the Office of the Secretary of Defense, the Joint Staff, and the military services have taken a number of steps intended to address long-standing challenges in the management of UAS programs and the operational use of these systems. To provide for common, joint, and effective UAS programs and to address challenges such as the development and acquisition of UAS and the integration of these assets into combat operations, DOD established new entities within the Office of the Secretary of Defense, including new task forces for ISR and UAS. In addition, it refocused the mission of an existing organization to coordinate the development of training activities and to improve the operational employment of UAS. DOD has also initiated several studies to determine UAS needs. For example, U.S. Strategic Command is leading a departmentwide study to determine all long-term requirements for ISR programs, including UAS. According to officials with the Office of the Secretary of Defense and the Joint Staff, the results of these studies will be used to guide future UAS acquisition decisions. Additionally, in December 2007 DOD issued the *Unmanned Systems Roadmap 2007-2032* (Roadmap),⁴ which it characterizes as a comprehensive, departmentwide plan for the evolution and transition of unmanned systems technology. The military services are also taking several actions intended to improve the management and operational use of UAS. For example, in select cases the military services are developing and fielding common UAS programs and proceeding to develop more common UAS concepts of operations.

While DOD has taken several steps to improve the management and operational use of UAS, its approach lacks key elements of an overarching organizational framework needed to fully integrate efforts, sustain progress, and resolve long-standing challenges in acquiring and operating UAS in a joint environment. First, despite its establishment of new entities to address issues, DOD has not designated one office or entity—supported by an implementation team—that is accountable for integrating the various management efforts undertaken to address challenges presented by the development and acquisition of UAS and their integration into combat operations. Second, DOD has not defined the roles, responsibilities, and relationships among the various UAS-related

⁴ Department of Defense, *Unmanned Systems Roadmap 2007-2032* (Dec. 10, 2007).

organizations to provide for effective communication of UAS efforts within DOD and among external stakeholders, such as Congress. Third, DOD has not developed a comprehensive and integrated strategic plan to align departmental and service efforts to improve the management and operational use of UAS with long-term implementation goals, priorities, and time lines, and with other departmental planning efforts. Our prior work has shown that a framework that includes an accountable leadership entity supported by an implementation team, an established communications strategy, and a comprehensive and integrated strategic plan can serve as a basis for organizations that seek to transform their cultures in response to governance challenges and to sustain progress over time. Senior DOD leaders have increased their emphasis on UAS and commenced at least seven separate initiatives and related organizational changes since September 2006 that at least in part are intended to address challenges that have arisen from the rapid integration of UAS into the military services' force structure, such as establishing the UAS Task Force. However, the accountability for these initiatives resides with differing organizations within DOD, and although these efforts are intended to complement one another, the priorities for each initiative have not been fully integrated with a DOD-wide approach to resolve UAS challenges and determine how UAS will meet the department's ISR or other mission needs. In addition, DOD has not clearly defined the roles, responsibilities, and relationships of its newly created task forces (e.g., clarifying how the department will coordinate efforts to implement the recommendations of the ISR Task Force). Further, although DOD issued the Roadmap in 2007 to guide the development of unmanned systems and related technologies to meet joint warfighter needs, the Roadmap lacks key elements of a sound strategic plan, such as a focus on how to accomplish DOD's goals and objectives for UAS, milestones to track progress, an identification of current performance gaps, and clear linkages between proposed UAS investments and long-term planning goals. Moreover, we found that the Roadmap's goals are not integrated with DOD's strategic goals for ISR, as established in other comprehensive departmental planning documents. In the absence of an approach that establishes clear leadership accountability and a strategic plan to guide UAS development and investment decisions, DOD will continue to be challenged to fully integrate departmental and service efforts to resolve long-standing problems in the management and operational use of UAS.

To develop a fully integrated framework to sustain progress and resolve long-standing challenges in the management and operational use of UAS, we are making recommendations to the Secretary of Defense to

- (1) designate a single departmental entity responsible and accountable for

integrating all cross-cutting DOD efforts related to UAS; (2) define the roles, responsibilities, and relationships among various UAS-related entities to facilitate communication within DOD and among external stakeholders; and (3) develop a UAS strategic plan to align and integrate respective departmental and service efforts and funding with long-term goals. DOD did not concur with our first recommendation; partially concurred with our second recommendation; and did not concur with our third recommendation, citing actions it has already taken. However, while recognizing DOD's efforts to date, we continue to believe additional actions are needed. DOD's comments and our evaluation appear later in this report.

Background

UAS of all types and categories include aircraft, payloads, control elements, and a human component. Aircraft can be rotary, fixed wing, or lighter than air, and they are capable of flight without an on-board crew. Payloads, which aircraft are designed to carry, allow the UAS to accomplish their mission. The range of payloads includes sensors; weapons; cargo, such as mission-critical supplies; and equipment to extend communications networks. Control elements are responsible for controlling the unmanned aircraft and their payloads as well as communications. Control elements can be ground based, sea based, or airborne. The human component consists of the personnel trained by the military services to support UAS operations. For example, personnel are trained as mission commanders, aircraft and payload operators, maintainers, or intelligence analysts. The military services also use contractors, in some cases, to perform these functions.

DOD documents categorize UAS into three main classes—man-portable, tactical, and theater.⁵ Man-portable UAS are small, self-contained, and portable and are generally used to support small ground combat teams in the field. Tactical UAS are larger systems, generally used to support operational units at tactical levels of command, such as battalions or brigades. Tactical UAS are locally operated and controlled by the units. Theater UAS are controlled by the Joint Forces Air Component

⁵ Additional efforts are under way to further define UAS categories. For example, the March 2007 *Joint Concept of Operations for Unmanned Aircraft Systems* expands the three classes into five categories: Tactical I, Tactical II, Tactical III, Operational, and Strategic. Tactical categories I through III are correlated closely with the typical operating altitudes for the systems in each category. The Operational and Strategic categories represent those UAS used for operational and strategic objectives.

Commander and are generally used to support the combatant commander's ISR priorities, but in certain circumstances they can be assigned to support tactical operations. Theater UAS have traditionally been more capable than tactical or man-portable UAS.

In 2000, DOD components had fewer than 50 unmanned aircraft in their inventory; as of May 2008, they had more than 6,000.⁶ Many of the UAS currently being used to support military operations are part of formal DOD acquisition programs. DOD components have also fielded other types of UAS in order to meet urgent warfighter requests and for technology demonstrations. UAS can be government owned and operated, government owned and contractor operated, or contractor owned and operated. Although every military service and U.S. Special Operations Command operate several types of UAS, each does not currently operate a UAS in every UAS class. Table 1 provides a summary of UAS currently operated by DOD components and contractors and of UAS that are not yet fielded but appear in DOD's acquisition plans.

Table 1: DOD Components' Current and Planned UAS

DOD component	UAS category	Current DOD UAS	Contractor-operated UAS	Planned DOD UAS
Army	Man-portable	• Micro Air Vehicle • Raven	• Micro Air Vehicle	None
	Tactical	• Hunter • Shadow	• Hunter • I-Gnat • Warrior-Alpha	• Sky Warrior • Fire Scout
	Theater	None	None	None
Air Force	Man-portable	• Battlefield Air Targeting Micro Air Vehicle • Raven	None	None
	Tactical	None	Scan Eagle	None
	Theater	• Predator • Reaper • Global Hawk	None	None
Navy	Man-portable	• Gas Micro Air Vehicle • Raven	None	• Wasp Micro Air Vehicle

⁶ The total number represents the number of unmanned aircraft, rather than UAS, and includes test and training assets.

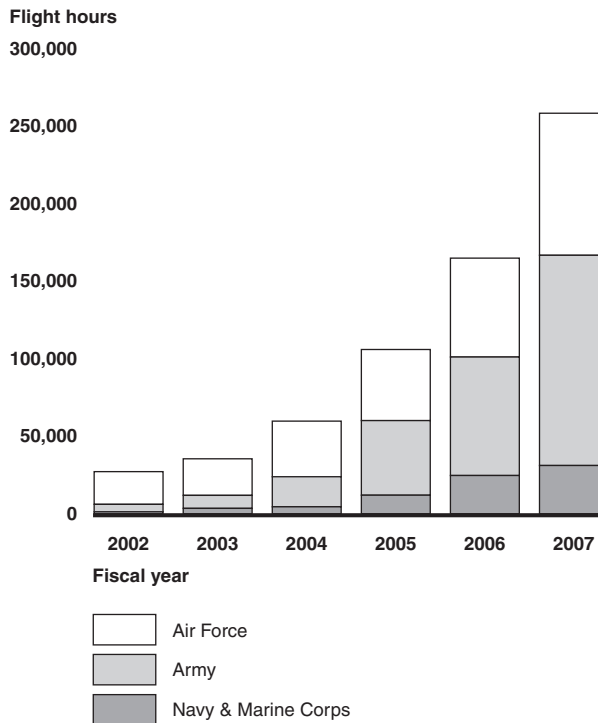
DOD component	UAS category	Current DOD UAS	Contractor-operated UAS	Planned DOD UAS
	Tactical	- Shadow - Silver Fox	Scan Eagle	- Small Tactical UAS - Fire Scout
	Theater	None	None	- Broad Area Maritime Surveillance - Unmanned Combat Air Vehicle
Marine Corps	Man-portable	- Wasp Micro Air Vehicle - Raven	None	None
	Tactical	Shadow	Scan Eagle	- Tier II UAS - Tier III Vertical UAS
	Theater	None	None	None
U.S. Special Operations Command	Man-portable	- Raven - Puma All Environment Capable Variant	None	None
	Tactical	- Neptune - Sentry - Predator	- Tiger Shark - Scan Eagle	None
	Theater	Reaper	None	None

Source: GAO analysis of DOD documents.

DOD's Increasing Reliance on UAS

Beyond replacing human beings in “dull, dirty, and dangerous” roles, UAS are highly valuable because they possess characteristics that many manned aircraft do not. For example, unmanned aircraft can fly for long-duration missions and can provide a sustained presence over the battlefield. Additionally, unmanned aircraft may be equipped with multiple payloads that may enable them to satisfy several missions during one flight. DOD's use of UAS has increased dramatically as the military services continue to develop and field these systems. As shown in figure 1, the number of flight hours performed by the military services' UAS has increased each year since fiscal year 2002.

Figure 1: Number of Flight Hours for DOD's UAS



Source: DOD.

Note: These data do not include smaller, man-portable UAS.

As of the end of May 2008, the military services' UAS had performed more than 230,000 flight hours in fiscal year 2008.

DOD has established goals for its continuing development and fielding of UAS programs. The February 2006 *Quadrennial Defense Review Report* stated that DOD intended to increase UAS procurement to nearly double the persistent surveillance⁷ capacity DOD had at the time of that publication; to establish a plan to develop a new land-based, long-range strike force by 2018, of which about 45 percent would be unmanned; to expand maritime aviation to include unmanned aircraft for both surveillance and strike missions; and to establish a UAS squadron under

⁷ DOD defines persistent surveillance as a collection strategy that emphasizes the ability of some collection systems to linger on demand in an area to detect, locate, characterize, identify, track, target, and possibly provide battle damage assessment and retargeting in near or real time.

U.S. Special Operations Command to provide the command with organic capabilities to locate and target enemy capabilities. DOD's funding plans for UAS reflect their growing importance to the department. In fiscal year 2009, DOD requested approximately \$3.5 billion for UAS procurement and research and development—approximately \$1 billion more than the department's fiscal year 2008 request. As shown in table 2, DOD plans to make additional investments in UAS programs from fiscal years 2010 through 2013.

Table 2: Defense Budget Plans for UAS

Dollars in millions							
	Fiscal year 2008	Fiscal year 2009	Fiscal year 2010	Fiscal year 2011	Fiscal year 2012	Fiscal year 2013	Total
Procurement	\$1,587.4	\$2,170.3	\$2,310.9	\$1,968.8	\$1,556.3	\$1,325.3	\$10,919.0
Research, development, test and evaluation	927.6	1,320.4	1,364.4	1,110.5	904.0	729.7	\$6,356.6
Total	\$2,515.0	\$3,490.7	\$3,675.3	\$3,079.3	\$2,460.3	\$2,055.0	\$17,275.6

Source: GAO analysis of funding for UAS included in the President's fiscal year 2009 budget request, not including supplemental funds.

Organizations Involved in UAS Management and Integration

The responsibility for the management and integration of UAS is shared among several DOD components. For example, each military service is responsible for the development and acquisition of UAS capabilities to meet validated combatant commander needs. In addition, DOD implemented the Joint Capabilities Integration and Development System in 2003 as the department's principal process for identifying, assessing, and prioritizing joint military capabilities.⁸ DOD has also established organizations that are intended to improve the management and operational use of UAS and to integrate the military services' UAS programs. In 2001, for example, the Undersecretary of Defense for Acquisition, Technology, and Logistics created the joint Unmanned Aerial Vehicle Planning Task Force to serve as a joint advocate for developing and fielding UAS. The task force was established to be the single focal point within DOD to help create a common vision for future UAS-related activities and to establish UAS interoperability standards. The task force was responsible for coordinating detailed plans, or roadmaps; recommending priorities for development and procurement efforts; and

⁸ The Joint Capabilities Integration and Development System is one component of DOD's capabilities-based planning process and plays a role in identifying the capabilities required by warfighters to support the national defense and military strategies.

preparing guidance to the military services and agencies for UAS programs and functions. The task force published several versions of the Roadmap, which described UAS programs, identified potential missions for UAS, and provided guidance on the development of emerging technologies.

In 2005, DOD established the Joint UAS Center of Excellence with the mission of providing support to joint warfighters and the military services to identify solutions for UAS capabilities and use. DOD chartered the Joint UAS Center of Excellence to focus on developing common UAS operating standards, capabilities, concepts, technologies, doctrine, tactics, techniques, procedures, and training. For example, the Joint UAS Center of Excellence has the responsibility to develop and update the joint concept of operations for UAS⁹ first published in March 2007. The document provides overarching principles, a discussion of UAS capabilities, operational views, and a discussion of UAS use in various operational scenarios.

In September 2006, the Deputy Secretary of Defense combined all the ISR systems across DOD to form a capability portfolio, in a test case for the joint capability portfolio management concept.¹⁰ Portfolio management principles are commonly used by large commercial companies to prioritize needs and allocate resources. Under this concept, a group of military capabilities, such as ISR, are managed as a joint portfolio across DOD—rather than by individual military service or individual program. In this way, DOD reasons that it can potentially improve the interoperability of future capabilities, minimize capability redundancies and gaps, and maximize capability effectiveness. DOD assigned the Office of the Undersecretary of Defense for Intelligence to be the lead office for this ISR portfolio, known as the battlespace awareness portfolio. In addition, the National Defense Authorization Act for Fiscal Year 2004 required the Undersecretary of Defense for Intelligence to develop a plan to guide the development and integration of DOD’s ISR capabilities from 2004 through

⁹ Department of Defense, *Joint Concept of Operations for Unmanned Aircraft Systems* (March 2007).

¹⁰ In February 2008, DOD announced its plans to formalize the test cases, including the ISR portfolio, as standing capability portfolio management efforts.

2018.¹¹ To date, DOD has provided two updates of the Defense ISR Integration Roadmap that discuss different management aspects of DOD's ISR programs, including UAS.

DOD has also considered other proposals related to the management and integration of UAS programs. In 2005, the military services were unable to reach consensus on the scope, composition, requirements, and charter for an executive agent for UAS. In 2007, the Air Force proposed that it be designated executive agent for medium- and high-altitude UAS, for several reasons, including to avoid duplicating separate service acquisition efforts by centralizing the procurement of all medium- and high-altitude unmanned aircraft and their associated ground equipment and standardizing UAS operations, training, and combat tactics, techniques, and procedures. Although the Joint Requirements Oversight Council¹² initially endorsed the establishment of an executive agent for medium- and high-altitude UAS under the Secretary of the Air Force, the Deputy Secretary of Defense ultimately decided that an executive agent was unnecessary and instead took alternative actions—such as convening the UAS Task Force—intended to provide for common, joint, and operationally effective UAS programs.

¹¹ Section 923 of the National Defense Authorization Act for Fiscal Year 2004 (Pub. L. No. 108-136) amended Title 10 of the U.S. Code by adding section 426, which required the Undersecretary of Defense for Intelligence to develop the ISR Integration Roadmap and to submit to Congress a report on the roadmap that addressed six management aspects of the ISR enterprise.

¹² The Joint Requirements Oversight Council is an advisory council that assists the Chairman of the Joint Chiefs of Staff in identifying and assessing the priorities for joint military requirements to achieve current and future military capabilities. Chaired by the Vice Chairman of the Joint Chiefs of Staff, the council is composed of a senior officer from each of the military services. Representatives from other DOD entities, such as the combatant commands and the Joint Staff, serve in an advisory role to the council.

Departmental and Military Service Efforts Are Under Way to Improve the Management and Operational Use of UAS

Over the past several years, the Office of the Secretary of Defense, the Joint Staff, and the military services have undertaken several initiatives to improve the management of UAS programs and the operational use of these systems. To address challenges such as the development and acquisition of UAS and the integration of these assets into combat operations, DOD has established new entities within the Office of the Secretary of Defense and refocused the mission of an existing organization. DOD has also initiated several studies to determine UAS needs and help inform future UAS acquisition decisions. In addition, DOD issued the Roadmap, which it characterizes as a comprehensive plan for the evolution and transition of unmanned systems technology, including UAS. Furthermore, in select cases the military services are developing and fielding common UAS programs and proceeding to develop more common UAS concepts of operations.

New and Existing Organizations within DOD Are Intended to Address UAS Challenges

DOD has established two new entities within the Office of the Secretary of Defense to address UAS challenges. First, in September 2007, in lieu of establishing an executive agent for UAS, the Deputy Secretary of Defense directed the Undersecretary of Defense for Acquisition, Technology, and Logistics to convene a task force to coordinate critical UAS issues and develop a way forward to enhance operations, enable interdependencies, and streamline UAS acquisition. In response to this direction, the Undersecretary of Defense for Acquisition, Technology, and Logistics rechartered the UAS Planning Task Force in October 2007 as the UAS Task Force and assigned organizations within the military services, the Joint Staff, and the Office of the Secretary of Defense to lead integrated product teams for issues related to the acquisition and management of UAS. DOD also established a senior steering group, composed of senior military officers and DOD civilians, to periodically assess the UAS Task Force's progress and to address unresolved issues. A primary near-term focus of the UAS Task Force has been to implement the Deputy Secretary of Defense's direction to the Army and the Air Force to combine the Army's Sky Warrior UAS and the Air Force's Predator UAS programs into a single acquisition program in order to achieve efficiencies in areas such as common development, procurement, and training activities. Table 3 provides a description of UAS Task Force organizations and summarizes their intended purpose.

Table 3: Description and Purpose of UAS Task Force Organizations

Lead DOD organizations	Description of organization	Purpose of organization
Office of the Secretary of Defense	Acquisition streamlining	Assess and evaluate programs for acquisition streamlining and develop options to combine the Sky Warrior and Predator UAS programs
Office of the Secretary of Defense and the Joint Staff	Research and development coordination	Identify critical warfighter deficiencies with potential to be supported by UAS, and identify opportunities to match science and technology investments with these deficiencies
Office of the Secretary of Defense and the Navy	Standardization and interoperability improvements	Develop interoperability standards with a near-term focus on developing a profile for the combined Sky Warrior and Predator program
Office of the Secretary of Defense and the Air Force	Civil airspace integration planning and technology development	Review and assess operational requirements; identify acquisition solutions; and recommend training and policy changes necessary to fully integrate UAS into all necessary classes of airspace to support DOD requirements
Office of the Secretary of Defense and the Army	Payload and sensor integration	Review and assess operational requirements; identify potential joint acquisitions; and recommend integrated training and sustainment activities to optimize UAS payload development and fielding
Office of the Secretary of Defense	Frequency and bandwidth utilization	Develop and implement a UAS frequency management plan for all DOD UAS to support the full range of mission requirements

Source: GAO analysis of DOD documents.

Second, in April 2008 the Secretary of Defense established a separate entity—the ISR Task Force—to develop options to deploy additional ISR capabilities, including UAS, to support ongoing military operations in Afghanistan and Iraq. The ISR Task Force is also responsible for developing options to improve the effectiveness and efficiency of deployed ISR and UAS assets and has made a series of recommendations to the Secretary of Defense to increase ISR capabilities. Based on these recommendations, DOD received congressional approval to reprogram about \$1.3 billion in fiscal year 2008 funds to increase ISR capabilities to support ongoing operations. Of this amount, about \$500 million will be used for various UAS initiatives, such as increasing the number of

Predator combat air patrols¹³ and acquiring additional contractor-operated UAS. The ISR Task Force is developing other proposals to further increase the use of UAS, such as deploying increased numbers of the Army's Shadow, a tactical UAS.

Furthermore, in November 2007 DOD refocused the mission of the Joint UAS Center of Excellence (Center) to coordinate the development of training activities and to improve the operational employment of UAS. The Center was established in July 2005 under the Joint Staff with a broad mission to enhance joint UAS operations. Since November 2007, the Center has initiated work on a range of activities. For example, it has conducted a study to evaluate alternative command and control arrangements for UAS to optimize the use of assets that are capable of conducting joint operations. In addition, the Joint Requirements Oversight Council requested that the Center assess the military services' training and manning approaches for all categories of UAS and develop recommendations to achieve joint-service efficiencies. It is also revising the joint concept of operations for UAS¹⁴ to include more detailed information on special operations forces' UAS procedures and maritime and urban UAS operations, among other topics. The Center is also assisting U.S. Joint Forces Command in its annual effort to update joint doctrine to ensure the inclusion of consistent and relevant information regarding UAS operations.

Several Studies Are Under Way to Assess Long-term UAS Demand and to Improve UAS Effectiveness

DOD organizations have initiated several studies to determine long-term UAS needs that will be used to inform future UAS acquisition decisions. For example, the Office of the Undersecretary of Defense for Intelligence is leading an assessment of the demand for ISR capabilities for conventional forces in the Global War on Terrorism and irregular warfare. According to officials, the study is intended to clarify mid- and long-term needs for specific ISR programs, including UAS. The analysis is based on an assessment of ISR performance across a range of military missions in Iraq, such as counterinsurgency operations, and has been used to determine which ISR capabilities are insufficient to meet the demand for these capabilities. According to officials with the Office of the Undersecretary of Defense for Intelligence, the analysis has been a key

¹³ A combat air patrol is composed of the system equipment, manpower, and communications infrastructure needed to provide continuous operations.

¹⁴ Department of Defense, *Joint Concept of Operations for Unmanned Aircraft Systems*.

source of data used to support DOD's decisions to increase investments in additional UAS platforms and sensors. In addition, the analysis has been used to develop guidance that the Office of the Secretary of Defense provided to the DOD components, instructing them to further invest in UAS capabilities. Based on current plans, these investments will be reflected in DOD's budget request for the President's fiscal year 2010 budget.

In addition, U.S. Strategic Command is leading a departmentwide study to determine all long-term requirements for ISR programs, including UAS. In order to meet warfighter demand for the capabilities provided by UAS assets, the department has requested increased production of certain UAS, including the Predator, Sky Warrior, Reaper, and Global Hawk, to their maximum production capacity. According to officials with the Office of the Secretary of Defense and the Joint Staff, U.S. Strategic Command is currently developing an approach to determine the mix of manned and unmanned ISR assets, including UAS, needed to support the department's force plans established in DOD's planning documents. The results of this study will be used by DOD to guide decisions in future investments in UAS programs.

Furthermore, in its first quadrennial review of the roles and missions of the armed forces, DOD is examining those concerning UAS operations in particular. DOD's review is intended to determine whether there is unnecessary duplication of capabilities across DOD components and how the department could better develop UAS to increase combat effectiveness and improve support to warfighters, among other issues. This review is being conducted in 2008 and DOD must submit the results to the relevant committees of Congress not later than the date for submission of the department's budget request for the President's fiscal year 2010 budget.¹⁵

¹⁵ Section 941 of the National Defense Authorization Act for Fiscal Year 2008 (Pub. L. No. 110-181) amended section 118b of Title 10 of the U.S. Code to require the Secretary of Defense to conduct a comprehensive assessment, every 4 years, of the roles and missions of the armed forces and the core competencies and capabilities of DOD to perform and support such roles and missions, and require the Chairman of the Joint Chiefs of Staff to prepare and submit to the Secretary, in each year of such assessment, the Chairman's assessment of the roles and missions of the armed forces as well as any recommendations for changes in assignment.

Roadmap Is Intended to Guide UAS Planning

In December 2007, DOD issued the Roadmap, which it characterizes as a comprehensive, departmentwide plan for the future development of unmanned systems, including UAS. The 2007 Roadmap is an update of the 2005 Roadmap and incorporates the military services' individual roadmaps and plans for UAS, unmanned ground vehicles, unmanned undersea vehicles, and unmanned surface vehicles. The Roadmap identifies mission areas within DOD that can be supported technologically and operationally by unmanned systems and that should be considered by DOD components when prioritizing future research, development, and procurement of unmanned systems. Additionally, the Roadmap establishes specific goals for unmanned systems to support larger DOD goals of fielding transformational capabilities, establishing and implementing joint standards, ensuring interoperability, balancing the portfolio, and controlling costs. The specific goals for unmanned systems are as follows:

- Improving the effectiveness of combatant command and coalition unmanned systems through improved integration and joint services collaboration.
- Emphasizing commonality to achieve greater interoperability among system controls, communications, data products, and data links on unmanned systems.
- Fostering the development of policies, standards, and procedures that enable safe and timely operations and the effective integration of manned and unmanned systems.
- Implementing standardized and protected control measures for unmanned systems and their associated armament.
- Supporting rapid integration of validated combat capabilities in fielded and deployed systems through a flexible test and logistical support process.
- Aggressively controlling cost by utilizing competition, refining and prioritizing requirements, and increasing interdependencies among DOD systems.

The Military Services Have Initiated Efforts Intended to Improve UAS Management and Operational Use

The military services have also taken steps intended to improve the management of UAS programs and the operational use of these systems. For example, the Army, Air Force, and Navy joint-service airspace integration work group has developed a two-phase strategy intended to meet DOD's UAS operational and training needs. The first phase focuses on resolving near-term issues to expand access to the national airspace for specific UAS beyond current DOD and Federal Aviation Administration restrictions. The second phase is intended to develop specific performance standards for UAS technologies and operational procedures

that will provide UAS with an appropriate level of safety to operate in the airspace required to accomplish its mission.

In addition, in select cases the military services have taken steps to develop more common UAS programs, and the Army and Air Force are developing a common concept of operations to employ similar UAS. For example:

- In September 2007, the Deputy Secretary of Defense directed that the Army's Sky Warrior UAS and the Air Force's Predator UAS be combined into a single acquisition program. In February 2008, the Army and Air Force signed a memorandum of agreement to establish an acquisition partnership for the development and acquisition of the combined Sky Warrior and Predator acquisition program. The goals of this effort are to reduce total acquisition costs and facilitate increased interoperability. As part of this effort, the services established an executive steering group to provide overarching management of the Army and Air Force combined acquisition effort.
- With guidance from the Office of the Secretary of Defense, the Army and Marine Corps have developed a common set of UAS programs to support land operations. For example, Army and Marine Corps ground forces, as well as special operations forces, employ the Raven man-portable UAS. Additionally, the Marine Corps began fielding the Shadow tactical UAS in 2007 as the replacement system for the legacy Pioneer UAS. The Shadow is the tactical UAS fielded by the Army's brigade combat teams.
- The Navy and Marine Corps have also taken steps to combine separate UAS acquisition programs. The Navy made the decision to combine two separate programs—the Navy's Small Tactical UAS and the Marine Corps' Tier II UAS—into a single acquisition program to eliminate duplicative development efforts while ensuring an integrated and interoperable program for Navy and Marine Corps requirements.
- In August 2007, the Joint Staff validated separate concepts of operations for the Army's Sky Warrior UAS and the Air Force's Predator UAS, stipulating that a joint force commander be enabled to use these assets as needed to meet theater requirements. However, the Army and Air Force, in coordination with U.S. Joint Forces Command, are currently identifying areas where commonality may be achieved in a common concept of operations, and they have initiated work to develop a joint-service concept of operations for the Sky Warrior and Predator UAS that will describe the capabilities and requirements for UAS employment at the theater level.

DOD Efforts Lack Elements of an Overarching Organizational Framework to Improve the Management and Operational Use of UAS

DOD has taken several positive steps to improve the management and operational use of UAS, but its approach lacks key elements of an overarching organizational framework needed to fully integrate efforts, sustain progress, and resolve long-standing challenges. First, although DOD has created new entities and assigned other offices to oversee various aspects of UAS matters, no single office or entity is accountable for integrating key management efforts undertaken to address the full range of challenges that DOD faces in the development and acquisition of UAS and the use of these assets in combat operations. Second, DOD has not defined the roles, responsibilities, and relationships among the various UAS-related organizations to provide for effective communication of UAS efforts within DOD and among external stakeholders, such as Congress. Third, DOD has not developed a comprehensive and integrated strategic plan to align departmental and service efforts to improve the management and operational use of UAS with long-term implementation goals, priorities, and time lines, as well as with other departmental planning efforts.

DOD Has Not Designated a Single Office or Entity That Is Accountable for Integrating UAS Efforts

DOD has not designated a single office or entity, supported by an implementation team, that is accountable for integrating departmental and service efforts to resolve the full range of challenges presented by the development and acquisition of UAS and their integration into combat operations. Our prior work has shown that as DOD and other agencies embark on large-scale organizational change initiatives, there is a compelling need to integrate various key management and transformational efforts into a coherent and enterprisewide approach. We have also reported that top-level leadership should vest an implementation team with dedicated resources and funding to ensure that change initiatives receive focused, full-time attention and are implemented in a coherent and integrated way.¹⁶ Without such leadership, DOD risks not being able to sustain its progress and ensure the success of its efforts to improve the management and operational use of UAS.

Although senior DOD leaders have increased management attention on UAS by establishing new entities and assigning responsibilities to improve the management and operational use of UAS to several different DOD offices, no single office or entity is accountable for coordinating and integrating the department's various cross-cutting UAS efforts. Our prior

¹⁶ See, for example, [GAO-07-1072](#), [GAO-03-293SP](#), and [GAO-03-192SP](#).

work has shown that DOD lacked a robust oversight framework to guide UAS development and investment decisions.¹⁷ As such, we previously recommended that DOD designate a single organization with sufficient authority to enforce the implementation of a UAS strategic plan and to promote joint operations and the efficient expenditure of funds. DOD did not agree with our recommendation noting that the existing organizational framework provided sufficient oversight.

Since that time, DOD has taken additional actions that are intended to both improve the management of UAS programs and the operational use of these systems, and determine how UAS capabilities will support the department's ISR needs. Our analysis shows that DOD has commenced at least seven separate initiatives and related organizational changes since September 2006 that at least in part are intended to do so. Yet as shown in table 4, the accountability for these initiatives resides with differing organizations within DOD. For example, the UAS Task Force receives its direction and provides recommendations through the Office of the Undersecretary of Defense for Acquisition, Technology, and Logistics to the Deputy's Advisory Working Group.¹⁸ Separately, the Joint UAS Center of Excellence has been directed to coordinate efforts to improve the training and operational use of UAS and will report progress through U.S. Joint Forces Command to the Joint Requirements Oversight Council. Although these efforts are intended to complement one another, the priorities for each initiative have not been fully integrated with a DOD-wide approach to resolve UAS challenges and determine how UAS will meet the department's ISR or other mission needs.

¹⁷ See GAO, *Force Structure: Improved Strategic Planning Can Enhance DOD's Unmanned Aerial Vehicles Efforts*, [GAO-04-342](#) (Washington, D.C.: Mar. 17, 2004), and *Unmanned Aircraft Systems: Improved Planning and Acquisition Strategies Can Help Address Operational Challenges*, [GAO-06-610T](#) (Washington, D.C.: Apr. 6, 2006).

¹⁸ The Deputy's Advisory Working Group is one of DOD's principal integrated civilian-military governance bodies. It provides advice and assistance to the Deputy Secretary of Defense on matters pertaining to DOD enterprise management, business transformation, and operations and strategic-level coordination and integration of planning, programming, budgeting, execution, and assessment activities.

Table 4: Select DOD Initiatives to Improve Management and Operations of ISR and UAS

Initiative	Initiation date	Purpose	Reporting line of authority
Battlespace awareness capability portfolio manager	Sept. 2006	To oversee ISR capabilities, including UAS programs, to improve interoperability, minimize capability redundancies and gaps, and maximize capability effectiveness	Undersecretary of Defense for Intelligence and the Deputy's Advisory Working Group
UAS Task Force	Oct. 2007	To lead a DOD-wide effort to coordinate critical UAS issues and develop a way ahead to enhance operations, enable interdependencies, and streamline acquisitions	Undersecretary of Defense for Acquisition, Technology, and Logistics and the Deputy's Advisory Working Group
Joint UAS Center of Excellence	Nov. 2007 ^a	To focus the mission of the Joint UAS Center of Excellence on coordinating training activities and improving the operational employment of UAS	U.S. Joint Forces Command and the Joint Requirements Oversight Council
ISR support for conventional forces and missions in the Global War on Terrorism and irregular warfare	Jan. 2008	To evaluate the growing demand for ISR and UAS capabilities in irregular warfare, and to identify mid- and long-term ISR and UAS needs to gain an ISR advantage in irregular warfare	Undersecretary of Defense for Intelligence and the Joint Staff
ISR Task Force	April 2008	To assess and propose options for maximizing the number of deployed ISR and UAS assets, and to improve the efficiency and effectiveness of their use	Undersecretary of Defense for Intelligence and the Secretary of Defense
Quadrennial roles and missions review	May 2008	To assess opportunities to expand jointness, achieve greater operational effectiveness, and reduce unnecessary duplication in ISR and UAS programs	Undersecretary of Defense for Policy
ISR force sizing construct	June 2008	To develop an operational ISR force sizing construct and test it in coordination with U.S. Pacific Command	Joint Requirements Oversight Council

Source: GAO analysis of DOD documents.

^aThe Joint UAS Center of Excellence was established in 2005 with a broad mission to develop common UAS operating standards, capabilities, concepts, technologies, doctrine, tactics, techniques, procedures, and training.

DOD also does not have an implementation team in place, with dedicated resources and funding, to ensure that its efforts to improve the management and operational use of UAS are implemented in a coherent and integrated way. For example, most of the officials who lead DOD's UAS Task Force's integrated product teams do so as an extra responsibility outside of their normal work duties. In addition, the ISR and UAS task forces do not have dedicated funding to support their activities, such as travel funds for attending meetings, or to implement task force initiatives and recommendations. Officials told us that the lack of dedicated personnel and resources has created challenges for them in completing their work. A senior UAS Task Force official told us that the challenge created by the limited number of personnel assigned to the task force is further exacerbated by the fact that these personnel also participate in other ongoing UAS-related activities, such as the ISR Task

Force and the quadrennial roles and missions study. In contrast, the Joint UAS Center of Excellence is composed of joint-service personnel and has dedicated funding to perform its mission. Without a long-term funding mechanism in place, DOD may be unable to ensure that efforts to improve the management and operational use of UAS can be sustained over a period of years.

DOD Lacks a Strategy to Facilitate Effective Communication of UAS Efforts

DOD does not have an effective strategy to facilitate communication of UAS efforts within DOD and among external stakeholders, such as Congress, because it has not clearly defined the roles, responsibilities, and relationships of its various initiatives intended to improve the management and operational use of UAS. We have previously reported that establishing a communications strategy is important because it creates shared expectations and is crucial in the public sector, where policy making and program management call for transparency regarding the goals and outcomes to be achieved and the processes to be used in achieving them.¹⁹

However, DOD has not clearly defined the missions, authorities, roles and responsibilities, and near- and long-term goals for the ISR and UAS task forces in directives or other publications. For example, the ISR Task Force initiated its work under the broad direction specified in an April 2008 Secretary of Defense memorandum. Senior task force officials have expressed uncertainty about accountability for implementing the task force's recommendations, because the Secretary of Defense's memorandum does not specify how the implementation of the recommendations will be handled. In August 2008, DOD decided to realign the ISR Task Force under the Office of the Undersecretary of Defense for Intelligence. As of September 2008, DOD had not published a directive or other publication to guide the efforts of the task force. Although a senior task force official told us that efforts are under way to promulgate such guidance, it is unclear how the guidance will clarify the roles and responsibilities for the ISR Task Force, and how the Undersecretary of Defense for Intelligence will coordinate efforts to implement the task force's recommendations.

Furthermore, DOD has not defined the relationships within or among UAS efforts. For example, the UAS Task Force's integrated product teams addressing issues such as UAS acquisition streamlining and airspace integration have not completed detailed action plans that are clearly

¹⁹ [GAO-03-293SP](#).

integrated with the UAS Task Force's charter and other departmental UAS efforts. Although the UAS Task Force's integrated product teams had initiated work on charters and action plans at the time of our work, these efforts had not been finalized and milestones had not been established for completing them. As a result, it is unclear to what extent the UAS Task Force's integrated product teams had identified specific goals, stakeholders and their empowerment, personnel and resource requirements, and milestones for completing work. Moreover, it is unclear how the UAS Task Force's work has been integrated with that of other DOD entities that is intended to improve the management and operational use of UAS.

An independent assessment of the UAS Task Force, completed in August 2008 at the request of the Task Force Director, concluded that a key challenge in accomplishing its goals was the lack of an effective communications plan. The assessment team made recommendations that the task force and its integrated product teams complete formal charters, develop detailed action plans with milestones that identify stakeholders and resource requirements, and develop a strategy to improve communication from the task force leadership to the integrated product team members and across the task force's integrated product teams. Without a communications strategy that clearly defines the roles, responsibilities, and relationships of the various entities addressing UAS challenges, DOD may not adequately address House Committee on Armed Services concerns regarding the actions that DOD has taken to overcome UAS-related challenges and how these efforts are being coordinated with DOD's ISR manned and unmanned capabilities.

DOD Lacks a Comprehensive and Integrated Plan to Align Efforts to Improve Management and Operational Use of UAS

DOD continues to be challenged in improving the management and operational use of UAS because it lacks a comprehensive and integrated strategic plan that aligns individual UAS efforts with other departmental planning efforts. Our prior work has shown that this type of plan should contain results-oriented goals, measures, and expectations that link institutional, unit, and individual performance goals and expectations to promote accountability, and establish an effective process and related tools for implementation and oversight. Furthermore, such an integrated plan would be instrumental in establishing investment priorities and guiding the department's key resource decisions.²⁰

²⁰ See, for example, [GAO-07-1072](#), [GAO-03-293SP](#), and [GAO-03-192SP](#).

We have previously reported that DOD lacked a comprehensive plan or set of plans for developing and fielding UAS across DOD.²¹ Specifically, we found that DOD's UAS roadmaps have not constituted a comprehensive strategic plan for integrating UAS into the military services' force structure. As such, we recommended that the Secretary of Defense modify the existing Roadmap or establish a comprehensive strategic plan that would include key elements such as a clear link connecting goals, capabilities, funding priorities, and needs. DOD partially agreed with our recommendation but noted that since UAS are one of many possible materiel solutions available to the department for a given mission capability, they should not be the exclusive focus of a separate strategic plan. DOD also stated that it would continue to work to develop detailed mission capability plans.

In December 2007, DOD issued the current Roadmap, which incorporates all of the department's individual roadmaps and master plans for unmanned systems into a comprehensive document. The Roadmap contains some elements of sound strategic planning to guide DOD's unmanned systems programs, including UAS. For example, it contains a detailed purpose, or mission statement, and a description of broad goals and objectives that DOD has established for its unmanned systems programs. Table 5 summarizes the Roadmap's goals and objectives for unmanned systems.

Table 5: DOD Goals and Objectives for Unmanned Systems

Goals	Objectives
Improve the effectiveness of combatant command and coalition unmanned systems through improved integration and joint services collaboration	• Conduct experimentation with promising technologies • Conduct risk reduction on mature technologies
Emphasize commonality to achieve greater interoperability among system controls, communications, data products, and data links on unmanned systems	• Field secure common data link communications systems for unmanned systems control and sensor product data distribution • Improve capability to prevent interception, interference, jamming, and hijacking • Migrate to a capability compliant with other communications initiatives, when available • Increase emphasis on common standards to allow for greater interoperability of unmanned systems • Ensure compliance with existing DOD and intelligence community standards and profiles for motion imagery

²¹ [GAO-04-342](#).

Goals	Objectives
Foster the development of policies, standards, and procedures that enable safe and timely operations and the effective integration of manned and unmanned systems	- Promote the development, adoption, and enforcement of government and commercial standards for the design, manufacturing, and testing of unmanned systems - Coordinate with federal transportation organizations to ensure that the operations of DOD unmanned systems adhere to comparable manned systems requirements - Develop and field unmanned systems that can autonomously sense and avoid other objects to provide a level of safety equivalent to comparable manned systems
Implement standardized and protected control measures for unmanned systems and their associated armament	- Develop a standard unmanned systems architecture and other standards for appropriate unmanned systems - Develop a standard unmanned systems architecture and other standards for unmanned systems capable of weapons carriage
Support rapid demonstration and integration of validated combat capabilities in fielded and deployed systems through a flexible prototyping, test, and logistical support process	- Develop and field reliable propulsion alternatives to gasoline-powered engines - Develop common power sources for unmanned systems that meet size, weight, and space requirements, preferably common with manned systems
Control cost aggressively by utilizing competition, refining and prioritizing requirements, and increasing interdependencies among DOD systems	- Compete all future unmanned system programs - Implement configuration steering boards to increase the collaboration between engineering and operations to field capabilities within budget constraints - Develop common interoperability profiles for development, design, and operation of unmanned systems

Source: Office of the Secretary of Defense's *Unmanned Systems Roadmap 2007-2032*.

While the most recent Roadmap incorporates some strategic planning elements, it only minimally addresses other key components that could further align departmental and service efforts to improve the management and operational use of UAS. For example, the Roadmap provides a plan for the integration of UAS into the national airspace system, which aligns with one of DOD's goals for unmanned systems: to foster the development of policies, standards, and procedures that enable safe and timely operations and the effective integration of manned and unmanned systems. However, the Roadmap does not indicate how DOD plans to achieve each of its goals and objectives for unmanned systems, or contain a detailed timeline with milestones to track the progress that DOD has achieved in meeting its goals and objectives.

Another element that is key for sound strategic planning is the identification of performance gaps and clear linkages between proposed investments and long-term planning goals. However, the Roadmap does not identify DOD's performance gap for the most urgent mission priorities that can be supported by unmanned systems or the resources needed to close these gaps. The Roadmap identifies the most urgent mission priorities that can be supported by UAS, including reconnaissance and surveillance; target identification and designation; and chemical,

biological, radiological, nuclear, and explosive reconnaissance. But the Roadmap does not clearly establish DOD's performance gap for these missions, which would help the military services and defense agencies prioritize future research, development, and procurement investments in unmanned systems technology. Furthermore, although the Roadmap provides summary data on DOD's current and planned investments in unmanned systems, including UAS, it does not show linkages between proposed UAS investments and the Roadmap's long-term planning goals.

Additionally, DOD has not clearly integrated the strategic goals for UAS with other departmental planning efforts. For example, DOD issued the ISR Integration Roadmap as a plan to guide the development and integration of DOD's ISR capabilities. However, we reported in March 2008 that the ISR Integration Roadmap does not provide a clear vision of a future ISR enterprise indicating what capabilities are required to achieve DOD's strategic goals for ISR.²² Our analysis shows that the current Roadmap does not link DOD's UAS activities with a larger ISR strategy and the goals in the ISR Integration Roadmap. As a result, although DOD continues to request funds to expand UAS inventories, it does so without the informed understanding that it could use to determine what long-term UAS force structure plans are required to achieve the department's strategic goals for ISR and the related funding needed to support these plans. DOD officials agreed with our analysis that the Roadmap lacks several strategic planning elements and that its strategic goals were not clearly linked with the goals established in the ISR Integration Roadmap. Officials stated that future versions of these documents would further refine planning elements, such as the department's unmanned systems vision, strategy, schedules, and investments. However, it is unclear whether these steps would constitute a comprehensive and integrated strategic plan for UAS.

Furthermore, while the department is planning to establish capability portfolio strategic plans for its existing joint capability areas,²³ including battlespace awareness, it is unclear how strategic goals for UAS initiatives

²² GAO, *Intelligence, Surveillance, and Reconnaissance: DOD Can Better Assess and Integrate ISR Capabilities and Oversee Development of Future ISR Requirements*, [GAO-08-374](#) (Washington, D.C.: Mar. 24, 2008).

²³ Joint capability areas are collections of like DOD activities functionally grouped to support capability analysis, strategy development, investment decision making, capability portfolio management, and capabilities-based force development and operational planning.

may be linked. According to DOD documents, these strategic plans will be used as part of the capability portfolio management process to evaluate capability demand against resource constraints, identify and assess risks, and suggest capability trade-offs within capability portfolios. However, since these planning efforts are in the early stages and are focused on capability areas, which are broader in scope, it is unclear how strategic goals for UAS initiatives may be linked.

Conclusions

Although DOD has experienced a high level of mission success with UAS in ongoing operations, the dramatic increase in the demand for and use of these assets has posed challenges. DOD has implemented various initiatives intended to address concerns with the development and acquisition of UAS, as well as with the integration of an increasing number of these assets into combat operations. However, the department continues to lack an overarching organizational framework to guide UAS development and the additional investments it plans to make to further increase UAS inventories. In the absence of such a framework, DOD faces challenges in managing the current inventories of UAS systems, developing coordinated concepts of operations, disseminating UAS plans, and coordinating the efforts of the numerous organizations addressing specific issues related to the UAS community. These challenges may become even more difficult to fully resolve, as the very existence and roles of DOD's UAS initiatives could change with the election of a new presidential administration. Without a single entity responsible for coordinating and integrating all cross-cutting UAS matters; clearly defined roles, responsibilities, and relationships to facilitate communication of UAS efforts; and a comprehensive and integrated strategic plan that aligns individual UAS efforts with long-term goals, priorities, and milestones, as well as with other departmental planning efforts, DOD will continue to face challenges to fully integrating departmental and service efforts to resolve long-standing problems in the management and operational use of UAS.

Recommendations for Executive Action

To develop a fully integrated framework to sustain progress and resolve long-standing challenges in the management and operational use of UAS, we recommend that the Secretary of Defense take the following three steps:

- Designate a single departmental entity that is responsible and accountable for integrating all cross-cutting DOD efforts related to improving the management and operational use of UAS. This entity should be supported

by an implementation team with dedicated resources and funding and should serve as the DOD point of coordination for all UAS initiatives; integrate all UAS activities throughout DOD; and as part of the planning, programming, budgeting, and execution process, make recommendations to the Secretary of Defense in determining the priority of the department's UAS-related initiatives.

- Define, in directives or other publications as appropriate, the roles, responsibilities, and relationships among various UAS-related entities to facilitate communication within DOD and among external stakeholders.
- Develop a comprehensive and integrated UAS strategic plan, in coordination with DOD components, to align UAS goals and funding with long-term departmental planning efforts. The UAS strategic plan should, at a minimum, include elements such as a comprehensive mission statement, long-term goals and an explanation of how the goals are to be achieved, a timeline with milestones to track progress toward short- and long-term goals, and a determination of the resources needed to close any current capability and capacity gaps. In addition, the strategic plan should show clear linkages between UAS initiatives and other comprehensive departmental planning efforts, such as the ISR Integration Roadmap and the development of joint capability area strategic plans.

Agency Comments and Our Evaluation

In written comments on a draft of this report, DOD partially concurred with one recommendation and did not concur with the other two recommendations. DOD's comments are reprinted in appendix II. DOD also provided technical comments, which we incorporated into the report as appropriate.

DOD did not concur with our recommendation that the Secretary of Defense designate a single departmental entity responsible and accountable for integrating all cross-cutting DOD efforts related to improving the management and operational use of UAS. DOD stated that in response to the 2006 Quadrennial Defense Review and in line with recommended best practices from a March 2007 GAO report,²⁴ DOD has undertaken several initiatives to improve the department's approach to investment and decision making, including the implementation of capability portfolio managers. DOD further stated that it had created the UAS Task Force—in lieu of an executive agent—to coordinate critical

²⁴ 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).

UAS issues to enhance operations, enable interdependencies, and streamline UAS acquisition. DOD stated that since UAS are gaining increasing roles in other capability portfolios, the UAS Task Force also coordinates with other portfolio managers on UAS issues. In our report, we specifically recognize that DOD has initiated a number of efforts, including capability portfolio management and the UAS Task Force. However, capability portfolio management efforts are focused on joint capability areas, such as battlespace awareness, which are broad in scope and the responsibilities of the capability portfolio managers are continuing to evolve. As yet, the Joint Battlespace Awareness Capability Portfolio Manager has not been formally assigned the responsibility for integrating all cross-cutting DOD efforts related to improving the management and operational use of UAS. Furthermore, although the UAS Task Force Director is responsible for coordinating some critical UAS issues, making recommendations to the Deputy's Advisory Working Group, and where necessary, assigning lead organizations for UAS acquisition and management, the Director has not been assigned specific authority or responsibility for integrating all cross-cutting DOD UAS initiatives. Conversely, the accountability for the department's various activities that are intended to improve the management and operational use of UAS is distributed among multiple organizations within DOD, and the priorities for these activities have not been fully integrated with a DOD-wide approach to resolve UAS challenges. Therefore, we continue to believe that a single entity—supported by an implementation team—that is accountable for integrating cross-cutting UAS issues would better position DOD to sustain its progress and ensure the success of its efforts to improve the management and operational use of UAS.

DOD partially concurred with our recommendation that the Secretary of Defense define, in directives or other publications as appropriate, the roles, responsibilities, and relationships among various UAS-related entities to facilitate communication within DOD and among external stakeholders. DOD stated that the UAS Task Force has developed a plan of action and milestones to address these issues. DOD also stated that it continues to improve the Roadmap, and sees the document as an effective tool for communication both across DOD and with external stakeholders. DOD also stated that several documents have been signed or are in the process of being signed that define the roles, responsibilities, and relationships among the key activities that interact in decisions relating to the management and use of UAS to provide specific warfighting

capabilities. For example, DOD published a directive in September 2008 that establishes policy and assigns responsibilities for the use of capability portfolio managers,²⁵ and the department is in the process of finalizing a charter for the ISR Task Force. We recognize that DOD has completed some steps and has additional efforts under way to further define the roles, responsibilities, and relationships of its UAS initiatives. However, neither the department's capability portfolio management directive nor the most recent version of the Roadmap provide comprehensive information on the various UAS-related entities, such as the UAS Task Force, which are intended to improve the management and operational use of UAS. Furthermore, we acknowledge in this report that DOD has efforts under way to publish guidance further defining the missions, authorities, roles and responsibilities, and near- and long-term goals for the UAS Task Force and the ISR Task Force. As DOD finalizes this guidance, we continue to believe it will be important that the result clearly defines the roles, responsibilities, and relationships for each of its UAS-related organizations.

DOD did not concur with our recommendation that the Secretary of Defense develop a comprehensive and integrated UAS strategic plan, in coordination with DOD components, to align UAS goals and funding with long-term departmental planning efforts. DOD stated that it has undertaken several initiatives to improve the department's approach to investment and decision making, including the implementation of its capability portfolio managers, and that the department's strategic plan for investment is aligned with portfolios that address specific warfighting capabilities as opposed to platforms or material solutions, such as UAS. DOD also stated that long-term goals and guidance for achieving those goals are provided in top-level documents, such as the Guidance for the Development of the Force, and that the Joint Capabilities Integration Development System provides a structured process to address warfighting capability and capacity gaps. Furthermore, DOD stated that to ensure that emphasis is not lost on making the most efficient use of UAS platforms and technologies, the department created the UAS Task Force, which translates the department's capabilities-based strategic plan into the platform- and technology-based Roadmap that can be shared with external stakeholders and industry. Lastly, DOD stated that our report came to a flawed conclusion by asserting that since the Unmanned Systems

²⁵ Department of Defense Directive 7045.20, *Capability Portfolio Management* (Sept. 25, 2008).

Roadmap does not have all of the elements of a strategic plan, DOD lacks a strategic plan. We recognize that DOD has a number of initiatives, processes, and guidance, including the Unmanned Systems Roadmap, that are part of the department's strategic planning approach. However, we believe these efforts, whether taken individually or collectively, do not constitute a strategic plan for UAS that lays out a clear path for the department's UAS programs. As we state in the report, in the case of the Unmanned Systems Roadmap, the document lacks key elements of a strategic plan, such as a focus on how to accomplish DOD's goals and objectives for UAS, milestones to track progress, identification of performance gaps, and clear linkages between proposed UAS investments and long-term planning goals. Further, while the department is planning to establish capability portfolio strategic plans for joint capability areas, these are broader in scope and it is unclear how strategic goals for UAS initiatives may be linked. Therefore, we continue to believe that our recommendation that DOD develop a comprehensive and integrated UAS strategic plan—or complementary set of plans—to align UAS goals and funding with long-term departmental planning efforts has merit.

We are sending copies of this report to the Secretary of Defense, the Secretary of the Army, the Secretary of the Air Force, the Secretary of the Navy, and the Commandant of the Marine Corps. We will make copies available to others upon request. In addition, this report will be made available at no charge on the GAO Web site at <http://www.gao.gov>. If you or your staffs have any questions about this report, please contact me at (202) 512-9619 or pickups@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 are listed in appendix III.



Sharon L. Pickup, Director
Defense Capabilities and Management

Appendix I: Scope and Methodology

To identify key departmental and military service efforts to improve the management and operational use of unmanned aircraft systems (UAS), we conducted a literature review of both previous reports prepared by Congress and our prior work and consolidated a list of challenges presented by the development and acquisition of UAS and their integration into combat operations. We obtained and analyzed available internal Department of Defense (DOD) documentation, such as briefings, directives, memorandums, and roadmaps that describe specific UAS-related initiatives implemented by DOD and the military services. We interviewed officials with the Office of the Secretary of Defense, the Joint Staff, DOD's unified combatant commands, and the military services to better understand DOD's decision-making processes for implementing these initiatives. We also interviewed officials who are leading and participating in the Office of the Secretary of Defense's UAS Task Force, including members of the task force's integrated product teams, to obtain information about the task force's goals, progress made to date, and any unresolved challenges. We interviewed officials with the Office of the Secretary of Defense's Intelligence, Surveillance, and Reconnaissance Task Force to obtain information about the task force's efforts to acquire UAS and to improve and the effectiveness and efficiency of UAS in ongoing military operations. We analyzed DOD plans for UAS-related studies and interviewed relevant officials to determine how DOD intends to use the study results to inform current and future UAS plans. We interviewed officials with the military services to document the key actions that each service was taking to improve the management and operational use of UAS programs.

To assess the extent to which DOD's efforts constitute an overarching organizational framework to guide and oversee UAS efforts, we obtained and analyzed documents that describe the roles, responsibilities, and relationships of the offices and entities that are responsible for improving the management and operational use of DOD's UAS programs. These documents include briefings; directives and memorandums; DOD's Unmanned Systems Roadmap;¹ draft and finalized organizational charters; and UAS program management and budget materials. We identified key elements of an overarching organizational framework based on our prior work and the Government Performance and Result Act of 1993 to determine the extent to which DOD's oversight structure incorporates these elements. We interviewed officials with the Office of the Secretary of

¹ Department of Defense, *Unmanned Systems Roadmap 2007-2032* (Dec. 10, 2007).

Defense, the Joint Staff, and the military services who are responsible for managing or overseeing key UAS issues, such as acquisition, program management, research and development, and training, to obtain their views on the progress that has been made and the challenges that remain to improve the management and operational use of UAS. In addition, we solicited their views on the extent to which DOD's efforts constitute an integrated approach. We analyzed DOD's Unmanned Systems Roadmap to determine which elements of sound strategic plans it contains, and discussed the results of our analysis with DOD officials responsible for preparing the document. We also reviewed the conclusions and recommendations of a DOD assessment of the management and operations of the Office of the Secretary of Defense's UAS Task Force, and interviewed the assessment team leader to determine the approach taken in conducting the assessment. We conducted this performance audit from September 2007 through November 2008 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

We interviewed officials and, where appropriate, obtained documentation at the following locations:

Office of the Secretary of Defense

- Office of the Undersecretary of Defense for Acquisition, Technology, and Logistics
- Office of the Undersecretary of Defense for Intelligence
- Office of the Undersecretary of Defense for Personnel and Readiness
- Office of the Director, Program Analysis and Evaluation

Joint Chiefs of Staff

- Directorate for Intelligence
- Directorate for Operations
- Directorate for Force Structure, Resources, and Assessment

Department of the Army

- Office of the Assistant Secretary of the Army for Acquisition, Logistics, and Technology
- Office of the Deputy Chief of Staff, G3/5/7
- Army Training and Doctrine Command
- Army Aviation Center of Excellence
- Army Intelligence Center
- Army UAS Training Battalion
- Army National Guard
- 25th Combat Aviation Brigade

Department of the Navy

- Office of the Chief of Naval Operations, Air Warfare Division
- Naval Air Systems Command
- Headquarters Marine Corps, Department of Aviation, Weapons Requirements Branch
- Marine Corps Unmanned Aerial Vehicle Squadron-2

Department of the Air Force

- Office of the Assistant Secretary of the Air Force, Financial Management
- Office of the Deputy Chief of Staff for Intelligence, Surveillance, and Reconnaissance
- Office of the Deputy Chief of Staff for Strategic Plans and Programs
- Air Force Air Combat Command
- Air National Guard
- Air Force Personnel Center
- Air Force 480th Intelligence Wing
- Air Force 432nd Wing

Other DOD components

- United States Central Command
- United States Joint Forces Command
- United States Special Operations Command
- United States Strategic Command

Appendix II: Comments from the Department of Defense



ACQUISITION
TECHNOLOGY
AND LOGISTICS

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

OCT 23 2008

Ms. Sharon L. Pickup
Director, Defense Capabilities and Management
U.S. Government Accountability Office
441 G Street, N.W.
Washington, DC 20548

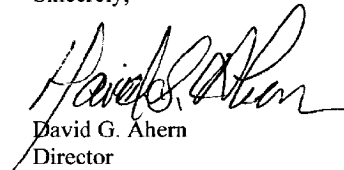
Dear Ms. Pickup:

This is the Department of Defense (DoD) response to the GAO draft report, GAO-08-1129, "UNMANNED AIRCRAFT SYSTEMS: Additional Actions Needed to Improve Management and Integration of DoD Efforts to Support Warfighter Needs," dated September 23, 2008 (GAO Code 351096).

The DoD non-concurs with two of the draft report's recommendations and partially concurs with the other. The rationale for our positions are enclosed.

We appreciate the opportunity to comment on the draft report. For further questions concerning this report, please contact Mr. Dyke Weatherington, Deputy Director, Unmanned Warfare, Dyke.Weatherington@osd.mil, 703-695-6188.

Sincerely,


David G. Ahern
Director
Portfolio Systems Acquisition

Enclosure:
As stated



**GAO DRAFT REPORT - DATED SEPTEMBER 23, 2008
GAO CODE 351096/GAO-08-1129**

**“UNMANNED AIRCRAFT SYSTEMS: Additional Actions Needed to Improve
Management and Integration of DoD Efforts to Support Warfighter Needs”**

**DEPARTMENT OF DEFENSE COMMENTS
TO THE RECOMMENDATIONS**

RECOMMENDATION 1: The GAO recommends that the Secretary of Defense designate a single departmental entity that is responsible and accountable for integrating all cross-cutting DoD efforts related to improving the management and operational use of Unmanned Aircraft Systems (UAS). This entity should:

- be supported by an implementation team with dedicated resources and funding;
- serve as the DoD point of coordination for all UAS initiatives;
- integrate all UAS activities throughout DoD; and
- as part of the planning, programming, budgeting, and execution process, make recommendations to the Secretary of Defense in determining the priority of the Department’s UAS-related initiatives.

DOD RESPONSE: Non-concur. In response to the 2006 Quadrennial Defense Review (QDR) and in line with recommended best practices from a March 2007 GAO report (GAO-07-388), DoD has undertaken several initiatives to improve the Department’s approach to investment and decision making including the implementation of Capability Portfolio Managers (CPMs) per DoD Instruction 7045.20, “Capability Portfolio Management” (September 25, 2008). In accordance with the instruction, the Joint Battlespace Awareness (BA) CPM derives authority from the Deputy’s Advisory Working Group (DAWG) to integrate, synchronize, and coordinate BA portfolio content, including UAS, to ensure alignment to strategic priorities and capability demand. Additionally, as the draft report rightly points out, the Department has taken a number of steps intended to address longstanding challenges in the management of UAS programs and the operational use of these systems. One of these steps is the creation of the UAS Task Force in lieu of an Executive Agent. The UAS Task Force Director coordinates critical UAS issues to enhance operations, enable interdependencies, and streamline acquisition of UAS. The Task Force reports findings and recommendations to the DAWG, and where necessary, assigns lead organizations for UAS acquisition and management. Although UAS primarily contribute to the BA portfolio, they are gaining increasing roles in other capability portfolios such as Force Application and Force Support. The Task Force Director coordinates with the CPMs and likewise has access to the DAWG to identify issues and to make recommendations for UAS in the context of their contribution to respective capability portfolios.

RECOMMENDATION 2: The GAO recommends that the Secretary of Defense define, in directives or other publications as appropriate, the roles, responsibilities, and relationships among various Unmanned Aircraft Systems (UAS) related entities to facilitate communication within DoD and among external stakeholders.

DOD RESPONSE: Partially concur. As noted in the report, an independent assessment of the UAS Task Force, conducted at the request of the Task Force Director, recommended the development of a formal charter for the Task Force that clearly identifies its role, stakeholders, and relationships to other DoD activities. The Task Force has developed a Plan of Action and Milestones (POA&M) to address this and other issues identified by the review team. Additionally, the Department continues to improve the Unmanned Systems Roadmap and sees it as an effective tool for communication both across DoD and with external stakeholders. Finally, there are several recent documents that have been signed or are in final staffing such as DoD Instruction 7045.20, "Capability Portfolio Management" (September 25, 2008) and the Intelligence, Surveillance, and Reconnaissance Task Force Charter, that define the roles, responsibilities and relationships among the key activities that interact in decisions relating to the management and use of UAS to provide specific warfighting capabilities.

RECOMMENDATION 3: The GAO recommends that the Secretary of Defense develop a comprehensive and integrated Unmanned Aircraft Systems (UAS) strategic plan, in coordination with DoD Components, to align UAS goals and funding with long-term departmental planning efforts. The UAS strategic plan should, at minimum, include elements such as a comprehensive mission statement; long-term goals, and an explanation of how the goals will be achieved; a timeline with milestones to track progress toward short- and long-term goals; and a determination of the resources needed to close any current capability and capacity gaps. In addition, the strategic plan should show clear linkages connecting UAS initiatives with other comprehensive Departmental planning efforts, such as the Intelligence, Surveillance and Reconnaissance Integration Roadmap and the development of joint capability area strategic plans.

DOD RESPONSE: Non-concur. In response to the 2006 QDR and in line with recommended best practices from a March 2007 GAO Report (GAO-07-388), DoD has undertaken several initiatives to improve the Department's approach to investment and decision making including the implementation of Capability Portfolio Managers (CPMs) per DoD Instruction 7045.20, "Capability Portfolio Management" (September 25, 2008). The Department's strategic plan for investment is aligned according to portfolios that address specific warfighting capabilities (Battlespace Awareness, Force Application, etc) as opposed to platforms or material solutions such as UAS. Long-term goals and guidance for achieving those goals is provided in top-level documents such as the Guidance for the Development of the Force (GDF). Capability and capacity gaps are addressed through the Joint Capabilities Integration Development System (JCIDS) structured process as outlined in CJCSM 3170.01C and are articulated in terms of warfighting capability needs. Each CPM derives authority from the Deputy's Advisory Working Group (DAWG) to integrate, synchronize, and coordinate portfolio content, including UAS, to ensure alignment to strategic priorities and capability demands. To ensure that emphasis is not lost on making the most efficient use of UAS platforms and technologies, the Department created the UAS Task Force to serve as a "platform advocate" at the senior decision-making level. As the UAS advocate, the UAS Task Force translates the Department's capabilities-based

strategic plan into the platform/technology-based Unmanned Systems Roadmap in a format and classification level that can be shared with external stakeholders and industry. The GAO comes to a flawed conclusion in asserting that since the Unmanned Systems Roadmap does not have all of the elements of a strategic plan, that the Department lacks a strategic plan. The Department's strategic planning is based on warfighting capabilities to which UAS contribute.

Appendix III: GAO Contact and Staff Acknowledgments

GAO Contact

Sharon L. Pickup, (202) 512-9619 or pickups@gao.gov

Acknowledgments

In addition to the contact named above, Patricia Lentini, Assistant Director; Susannah Hawthorne; James Lawson; Brian Mateja; Karen Thornton; Matthew Ullengren; and Cheryl Weissman made contributions to this report.

Related GAO Products

Unmanned Aircraft Systems: Federal Actions Needed to Ensure Safety and Expand Their Potential Uses within the National Airspace System. [GAO-08-511](#). Washington, D.C.: May 15, 2008.

Intelligence, Surveillance, and Reconnaissance: DOD Can Better Assess and Integrate ISR Capabilities and Oversee Development of Future ISR Requirements. [GAO-08-374](#). Washington, D.C.: March 24, 2008.

Unmanned Aircraft Systems: Advance Coordination and Increased Visibility Needed to Optimize Capabilities. [GAO-07-836](#). Washington, D.C.: July 11, 2007.

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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.: April 19, 2007.

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Unmanned Aircraft Systems: New DOD Programs Can Learn from Past Efforts to Craft Better and Less Risky Acquisition Strategies. [GAO-06-447](#). Washington, D.C.: March 15, 2006.

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