

July 2010

# COAST GUARD

## Deepwater Requirements, Quantities, and Cost Require Revalidation to Reflect Knowledge Gained



GAO

Accountability \* Integrity \* Reliability



Highlights of [GAO-10-790](#), a report to congressional committees

## Why GAO Did This Study

The Deepwater Program includes efforts to build or modernize ships and aircraft and to procure other capabilities. After a series of project failures, the Coast Guard announced in 2007 that it was taking over the systems integrator role from Integrated Coast Guard Systems (ICGS). At the same time, a \$24.2 billion program baseline was established which included schedule and performance parameters at an overall system level. GAO has previously reported on the Coast Guard's progress in establishing individual baselines for Deepwater assets and has made a number of recommendations, which have largely been addressed. In response to the conference report accompanying the Department of Homeland Security (DHS) Appropriations Act, 2010, GAO assessed (1) DHS and Coast Guard acquisition policies and approach to managing the program, (2) whether the program is meeting the 2007 baseline, and (3) Coast Guard efforts to manage and build its acquisition workforce. GAO reviewed Coast Guard and DHS policies and program documents, and interviewed officials.

## What GAO Recommends

GAO recommends that the Coast Guard complete an overall assessment that clarifies the quantities, mix, and cost of assets needed to meet requirements, given that the current Deepwater baseline is no longer feasible, and that the results be reported to Congress. DHS concurred with the recommendation.

[View GAO-10-790 or key components.](#)  
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## COAST GUARD

### Deepwater Requirements, Quantities, and Cost Require Revalidation to Reflect Knowledge Gained

#### What GAO Found

DHS has revised its approach to managing and overseeing Deepwater by making the program subject to its recently finalized acquisition directive, which establishes a number of review points to provide insight into such key documents as baselines and test reports. DHS has also increased the number of its reviews of individual Deepwater assets. The Coast Guard's own management policies are generally aligned with DHS directives, although operational testing policies are still being revised, and it has developed additional guidance on completion of key requirements documents. In taking on the systems integrator role, the Coast Guard is also decreasing its dependence on ICGS by planning for alternate vendors on some of the assets already in production, as well as awarding and managing work outside of the ICGS contract for other assets.

Currently, the Deepwater Program exceeds the 2007 cost and schedule baselines, and given revisions to performance parameters for certain assets, it is unlikely to meet system-level performance baselines. The asset-specific baselines that have been approved to date, while providing greater insight into asset-level capabilities, place the total cost of Deepwater at roughly \$28 billion, or \$3.8 billion over the \$24.2 billion 2007 baseline. The revised baselines also present life-cycle costs, which encompass the acquisition cost as well as costs for operations and maintenance. While the revised baselines show a significant decrease in life-cycle costs, due to changes to assumptions like shorter service lives for assets, the Coast Guard's understanding of them continues to evolve as the agency revisits its assumptions and produces new cost estimates. Costs could continue to grow as four assets currently lack revised cost baselines; among them is the largest cost driver in the Deepwater Program, the Offshore Patrol Cutter. The asset-level baselines also indicate that schedules for some assets are expected to be delayed by several years. Regarding system-level performance, the 2007 baseline may not be achievable, as the Coast Guard has redefined or eliminated key performance indicators for many individual assets, while significant uncertainties surround other assets. Further, a planned analysis to reassess the overall fleet mix for Deepwater was not completed as planned, and a new analysis will include surface assets only. In the meantime, the Coast Guard and DHS are proceeding with acquisition decisions on individual assets.

The Coast Guard continues to take steps to address its acquisition workforce needs as it assumes the role of system integrator. For example, it is using a workforce planning model to estimate current and future needs for key acquisition personnel. The Coast Guard has also begun to implement initiatives such as promoting career growth for acquisition professionals. External limitations on the availability of acquisition personnel, coupled with 100 new positions authorized in fiscal year 2010, place the Coast Guard's acquisition directorate vacancy rate at about 20 percent. While it is using contractors in support roles, the Coast Guard has released guidance regarding the roles of government staff in overseeing contractors.

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## Abbreviations

C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
DHS	Department of Homeland Security
ICGS	Integrated Coast Guard Systems
<i>MSAM</i>	<i>Major Systems Acquisition Manual</i>
NSC	National Security Cutter

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United States Government Accountability Office  
Washington, DC 20548

July 27, 2010

The Honorable Frank Lautenberg  
Interim Chairman  
The Honorable George Voinovich  
Ranking Member  
Subcommittee on Homeland Security  
Committee on Appropriations  
United States Senate

The Honorable David E. Price  
Chairman  
The Honorable Harold Rogers  
Ranking Member  
Subcommittee on Homeland Security  
Committee on Appropriations  
House of Representatives

The Deepwater Program—the largest acquisition program in the Coast Guard’s history—began in 1996 as an effort to recapitalize the Coast Guard’s operational fleet. The program now includes projects to build or modernize five classes each of ships and aircraft, and procurement of other capabilities such as improved command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) and unmanned aircraft. Recognizing that it did not have a workforce with the experience and depth to manage the acquisition, the Coast Guard contracted with Integrated Coast Guard Systems (ICGS) in June 2002 to be the systems integrator for Deepwater.<sup>1</sup> ICGS was contractually responsible for designing, constructing, deploying, supporting, and integrating the Deepwater assets into a system-of-systems. However, after a series of programmatic failures, the Commandant acknowledged in April 2007 that the Coast Guard had relied too heavily on contractors to do the work of the government and that government and industry had failed to control costs. He announced several major changes to the acquisition approach for Deepwater—primarily the Coast Guard taking over as the systems integrator. In May 2007, soon after this announcement, the Department of

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<sup>1</sup> ICGS is a business entity jointly owned by Northrop Grumman and Lockheed Martin. These companies are first-tier subcontractors to ICGS and under the ICGS contract provide Deepwater assets or award second-tier subcontracts.

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Homeland Security (DHS) approved an acquisition program baseline of \$24.2 billion for the Deepwater Program.<sup>2</sup> Since that time, the Coast Guard—with greater oversight from DHS—has taken a number of steps in managing Deepwater projects, such as:

- reorganizing the acquisition directorate and its relationships with Coast Guard technical authorities,
- applying the knowledge-based acquisition policies and practices outlined in the Coast Guard’s *Major Systems Acquisition Manual (MSAM)*, and
- developing baselines on an asset-by-asset level as opposed to a system-of-systems level.

In response to direction in the conference report accompanying the Department of Homeland Security Appropriations Act, 2010, and discussions with your offices, we assessed (1) changes to DHS and Coast Guard acquisition policies, processes, and the approach related to Deepwater since our July 2009 report;<sup>3</sup> (2) whether the Deepwater Program is meeting baselines for cost, schedule, and performance; and (3) the Coast Guard’s efforts to manage and build its acquisition workforce.

To conduct our work, we reviewed key Coast Guard and DHS documentation such as the *MSAM*, *DHS Acquisition Instruction 102-01*, original and revised acquisition program baselines, and human capital plans. We interviewed Coast Guard acquisition directorate officials, including program managers and human capital officials, and officials from other Coast Guard directorates such as those responsible for providing life-cycle support and for assessing and developing operational requirements for Deepwater assets. In addition, we interviewed DHS officials from the Acquisition Program Management Directorate, Cost Analysis Division, and Test and Evaluation Directorate. We also interviewed contractor officials from Northrop Grumman Shipbuilding and Bollinger Shipyards and toured the shipyards. We relied in part on our past work on the Deepwater Program. Appendix I contains more information regarding our scope and methodology. We conducted this performance audit from October 2009 to July 2010 in accordance with generally

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<sup>2</sup> The Deepwater Program originally had an estimated cost of \$17 billion. The May 2007 baseline of \$24.2 billion reflects changes to the program to reflect the Coast Guard’s post-September 11, 2001, missions.

<sup>3</sup> GAO, *Coast Guard: As Deepwater Systems Integrator, Coast Guard Is Reassessing Costs and Capabilities but Lags in Applying Its Disciplined Acquisition Approach*, [GAO-09-682](#) (Washington, D.C.: July 14, 2009).

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accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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## Background

The Coast Guard is a multimission, maritime military service within DHS. The Coast Guard's responsibilities fall into two general categories—those related to homeland security missions, such as port security and vessel escort, and those related to the Coast Guard's traditional missions, such as search and rescue and polar ice operations. To carry out these responsibilities, the Coast Guard operates a number of vessels and aircraft, some of which it is currently modernizing or replacing through its Deepwater Program. Since 2001, we have reviewed the Deepwater Program and have reported to Congress, DHS, and the Coast Guard on the risks and uncertainties inherent in the acquisition.<sup>4</sup> In our July 2009 report on the Coast Guard's progress in fulfilling the role of systems integrator for the Deepwater Program, we found that the Coast Guard had increased its role in managing the requirements, determining how assets would be acquired, defining how assets would be employed, and exercising technical authority in asset design and configuration.<sup>5</sup> In addition, we found that the Coast Guard was taking steps to improve its insight into individual assets by reviewing and revising cost, schedule, and performance baselines. Additional insight gained by the review of several assets revealed that the program's 2007 baselines for acquisition cost and delivery schedules had been exceeded. We concluded that while the steps the Coast Guard was taking were beneficial, continued oversight and improvement were necessary to further mitigate risks. We made several recommendations, which the Coast Guard has taken actions to address. For example, we recommended that the Coast Guard not exercise options under the Fast Response Cutter (Sentinel class) contract until the project was brought into full compliance with the *MSAM* and DHS acquisition directives. Coast Guard program officials stated that the program was in compliance with these directives before the low-rate initial production option was exercised in December 2009.

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<sup>4</sup> See a list of related GAO products at the end of this report.

<sup>5</sup> [GAO-09-682](#).

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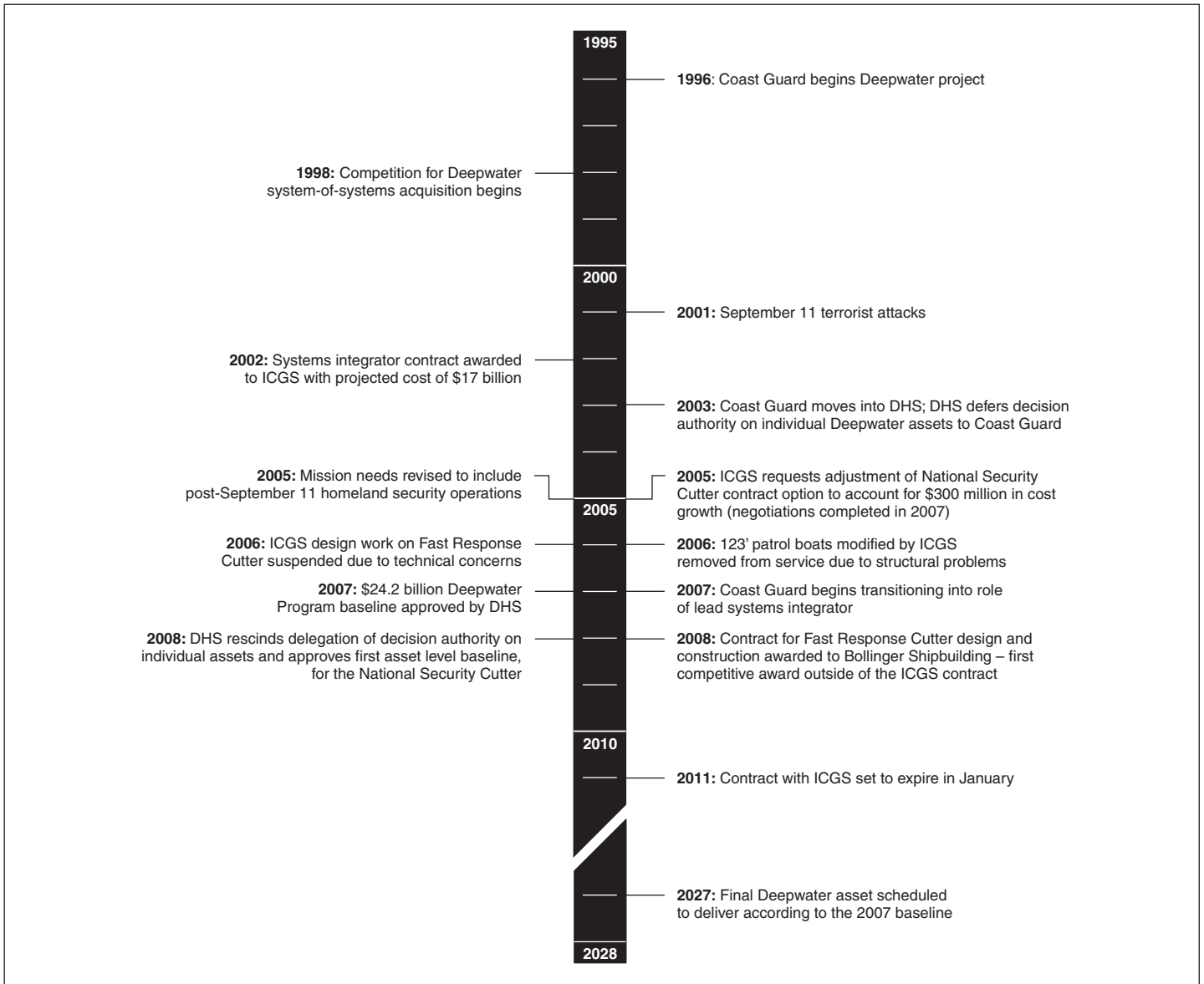
## A Brief History of the Deepwater Program

At the start of the Deepwater Program in the late 1990s, the Coast Guard chose to use a system-of-systems acquisition strategy. A system-of-systems is a set or arrangement of assets that results when independent assets are integrated into a larger system that delivers unique capabilities. The Coast Guard provided ICGS with broad, overall performance specifications—such as the ability to interdict illegal immigrants—and ICGS determined the assets needed and their specifications. According to Coast Guard officials, the ICGS proposal was submitted and priced as a package; that is, the Coast Guard bought the entire solution and could not reject any individual component. In November 2006, the Coast Guard submitted a revised cost, schedule, and performance baseline for the overall Deepwater Program to DHS that reflected post-September 11 missions. That baseline established the total acquisition cost of the ICGS solution at \$24.2 billion and projected that the acquisition would be completed in 2027. In May 2007, shortly after the Coast Guard had announced its intention to take over the role of systems integrator, DHS approved the baseline.

DHS too has changed its approach to oversight and management of the Deepwater Program. In 2003, the department had delegated approving acquisition decisions at key points in the life cycle of individual assets to the Coast Guard, while retaining some oversight at the system-of-systems level and requiring annual reviews. In September 2008, in response to our recommendation, DHS rescinded that authority from the Coast Guard, and began officially reviewing and approving acquisition decisions for Deepwater assets. In November 2008, DHS also instituted requirements for new acquisition documentation at key program decision points to be submitted by DHS components, including the Coast Guard. Figure 1 provides a time line of key events in the Deepwater Program.



**Figure 1: Key Events in the Deepwater Program**



Source: GAO presentation of Coast Guard data.

As we reported in July 2009, since assuming the role of systems integrator in April 2007, the Coast Guard has taken a number of key steps to reassert its control and management of the Deepwater Program.<sup>6</sup> While decreasing the scope of work under the ICGS contract, which as noted above is scheduled to expire in January 2011, the Coast Guard has also reorganized its own acquisition directorate to better fulfill its expanded roles in acquiring and managing Deepwater assets. In addition, the Coast Guard formalized new relationships among its directorates to better establish and maintain technical standards for Deepwater assets related to design, construction, maintenance, C4ISR, and life-cycle staffing and training. The Coast Guard also began transitioning to an asset-based acquisition approach—as opposed to the former approach that focused at the high-level system-of-systems approach—guided by the formalized process outlined in its *MSAM*.

As a part of its asset-based acquisition approach, the Coast Guard has also begun to develop better-informed cost, schedule, and performance baselines. While these new baselines provided increased insight into what the Coast Guard is buying, the anticipated cost, schedules, and performance of many of the assets have changed since the \$24.2 billion system-level baseline was approved by DHS in 2007. Table 1 describes in more detail the assets the Coast Guard plans to procure or upgrade under the Deepwater Program.

**Table 1: Information on Deepwater Assets**

<b>Asset</b>	<b>Planned quantity</b>	<b>Delivered quantity (as of July 2010)</b>	<b>Description</b>
National Security Cutter (NSC)	8 cutters	2 cutters	The NSC is intended to be the flagship of the Coast Guard's fleet, with an extended on-scene presence, long transits, and forward deployment. The cutter and its aircraft and small boat assets are to operate worldwide.
Offshore Patrol Cutter	25 cutters	0	This cutter is intended to conduct patrols for homeland security functions, law enforcement, and search and rescue operations. It will be designed for long-distance transit, extended on-scene presence, and operations with multiple aircraft and small boats. The Coast Guard has developed requirements for this asset and submitted them to DHS for approval.

<sup>6</sup> [GAO-09-682](#).

<b>Asset</b>	<b>Planned quantity</b>	<b>Delivered quantity (as of July 2010)</b>	<b>Description</b>
Fast Response Cutter	58 boats	0	The Fast Response Cutter, also referred to as the Sentinel class, is conceived as a patrol boat with high readiness, speed, adaptability, and endurance to perform a wide range of missions. After terminating ICGS' design efforts, the Coast Guard competitively awarded a contract for a modified commercially available patrol boat in 2008.
Medium Endurance Cutter Sustainment	27 cutters	19 cutters	The cutter sustainment project is intended to improve the cutters' operating and cost performance by replacing obsolete, unsupportable, or maintenance-intensive equipment. This work is being performed at the Coast Guard yard in Curtis Bay, Maryland.
Patrol Boat Sustainment	20 boats	11 boats	The patrol boat sustainment project is intended to improve the boats' operating and cost performance by replacing obsolete, unsupportable, or maintenance-intensive equipment. This work is being performed at the Coast Guard yard in Curtis Bay, Maryland.
Cutter Small Boats	124 boats	9 boats	Cutter small boats are an integral component of the planned capabilities for the larger cutters and patrol boats and are critical to achieving success in all operational missions. The Coast Guard is currently restructuring its cutter small boat programs.
Maritime Patrol Aircraft	36 aircraft with mission system pallets	9 aircraft, 4 mission system pallets	This transport and surveillance, fixed-wing aircraft is intended to be used to perform search and rescue missions, enforce laws and treaties, and transport cargo and personnel. Much of the capability for this aircraft, especially for C4ISR-intensive missions, is provided by the mission system pallet, a suite of electronic equipment installed on the aircraft that enables the aircrew to compile data from sensors and transmit them to surface vessels, other aircraft, and shore facilities.
HC-130J Long-Range Surveillance Aircraft	6 aircraft	6 aircraft	The HC-130J is a four-engine turbo-prop aircraft which the Coast Guard has deployed with improved interoperability, C4ISR, and sensors to enhance surveillance, detection, classification, identification, and prosecution.
HC-130H Long-Range Surveillance Aircraft	16 aircraft	16 aircraft through first segment	The HC-130H is the legacy Coast Guard long-range surveillance aircraft which the Coast Guard intends to update in six segments—one of which is currently unfunded—for radar replacement, updates and upgrades of avionics, structural sustainability, improved mission capabilities, and life extension.
HH-65 Multi-mission Cutter Helicopter	102 aircraft	57 aircraft through third segment, 2 through fourth, prototype for fifth	The HH-65 Dolphin is the Coast Guard's short-range recovery helicopter. It is being upgraded to improve its engines, sensors, navigation equipment, avionics, ability to land on the NSC, and other capabilities in nine segments—three of which are currently unfunded.
HH-60 Medium Range Recovery Helicopter	42 aircraft	10 aircraft through first segment	The HH-60 is a medium-range recovery helicopter designed to perform search and rescue missions offshore in all weather conditions. The Coast Guard has planned upgrades to the helicopter's avionics, sensors, radars, and C4ISR systems in four segments.
Unmanned Aerial System	TBD	0	The Coast Guard has deferred acquisition of this asset because of challenges in technology maturation of the initial design. The Coast Guard continues its analysis of needs and alternatives, and an acquisition plan for this asset is in development.

Asset	Planned quantity	Delivered quantity (as of July 2010)	Description
C4ISR	8 segments	1 segment	The Coast Guard is incrementally acquiring C4ISR capabilities, including upgrades to existing cutters and shore installations, acquisitions of new capabilities, and development of a common operating picture to provide operationally relevant information and knowledge across the full range of Coast Guard operations.

Source: GAO analysis of Coast Guard data.

## DHS and Coast Guard Acquisition Policies and Processes Continue to Evolve, Further Establishing the Coast Guard as Systems Integrator

DHS has revised its approach to managing and overseeing Deepwater by conforming the program to its recently finalized acquisition directive, *Acquisition Management Directive 102-01*, which establishes a number of review points for the department's acquisitions to provide senior acquisition officials insight into such key documents as baselines and test reports. DHS has increased the number of reviews of individual Deepwater assets and plans to review up to six assets in fiscal year 2010. For its part, the Coast Guard's *MSAM* is generally aligned with DHS directives although operational testing policies are still being revised, and the Coast Guard has developed additional guidance on completing key requirements documents. The Coast Guard is also decreasing its dependence on ICGS by planning for alternate vendors on some of the assets already in production, as well as awarding and managing work outside of the ICGS contract for those assets at earlier stages of the acquisition life cycle.

## DHS Oversight of Deepwater Acquisitions Has Increased

Since our last report,<sup>7</sup> DHS has finalized its *Acquisition Management Directive 102-01*, effective January 2010, which provides guidance on planning and executing acquisitions by linking DHS's requirements, resourcing, and acquisition processes. The four phases of the DHS acquisition life-cycle process, each of which is authorized by an acquisition decision event, are as follows.

- The first phase identifies the specific functional capabilities needed for the asset and how these capabilities fill identified gaps.
- The second phase explores alternative solutions to provide these capabilities and establishes cost, schedule, and performance baselines as well as operational requirements. By the end of this phase, a decision event is held which reviews the selection of the preferred alternative and approves program start.

<sup>7</sup> GAO-09-682.

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- The third phase is focused on developing, testing, and evaluating the selected alternative and refining it prior to entering full production. This phase can contain multiple decision events depending on the complexity of the program. DHS approval is sometimes required for supporting acquisitions and activities such as procuring demonstrator assets for test and evaluation, service contracts, and low-rate initial production.<sup>8</sup>
  - In order to proceed into the fourth phase, a final decision event is held to review the results of formal operational testing and determine if the asset meets requirements and is supportable and sustainable within cost baselines. This decision event authorizes full-rate production and transfers responsibility for deployment and support to the DHS component.

Figure 2 depicts the DHS acquisition phases and decision events and where Deepwater assets currently fall within the process.<sup>9</sup>

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<sup>8</sup> DHS officials stated that a decision event has been added to authorize low-rate initial production; this addresses a recommendation in GAO, *Homeland Security: Successes and Challenges in DHS's Efforts to Create an Effective Acquisition Organization*, [GAO-05-179](#) (Washington, D.C.: Mar. 29, 2005).

<sup>9</sup> For information on how DHS' process is being applied to programs across the department, see GAO, *Department of Homeland Security: Assessments of Selected Complex Acquisitions*, [GAO-10-588SP](#) (Washington, D.C.: June 30, 2010).

**Figure 2: Deepwater Assets Within DHS Acquisition Phases and Decision Events as of July 2010**

Need Define the problem	Analyze/select Identify alternatives and resource requirements	Obtain Develop and evaluate capabilities			Produce/deploy/ support Produce and maintain the capabilities
<p><b>0</b></p> <ul style="list-style-type: none"> <li>• Unmanned Aircraft Systems</li> <li>• C4ISR Segment III-VIII</li> </ul>	<p><b>1</b></p> <ul style="list-style-type: none"> <li>• Cutter Small Boats</li> <li>• Offshore Patrol Cutter</li> <li>• HH-60 Medium Range Recovery Helicopter Upgrades Segment IV</li> </ul>	<p><b>2A</b></p>	<p><b>2B</b></p> <ul style="list-style-type: none"> <li>• HH-65 Multi-Mission Cutter Helicopter Upgrade Segment VI</li> <li>• HC-130H Segment II</li> <li>• Fast Response Cutter</li> </ul>	<p><b>2C</b></p> <ul style="list-style-type: none"> <li>• Maritime Patrol Aircraft</li> <li>• HH-60 Medium Range Recovery Helicopter Upgrades Segment I-III</li> <li>• National Security Cutter</li> <li>• C4ISR Increment II</li> <li>• HH-65 Multi-Mission Cutter Helicopter Upgrade Segment V</li> </ul>	<p><b>3</b></p> <ul style="list-style-type: none"> <li>• HH-65 Multi-Mission Cutter Helicopter Upgrade Segment IV</li> <li>• Medium Endurance Cutter Sustainment</li> <li>• HH-65 Multi-Mission Cutter Helicopter Upgrade Segment I - III</li> <li>• Patrol Boat Sustainment</li> <li>• HC-130H Segment 1</li> <li>• C4ISR Increment I</li> <li>• HC-130J</li> </ul>

Source: DHS data with GAO presentation.

Note: Black diamonds denote key DHS acquisition decision events.

Acquisition review boards are the principal mechanism DHS uses to oversee major acquisitions. These boards, which include DHS executives from the cost, management, and test and evaluation directorates, evaluate the progress of an asset at the acquisition events described above. The review boards make recommendations about asset acquisition decisions and, according to officials, can request the revision of key documents, like life-cycle cost estimates and test plans. For example, because of concerns about operational testing on the Maritime Patrol Aircraft, the DHS review board recommended that the aircraft’s “obtain” acquisition phase be extended, keeping the aircraft in low-rate, rather than full-rate, production. In another example, the DHS review board authorized low-rate initial production of three additional Fast Response Cutters (Sentinel class); however, it asked that the Coast Guard revise some documentation, such as the plans for logistics support and life-cycle cost estimates. According to Coast Guard program officials, this documentation has been submitted to DHS.

DHS has increased the frequency with which it holds Deepwater acquisition decision events: it held no reviews in fiscal year 2008 and three in fiscal year 2009; thus far three have been held in fiscal year 2010 and an additional three are planned. Coast Guard program and project managers told us that the level of DHS scrutiny and questions has increased significantly, which has led to constructive discussions and improvements. However, Coast Guard and DHS approval of key documentation such as program baselines can take months. Table 2 provides approval times for the most recent Deepwater asset baselines.

**Table 2: Length of Approval Processes for Department-approved Baseline Revisions**

	<b>Coast Guard project manager submission</b>	<b>USCG endorsement</b>	<b>DHS approval</b>	<b>Time to final approval</b>
National Security Cutter	Sept. 2008	Sept. 2008	Dec. 2008	2 months 9 days
Fast Response Cutter	Dec. 2008	Feb. 2009	Aug. 2009	8 months 13 days
Maritime Patrol Aircraft	July 2008	Dec. 2008	Feb. 2009	6 months 14 days
HC-130J	Oct. 2008	Dec. 2008	May. 2009	7 months 16 days
HC130-H	Oct. 2008	Dec. 2008	June 2009	8 months 12 days
HH-65	Oct. 2008	Dec. 2008	May 2009	7 months 15 days
HH-60	Oct. 2008	Dec. 2008	Aug. 2009	10 months 0 days

Source: GAO analysis of Deepwater acquisition baseline documents.

Coast Guard officials stated that DHS approval of these documents is an iterative process that can take some time but they coordinate informally to speed approvals when necessary. According to officials, Coast Guard and DHS officials are working together to reduce the approval times for key program documents. For example, the Coast Guard now forwards a draft version of key acquisition documents, such as requirements documentation and cost estimates, to DHS at the same time that it is being reviewed within the Coast Guard. This approach gives DHS an earlier opportunity to review and comment.

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## Coast Guard Continues to Refine Its Processes for Managing Deepwater Assets with a Focus on Requirements Definition

To support the continued procurement of Deepwater assets, the Coast Guard's *MSAM* is generally aligned with DHS' *Acquisition Management Directive 102-01*. As a result of this and other changes, the *MSAM* now requires additional requirements documentation—referred to as the concept of operations and the preliminary operational requirements document—to ensure traceability through the design, development, and testing of an asset. In particular, the *MSAM* requires that the capabilities directorate, known as CG-7, describe clearly and in detail what specific functional capabilities will be filled with a proposed asset or system, the relationship of a proposed asset to existing assets or systems, and how the asset is expected to be used in actual operations. As we have previously reported, determining an asset's requirements early in the life cycle is essential, as requirements ultimately drive the performance and capability of an asset and should be traceable through design, development, and testing to ensure that needs are met.<sup>10</sup>

Generation of Coast Guard requirements documentation is now guided by *USCG Publication 7-7 Requirements Generation and Management Process*, which was released by CG-7 in March 2009. The previous lack of overarching, formalized guidance had often resulted in requirements that were vague, not testable, not prioritized, and not supportable or defensible. The Coast Guard has also expanded the key stakeholders involved in the requirements process to include not only the operational users and the capabilities directorate, but also the acquisitions directorate, technical authorities, support and maintenance authorities, and budget officials.

One area where the DHS guidance and the *MSAM* are still not fully aligned is the issue of the independent test authority, the entity responsible for concurring that an asset's test and evaluation master plan ensures adequate demonstration of an asset's ability to meet operational needs. Last year, we reported that the *MSAM* appeared to be inconsistent with DHS guidance regarding the role of this test authority. The DHS *Acquisition Guidebook* states that the test authority should be independent of both the acquirer and the user, while the *MSAM* allows the Coast Guard's requirements directorate—CG-7, which represents the end user—to serve as the test authority. We recommended that the Coast Guard consult with the DHS Office of Test & Evaluation and Standards on

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<sup>10</sup> GAO, *Coast Guard; Change in Course Improves Deepwater Management and Oversight, but Outcome Still Uncertain*, [GAO-08-745](#) (Washington D.C.: June 24, 2008).



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this apparent conflict. Both DHS and the Coast Guard are in the process of revising their policies to address this issue. Coast Guard officials state that a new version of the *MSAM* will be released this summer, and that they are working with DHS to determine which entities may act as test authorities for specific assets. In May 2009, DHS released its test and evaluation directive which states that the test authority may be organic to the component—the Coast Guard in this case—another government agency, or a contractor but must be independent of the developer and the development contractor. In commenting on this directive, DHS officials stated that the test authority should be independent of the acquisition division but can be within another division of the component acquiring the asset, including those representing the asset’s end user. According to DHS officials, it is preferred that a test authority independent of both the acquirer and the user representative conduct operational testing for assets whose life-cycle costs are at or exceed \$1 billion. This independent test authority is already in place for some of the Deepwater assets, including the NSC, the Maritime Patrol Aircraft, and the Fast Response Cutter (Sentinel class). However, for assets below this threshold, operational testing may be planned and conducted by the user, subject to approval by the department.

### Coast Guard Is Reducing Contractual Reliance on ICGS

As the Coast Guard has assumed the Deepwater systems integrator role, the extent of its reliance on ICGS continues to decrease. ICGS remains the prime contractor for four Deepwater assets: the NSC, HC-130J Long-Range Surveillance Aircraft, the Maritime Patrol Aircraft, and C4ISR, but some of these assets are transitioning away from ICGS. Contracts for other assets at earlier stages of the acquisition process, such as the Fast Response Cutter (Sentinel class), were awarded outside of the ICGS contract.

The status of Deepwater assets with contracts in place for production as of July 2010 is as follows.

- While ICGS remains under contract for the production of the third NSC, the *USCGC Stratton*, the Coast Guard plans to contract directly with Northrop Grumman Ship Systems, previously a subcontractor for ICGS, on a sole-source basis to produce the remaining five cutters.
- Two additional Maritime Patrol Aircraft and eight removable electronic command and control mission system pallets also remain on contract with ICGS. The Coast Guard intends to hold a limited competition for the additional aircraft in order to retain the same airframe, issuing a request for proposals in April 2010 for up to nine aircraft over the next 5 years. According to Coast Guard officials, the procurement strategy for additional mission systems pallets is still in development.

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- The Coast Guard is preparing to move the HC-130J into the sustainment phase as it nears the end of this acquisition, with ICGS' delivery of the sixth and final aircraft on May 27, 2010.
  - Development of C4ISR, a key Deepwater asset referred to as the “glue” intended to make all assets interoperable, is currently in transition from ICGS. Under the 2007 Deepwater baseline, the C4ISR project was to consist of four segments of capability, plus upgrades to Coast Guard shore facilities and legacy cutters. According to program officials, C4ISR will now comprise eight segments, including the capabilities planned for Deepwater and additional capabilities for post-9/11 homeland security missions. ICGS has delivered the first segment, which is currently in operation on the NSC, Maritime Patrol Aircraft, and HC-130J, and is under contract to develop the second segment. This second segment is primarily focused on increasing the Coast Guard's ability to develop and maintain future capabilities. It is considered a bridge to begin the transition from the ICGS-developed architecture to a Coast Guard-developed and managed architecture by ensuring that the ICGS systems are operational and supported while the Coast Guard puts in place its own capability to support the systems. Program officials state that development of the third segment has been delayed due to funding constraints, although development of capabilities for key assets, such as the Offshore Patrol Cutter, will continue. According to officials, the acquisition strategy for future C4ISR segments has not been determined.
  - The Coast Guard structured the acquisition of the Fast Response Cutter (Sentinel class) as the systems integrator, competitively awarding a lead ship design and production contract to Bollinger Shipyards in September 2008 for the lead cutter. The Coast Guard has exercised contract options for hulls 2 through 4, with the goal of having up to 15 cutters either delivered or under contract by 2012.

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## As Understanding of Assets Evolves, Achievement of 2007 Deepwater Baselines Is Unlikely

Currently, the Deepwater Program as a whole exceeds the cost and schedule baselines approved by DHS in May 2007, and it is unlikely to meet the system-level performance baselines that were approved at that time. The new asset-specific baselines that have been developed—and approved by DHS for seven of nine assets—put the total cost of Deepwater at roughly \$28 billion, or \$3.8 billion over the \$24.2 billion baseline. The revised baselines also present life-cycle costs, which encompass the acquisition cost as well as costs for operations and maintenance throughout the assets' life cycle. While the revised baselines show a significant decrease in life-cycle costs compared to the 2007 baseline, the Coast Guard's understanding of these costs continues to evolve as the agency revisits its assumptions and produces new cost estimates. These baselines also indicate that some schedules are expected to be delayed by

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several years. Preliminary assessments by the Coast Guard indicate that some assets may be at risk for further cost and schedule growth. Further, as the Coast Guard develops more refined requirements, it has redefined or eliminated key performance indicators for many individual assets, while significant uncertainties surround other assets like C4ISR, the key to the system-of-systems as initially envisioned and approved. As a result of the way Deepwater was implemented in the past, some assets—including the NSC, Maritime Patrol Aircraft, and HC-130J—have begun deployment and operations, but their ability to fully satisfy operational requirements is unproven as they have not yet undergone operational evaluations. Further, because the Coast Guard has not determined the overall quantities and mix of assets needed for Deepwater in light of changes to the 2007 baseline, it is unknown what the overall Deepwater Program should look like going forward. In the meantime, the Coast Guard and DHS are proceeding with acquisition decision events on individual assets.

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### Total Acquisition Costs Continue to Exceed 2007 Baselines

As of July 2010, DHS had approved seven of the revised baselines and the Coast Guard had approved two of them based on a delegation of approval authority from DHS. Regarding total acquisition cost, the Coast Guard has determined that some of the assets will significantly exceed anticipated costs in the 2007 Deepwater baseline. Due to this growth, the total cost of the Deepwater Program is now expected to be roughly \$28 billion, or \$3.8 billion more than the \$24.2 billion that DHS approved in 2007, an increase of approximately 16 percent. For the assets with revised baselines this represents cost growth of approximately 35 percent. Further growth could occur, as four Deepwater assets currently lack revised cost baselines. Among them is the largest cost driver in the program, the 25 cutters of the Offshore Patrol Cutter class which, in the 2007 baseline, accounted for over 33 percent of the \$24.2 billion total acquisition cost.

Table 3 compares the 2007 and revised baselines of asset acquisition costs available as of July 2010. The table does not reflect the roughly \$3.6 billion in other Deepwater costs, such as program management, that the Coast Guard states do not require a new baseline.

**Table 3: Increased Total Acquisition Costs for Deepwater Assets with Approved Baselines as of July 2010 (then-year dollars in millions)**

<b>Asset</b>	<b>2007 Baseline</b>	<b>Revised baseline</b>	<b>Change</b>
National Security Cutter	3,450	4,749	1,299
Fast Response Cutter <sup>a</sup>	3,206	4,243	1,037
Medium Endurance Cutter Sustainment	317	321 <sup>b</sup>	4
Patrol Boat Sustainment	117	194 <sup>b</sup>	77
Maritime Patrol Aircraft	1,706	2,400	694
HC-130J	11	176	165
HC-130H	610	745	135
HH-65	741	1,041 <sup>c</sup>	300
HH-60	451	487	36
C4ISR	1,353	Baseline submitted to DHS January 2009	
Offshore Patrol Cutter	8,098	Baseline in development	
Cutter Small Boats	110	Baseline in development	
Unmanned Aerial System	503	Baseline in development	

Source: GAO analysis of Coast Guard data.

Note: If the approved baselines present both threshold costs (the maximum costs allowable before a breach occurs) and objective costs (the minimum cost expected), threshold costs are used.

<sup>a</sup>In the 2007 baseline, costs for two variants of the Fast Response Cutter were presented. The revised baseline presents the total costs for the design currently in production.

<sup>b</sup>The baselines for these assets were approved within the Coast Guard.

<sup>c</sup>We removed the costs of some capabilities introduced in the revised baseline to preserve traceability to the 2007 Deepwater baseline. A detailed cost estimate for portions of the planned upgrades has not been completed, so additional revisions may occur in the future.

These revised baselines reflect the Coast Guard’s and DHS’ improved understanding of the acquisition costs of individual Deepwater assets, as well as insight into the drivers of the cost growth. We reported last year on some of the factors contributing to increased costs for the NSC and Maritime Patrol Aircraft.<sup>11</sup> More recently, DHS approved the revised baseline for the Fast Response Cutter (Sentinel class) in August 2009. The Coast Guard has attributed this asset’s more than \$1 billion rise in cost to the use of actual contract costs from the September 2008 contract award and costs for shore facilities and initial spare parts not included in the original baseline.

<sup>11</sup> [GAO-09-682](#).

## Coast Guard's Assessment of Life-cycle Costs Continues to Evolve

As the Coast Guard has revised asset baselines for acquisition costs, it has also reevaluated operating costs and their effect on life-cycle costs. According to the 2007 Deepwater baseline, the program's life-cycle cost was to be approximately \$304.4 billion. The life-cycle costs presented in the revised asset baselines decreased by approximately \$96 billion, as shown in table 4.

**Table 4: 2007 and Revised Life-cycle Cost Baselines for Deepwater Assets (then-year dollars in millions)**

Asset	2007 Life-cycle cost baseline	Revised baseline	Change
National Security Cutter	22,998	24,277	759
Fast Response Cutter <sup>a</sup>	22,256	15,634	(6,622)
Medium Endurance Cutter Sustainment	7,157	4,515 <sup>b</sup>	(2,642)
Patrol Boat Sustainment	897	847 <sup>b</sup>	(50)
Maritime Patrol Aircraft	22,773	13,267	(9,506)
HC-130J	6,551	430 <sup>c</sup>	(6,121)
HC-130H	16,582	16,662	80
HH-65	53,433	6,298 <sup>c</sup>	(47,135)
HH-60	26,075	902 <sup>c</sup>	(25,173)
C4ISR	1,353	Baseline submitted to DHS January 2009	
Offshore Patrol Cutter	47,601	Baseline in development	
Unmanned Aerial System	17,753	Baseline in development	

Source: GAO analysis of Coast Guard data.

Note: If the approved baselines present both threshold and objective costs, threshold costs (which are the maximum allowable costs) are used.

<sup>a</sup>In the 2007 baseline, costs for two variants of the Fast Response Cutter were presented. The revised baseline presents the total costs for the design currently in production.

<sup>b</sup>The baselines for these assets were approved within the Coast Guard.

<sup>c</sup>Reflects only the cost of upgrades to mission systems and not the costs to acquire and maintain the whole asset.

This substantial reduction in life-cycle costs is due in part to new assumptions applied by the Coast Guard in calculating the costs to support and maintain its assets. In preparing the revised baselines, the Coast Guard updated its assumptions by reducing the time it expects certain assets to continue in operations. Any reduction of the years in service for an asset reduces the total life-cycle cost, as the overall cost for operating the asset would decrease. For example, the useful life of the HH-65 was reduced from 40 years to 23 years of extended service, contributing to a

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\$47 billion reduction in life-cycle costs in the revised baseline. According to the Coast Guard, a 40-year extended service life for the HH-65 was not realistic, as the first of these assets became operational in 1984 and upgrades to extend the service life will not enable the helicopters to operate for an additional 40 years. The service life expected of the HH-60 was also reduced, from 30 years of additional service to 20, which contributed to its \$25.2 billion decrease in life-cycle costs. Assumptions for the expected service life of the Fast Response Cutter (Sentinel class) also changed as a result of selecting an alternate design for production. The current Sentinel class design is expected to have a service life of 20 years, less than ICGS' proposed Fast Response Cutter-A—which had an estimated service life of 35 years—but more than its proposed Fast Response Cutter-B, which had a proposed 15-year service life. While altering these assumptions does reduce the expected life-cycle costs associated with the current Deepwater Program, it also indicates that the Coast Guard may need to acquire new assets sooner than anticipated in the 2007 baseline.

The Coast Guard also used different assumptions about what support costs were included in its revised baselines. For example, the life-cycle costs in the revised baselines for the HH-65, HH-60, and the HC-130J reflect only the costs to support the upgraded mission systems and not the costs of the entire aircraft and therefore appear to be understated. As a result, the stated life-cycle costs for these assets significantly decreased; for example, in the case of the HC-130J costs decreased from \$6.6 billion to \$430 million.

However, the Coast Guard's understanding of life-cycle costs continues to evolve. DHS approved all the revised Deepwater asset baselines on the condition that the Coast Guard resubmit life-cycle cost estimates. According to Coast Guard officials, DHS also requested that new estimates for the HC-130J, HH-60, and HH-65 reflect the cost to support the entire aircraft. As of July 2010, the Coast Guard has submitted life-cycle cost estimates for eight assets: NSC, Fast Response Cutter (Sentinel class), Maritime Patrol Aircraft, HC-130J, C4ISR, HH-65, and the two mission effectiveness programs. These estimates suggest that some assets may meet the revised cost baselines while others are in danger of exceeding them. Table 5 compares the revised baselines to the Coast Guard's current life-cycle cost estimates.

**Table 5: Revised Life-cycle Cost Baselines and Current Life-cycle Cost Estimates for Deepwater Assets (then-year dollars in millions)**

Asset	Revised baseline	Current estimate <sup>a</sup>	Difference
National Security Cutter	24,277	16,859	(7,419)
Fast Response Cutter <sup>b</sup>	15,634	13,174	(2,460)
Medium Endurance Cutter Sustainment	4,515 <sup>c</sup>	4,427	(88)
Patrol Boat Sustainment	847 <sup>c</sup>	861	14
Maritime Patrol Aircraft	13,267	25,493	12,226
HC-130J	430 <sup>d</sup>	1,705	1,275
HC-130H	16,662	Estimate in development	
HH-65	6,298 <sup>d</sup>	8,173	1,875
HH-60	902 <sup>d</sup>	Estimate in development	
C4ISR	Baseline submitted to DHS January 2009	6,713 <sup>e</sup>	5,360 <sup>e</sup>

Source: GAO analysis of Coast Guard data.

Note: If the approved baselines present both threshold and objective costs, threshold costs (which are the maximum allowable costs) are used.

<sup>a</sup>The current estimates presented represent the risk-adjusted costs which, according to program managers, are the estimates used for budgeting purposes.

<sup>b</sup>In the 2007 baseline, costs for two variants of the Fast Response Cutter were presented. The revised baseline presents the total costs for the design currently in production.

<sup>c</sup>The baselines for these assets were approved within the Coast Guard.

<sup>d</sup>Reflects only the cost of upgrades to mission systems and not the costs to acquire and maintain the whole asset.

<sup>e</sup>Although DHS has not yet approved the C4ISR acquisition program baseline, the Coast Guard has approved a life-cycle cost estimate for this asset.

As shown in the table above, expected life-cycle costs for some assets, such as the NSC and the Fast Response Cutter (Sentinel class), continue to decrease as more information about the actual costs to operate and acquire these assets is used to refine estimates. The expected life-cycle costs of other assets, however, have increased beyond their current baselines. Coast Guard officials told us they have worked to make their life-cycle cost estimates consistent, in keeping with DHS guidance, and plan to update them every 12 to 18 months. A discussion of the estimates for the NSC, Fast Response Cutter (Sentinel class), Maritime Patrol Aircraft, C4ISR, and the HH-65 follows.

- The current estimate for the NSC is \$7.4 billion below the revised baseline for life-cycle costs even when additional costs are added to the estimate to account for identified risks. These risks include unstable C4ISR

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requirements, which could result in modifications to the ship, and the Coast Guard's change in contract type for construction of the last five NSCs from cost-reimbursement to fixed price-incentive fee. Generally, cost-reimbursement contracts are suitable only when uncertainties involved in contract performance do not permit costs to be estimated with sufficient accuracy to use a fixed-price contract—such as the lack of cost experience in performing the work or unstable manufacturing techniques or specifications.<sup>12</sup> Under cost-reimbursement contracts, most of the cost risk is placed on the government, while under fixed-price incentive fee contracts an increased share of cost performance risk is borne by the builder. Because of this additional risk, the cost estimate assumed that the contract price would increase.

- The current life-cycle cost estimate for the Fast Response Cutter (Sentinel class) is also below its revised life-cycle cost baseline, by \$2.5 billion, even after additional costs were added to account for risks. The most significant risk is attributable to the Coast Guard's acquisition approach for this asset. The government plans to procure a total of 58 cutters. Under the contract for design and production of the first patrol boat, the government plans to procure 24-34 boats, with the remaining portion to be competitively procured, potentially resulting in a change of contractor. This competition would be for construction of the remaining boats utilizing the same design. The Coast Guard adopted this acquisition strategy as a means of reducing overall risk under the contract. The current cost estimate states that there could be an increase in cost if a new contractor were brought on board, potentially modifying the design to fit its construction processes in addition to establishing the production line and learning how to more efficiently produce the boats. The cost estimate also presents risks in the estimates of operating costs. As the Sentinel class has never been used operationally, these costs were determined by using historical data on similar ships and discussions with the intended Coast Guard user, meaning true costs are unknown and could exceed or be lower than the current estimates. Uncertainty about future fuel costs also drives risk.
- The \$12.2 billion increase between the current life-cycle cost estimate and the revised baseline for the Maritime Patrol Aircraft is primarily attributable to a difference in assumptions about crew sizes and cost per flight hour, which affect the cost to operate the aircraft. Further, additional costs for training devices are now included in the estimate. The primary risks discussed in the estimate, which have also added costs, are

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<sup>12</sup> We recently reported on the government's use of cost-reimbursement contracts. GAO, *Contract Management: Extent of Federal Spending under Cost-Reimbursement Contracts Unclear and Key Controls Not Always Used*, [GAO-09-921](#) (Washington, D.C.: Sept. 30, 2009).



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the Euro/dollar exchange rate and the cost to maintain the aircraft over time. Because a portion of the aircraft the Coast Guard currently has under contract is produced in Europe, any fluctuation in the strength of the dollar could have an effect, positive or negative, on the aircraft's cost. The estimate also states that long-term maintenance of the mission systems pallet could be problematic if parts become obsolete, a risk identified for other systems dependant on C4ISR-intensive systems.

- The current life-cycle cost estimate for C4ISR places the cost at \$6.7 billion, well above the \$1.3 billion baseline established in 2007. This estimate presents, for the first time, a full life-cycle cost for this capability, as the 2007 baseline presented only acquisition costs for C4ISR and assumed that operations and maintenance costs were included in the baselines for individual assets. This increase is attributed to the changing nature of the program and the risks involved. When the Coast Guard made the decision to become systems integrator, it also assumed greater oversight of the software development and maintenance associated with C4ISR. The Coast Guard intends to establish laboratories to develop, integrate, and support this software, which accounts for a portion of the cost increase. According to program officials, costs have also increased due to maintenance needs, especially the need for upgrades to keep software and information secure. The risks are driven primarily by technical uncertainty due to undefined requirements in later segments and the effect of technology changes on C4ISR capabilities in the future. As the Coast Guard has not yet fully defined the capabilities it wants from C4ISR, it is difficult to assess the associated costs. The interrelated nature of segments, with each segment building upon and enhancing the capabilities of prior segments, could lead to cascading effects on cost and schedule if one is delayed. To account for these uncertainties, the Coast Guard built additional costs into the estimate.
- The current life-cycle cost estimate for the HH-65 Multi-mission Cutter Helicopter is \$8.2 billion—\$1.9 billion above the cost stated in the revised baseline. The majority of the increase is due to a change in the assumptions about the costs to operate and maintain the asset over its life cycle. As mentioned previously, the revised baseline included only the costs to support the upgraded mission systems aboard the HH-65. The current cost estimate includes support for the entire aircraft and raises the cost of operations and maintenance from \$5.164 billion to \$7.033 billion. The current cost estimate also takes into account risks the aircraft may encounter in the further development of its upgraded mission systems and risks that could increase operational costs. The risks discussed in the estimate include the possibility of a structural redesign or installation issues associated with a new sub-system that improves the helicopter's ability to land on the NSC, the possibility of software or labor cost growth for other upgrades, and the uncertainty surrounding the future price of

fuel. To account for these uncertainties, the Coast Guard built additional costs into the estimate.

## Revisions to Asset Baselines Show Further Schedule Delays

The Coast Guard’s reevaluation of asset baselines has also improved insight into the schedules for when assets are expected to begin operations—also known as initial operational capability—and when all assets have been delivered and are ready for operations—or full operational capability. For example, the Fast Response Cutter (Sentinel class) patrol boat is now scheduled to deliver the final asset by September 2021, rather than 2016 as stated in the 2007 baseline—a delay of 5 years. The HH-60 Medium Range Recovery helicopter will also not complete deliveries until later than planned due to a restructuring of scheduled upgrades. This asset will now complete upgrades by 2020, a 1-year delay from the previous baseline. The schedule to upgrade the capabilities of the HH-65 Multi-mission helicopter has also been restructured, but a date for completing all the necessary upgrades has not yet been determined. Table 6 provides more information on changes in asset schedules.

**Table 6: Changes in Initial Operational Capability and Final Asset Delivery from 2007 Baseline for Selected Deepwater Assets as of July 2010**

Asset	Initial operational capability (FY)			Final asset delivery (FY)		
	2007 baseline	Current baseline	Change	2007 baseline	Current baseline	Change
National Security Cutter	2008	2009	12 months	2014	2016	24 months
Fast Response Cutter <sup>a</sup>	2010	2013	27 months	2016	2021	60 months
Medium Endurance Cutter Sustainment	2006	2006 <sup>b</sup>	0 months	2016	2017 <sup>b</sup>	17 months
Patrol Boat Sustainment	2009	2007 <sup>b</sup>	(18 months)	2013	2014 <sup>b</sup>	17 months
Maritime Patrol Aircraft	2008	2009	21 months	2016	2020	57 months
HC-130J	2008	2009	3 months	2009	2011	21 months
HC-130H	2013	to be determined		2017	to be determined	
HH-65	2009	to be determined		2013	to be determined	
HH-60	2014	to be determined		2019	2020	12 months

Source: GAO analysis of Coast Guard data.

Note: If the approved baselines present both threshold and objective dates, threshold dates (which are the latest allowable dates) are used.

<sup>a</sup>In the 2007 baseline, costs for two variants of the Fast Response Cutter were presented. For the 2007 baseline initial operational capability date we use the first delivery and for full operating capability the last possible date reported.

<sup>b</sup>The baselines for these assets were approved within the Coast Guard.

**System-level Performance  
Baselines Unlikely to be  
Met**

In addition to establishing cost and schedule baselines, the 2007 Deepwater acquisition program baseline also established a baseline for system-of-systems level performance and the key performance parameters at the asset level that contribute to this performance. This system-level baseline remains important, as the Coast Guard continues to pursue system-of-systems level effects even as it devolves its approach to Deepwater management to an asset level. According to the Coast Guard’s 2005 mission needs statement, the intent of the Deepwater Program was to improve the capability to detect, intercept, and interdict potential threats in the maritime domain using a layered defense of major cutters, patrol boats, helicopters, unmanned aerial vehicles, and maritime patrol aircraft, all connected using a single command and control architecture. This description is still valid given that the Coast Guard is still pursuing the same types of assets and capabilities proposed by ICGS. The 2007 baseline describes thresholds and objectives for three system-level performance requirements.<sup>13</sup>

- Available mission hours: Establishes the numbers of hours surface and aviation assets must perform on an annual basis to meet mission needs.
- Surveillance of nautical square miles: Describes system-level effects specific to an NSC acting in concert with its embarked HH-65 helicopter and unmanned aerial vehicles.
- System task sequence: Establishes the number of nautical square miles in which the fully deployed Deepwater Program is capable of searching for, identifying, and prosecuting targets of interest per day.

The specific capabilities to be achieved under these overarching performance requirements are listed in table 7.

**Table 7: System-level Requirements from 2007 Deepwater Baseline**

	<b>Threshold</b>	<b>Objective</b>
Available mission hours	366,257 hours	445,000 hours
Surface vessels	265,572 hours	305,000 hours
Aircraft	100,685 hours	140,000 hours
National Security Cutter Force Package Surveillance	13,489 nm <sup>2</sup>	56,000 nm <sup>2</sup>
System task sequence		

<sup>13</sup> A threshold is the minimum performance value necessary to satisfy a requirement. A requirement’s objective is a measurable, cost-effective value greater than the threshold. In some cases, the threshold and objective are the same.

	<b>Threshold</b>	<b>Objective</b>
Search	1,101,593 nm <sup>2</sup> /day	2,500,000 nm <sup>2</sup> /day
Identify	500,182 nm <sup>2</sup> /day	1,300,000 nm <sup>2</sup> /day
Prosecute	351,583 nm <sup>2</sup> /day	850,000 nm <sup>2</sup> /day

Source: GAO analysis of Coast Guard data.

The ability of the overall system to meet these capabilities hinges on the ability of the individual assets to meet key performance criteria that contribute to the overall performance. For example, assets contribute to the ability to search a given area by meeting criteria for detection range and speed. In addition, the ability to meet mission hours largely depends on the assets' availability for operations and ability to remain in operations for a set period of time. These asset-level criteria are evolving as the Coast Guard revisits requirements baselines for individual assets. According to Coast Guard officials, the primary focus when revising the asset baselines has been on accurately stating the asset's expected capabilities or, when possible, on making trade-offs between performance and cost. While Coast Guard officials told us that the effect of revised asset-level baselines on the overall system-level performance was considered to some extent, the revised baselines do not reflect any impact on the system-of-systems requirements.

In addition, the revised, asset-level performance baselines for assets already in production or being upgraded have redefined or eliminated key performance criteria that were in the 2007 baseline. As the Coast Guard develops more comprehensive requirements documentation for Deepwater assets, the performance criteria for many of these assets has changed as key performance criteria are added, altered, or eliminated. According to program officials, these changes are being made to ensure that requirements are measurable and testable. For example, the criteria for speed and detection range or operational availability have been deleted—or redefined in a manner that makes traceability to the system-level requirements difficult—in the revised baselines for the HH-60, HH-65, Maritime Patrol Aircraft, HC-130J, and the Fast Response Cutter (Sentinel class). In total, the revised acquisition program baselines for only 4 of the 13 assets included in the 2007 baseline—the NSC, HC-130H, and medium cutter and patrol boat sustainment programs—have not yet had changes to the key performance criteria. According to program officials, changes to performance criteria are made to clarify requirements and develop measurable criteria for testing. The Coast Guard has not fully taken into

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account, however, how these changes affect system-of-systems level requirements, although officials state that those requirements are being revalidated.

Some assets or capabilities key to the performance of the Deepwater Program as a whole—including the 25 ships of the Offshore Patrol Cutter class, the capabilities provided by the integrated C4ISR system, and the cutter-based Unmanned Aerial Vehicle essential to extending major cutter surveillance times and ranges—remain in development. The capabilities provided by C4ISR are particularly important to achieving the performance required for Deepwater. These systems are at the core of every Coast Guard activity and provide the essential situational awareness, data processing, interoperability, and records accountability and transparency necessary to successfully execute the Coast Guard's many missions. If the designs of these assets, and therefore the performance criteria they are able to meet, were to be significantly different than those proposed under the ICGS baseline, the system's ability to achieve the higher-level performance requirements set forth in the 2007 system-level baseline would be doubtful.

Results of Ongoing and Planned Operational Assessments May Further Affect Performance Baselines

To determine whether Deepwater assets can meet their revised performance baselines, the Coast Guard has performed operational and capability assessments, through formalized test procedures or through limited operations, on a number of assets. Three of the Deepwater assets—the NSC, Maritime Patrol Aircraft, and HC-130J—have begun limited operations although they have not undergone formal testing to determine whether capabilities meet requirements. The Fast Response Cutter (Sentinel class) has undergone an early operational assessment to determine whether its capabilities meet requirements, and the Coast Guard plans to conduct an operational evaluation of the asset in 2011. Additional information on the status of operational testing for these assets follows.

- The first NSC completed an assessment of its operational capabilities in 2007, before final delivery to the Coast Guard, and has since been performing limited operations from its homeport in Alameda, California.<sup>14</sup>

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<sup>14</sup> An operational assessment focuses on significant trends noted in development efforts, programmatic voids, risk areas, adequacy of requirements, and the ability of the program to support operational testing. An operational assessment may be conducted at any time using technology demonstrators, prototypes, mock-ups, engineering development models, or simulations, but is not to substitute for initial operational testing and evaluation.

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While it has completed some missions successfully, shortfalls in the expected overall capabilities have been noted. Specifically, the lack of unmanned air vehicles limits the full capability of the cutter to conduct surveillance as reflected in the 2007 performance baseline. The Coast Guard is also continuing to address design problems with the NSC's small boat launch and recovery systems.<sup>15</sup> The operational evaluation for the NSC is currently scheduled to begin in 2011; however, there are some aspects of the cutter's performance that will not be demonstrated at that time. Coast Guard officials stated that the NSC will not demonstrate the ability to operate for 230 days away from port. This demonstration requires the use of four sets of crews to operate three cutters at different times in order to maintain operations without exceeding regulations governing how long crews can remain at sea. This multicrewing concept could have an effect on the maintenance needs of these vessels or on personnel deployment times. The Coast Guard states that it will not fully demonstrate this multicrewing capability until 2014 or 2015, when three cutters are available for operations. In addition, the operational evaluation will not demonstrate the ability of an unmanned aerial system to operate as intended from the NSC, as the Coast Guard has not selected an appropriate unmanned system and has not indicated when it plans to do so. According to officials, some demonstrations of the ability of an unmanned system to take off and land on the cutter may take place, but operational missions with an unmanned aerial system will not be performed.

- The Maritime Patrol Aircraft underwent an operational assessment in 2009 using aircraft previously delivered to the Coast Guard. This asset, too, has been used in limited operations before completing operational evaluation. Program officials stated that while the aircraft itself is performing well in those limited operations, the mission systems pallet—which contributes significantly to operational capabilities—has previously experienced reliability and maintenance challenges. The Coast Guard is working to address these challenges by updating the software and hardware. Currently, the Maritime Patrol Aircraft is expected to provide 1,200 hours of operational performance per year. Coast Guard officials stated that the ability of the aircraft to achieve this will be demonstrated in fiscal year 2011 during the aircraft's operational evaluation.

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<sup>15</sup> We recently reported on the operational effects of delays in the delivery of the NSC class and its accompanying support assets of unmanned aircraft and small boats. GAO, *Coast Guard: Better Logistics Planning Needed to Aid Operational Decisions Related to the Deployment of the National Security Cutter and Its Support Assets*, [GAO-09-497](#) (Washington, D.C.: July 17, 2009).

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- The HC-130J did not undergo any operational testing or assessments conducted by an independent operational test authority and none are planned. The current approved operational requirements document, which establishes the performance baseline for the aircraft and should be reflected in the key performance criteria to which the asset is tested, was signed in 2003 and does not necessarily reflect the current capabilities or established baseline for the aircraft. According to officials, the Coast Guard and DHS have developed a report that defines the aircraft's performance by describing the demonstrations that have already been conducted to quantify the characteristics of the aircraft and mission systems—such as the performance capabilities of the radar. This report, however, is not akin to a test plan that demonstrates the aircraft is able to meet operational needs. Determining the capabilities in this manner makes it difficult to assess whether the aircraft meets asset-level or system-level capabilities. However, DHS and the Coast Guard have agreed that no further testing or documentation is necessary, as production for the aircraft is complete.
  - The Fast Response Cutter (Sentinel class) is one of the few Deepwater assets to undergo an early operational assessment, conducted by an independent test authority—the Navy's Commander Operational Test and Evaluation Force—prior to the project's critical design review, which allowed for early detection and rectification of issues. According to Coast Guard program and Navy test officials, all but five minor items recommended for correction as a result of this assessment were addressed prior to the design review. However, program and test officials stated that the cutter will not undergo an additional assessment before as many as 15 of the expected 58 vessels are under contract and operational testing is completed. If significant issues are found in testing, these vessels may have to undergo costly modifications. The Coast Guard acknowledges the risks inherent in this approach and states that it is reducing risk by conducting testing of the patrol boat's design and subsystems and closely monitoring the contractor's performance during production.

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### Coast Guard Has Not Yet Revalidated the Quantities or Mix of Assets Required to Meet Needs

While the Coast Guard has made progress in revising baselines for the cost, schedule, and capabilities of individual assets, it has not yet revalidated the quantities of those assets needed to meet operational needs—as it stated that it would in assuming the role of systems integrator. Determining the force structure and size of the Deepwater Program, specifically the number and type of assets needed to meet mission demands, is key to managing the acquisition and will have an impact on the final cost and performance of the program.

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The Coast Guard planned to complete a comprehensive fleet mix analysis in July 2009 to eliminate uncertainty surrounding future mission performance and to produce a baseline for the acquisition. The analysis, which began in October 2008—and is now termed the fleet mix analysis Phase I—was led by the capabilities directorate and included a review of all Deepwater missions and assets. Assumptions on asset capabilities were based on the capabilities of the current fleet as well as the capabilities that are projected for the Deepwater assets. In most cases, Coast Guard officials stated, Deepwater assets retained the capabilities determined by ICGS with a few exceptions. For example, the Offshore Patrol Cutter was assumed to operate away from port for 230 days out of the year as envisioned by ICGS, but the Maritime Patrol Aircraft was assumed to operate for 800 instead of 1,200 flight hours per year. For those assets that have evolved significantly since 2007, the analysis made “best guess” assumptions that utilized the capabilities currently being pursued by the Coast Guard. While the 2007 Deepwater baseline was considered the “floor” for asset capabilities and quantities, officials stated that the analysis did not impose financial constraints on the outcome and that, therefore, the result was not feasible in terms of what the Coast Guard could afford. As a result, officials stated that they do not intend to use the results to produce recommendations on a baseline for fleet mix decisions, as originally intended. The results of the analysis have not been released.

As a result of discussions with DHS, the Coast Guard intends to conduct a second, cost-constrained fleet mix analysis Phase II, limited to surface assets. This analysis is being conducted to further validate mission needs, roles, and responsibilities and will produce recommendations on the numbers and types of surface assets the Coast Guard should procure. It is intended to be complete in February 2011. In the meantime, the Coast Guard continues to pursue quantities of planned procurements that, to a large extent, reflect the 2007 baseline.

The Coast Guard also completed a study in August 2008 on the appropriate number and type of HC-130 aircraft to procure to meet needs, but no decision has been made yet. The Coast Guard currently operates two models of the HC-130 aircraft: the HC-130H, which entered operations in the 1970s, and the HC-130J, which entered operations in the last few years. Both models were upgraded as part of the Deepwater Program but, given the advanced age and deteriorating state of many of the older HC-130H aircraft, the Coast Guard decided to revalidate how many of each aircraft should be upgraded and maintained. The study concluded that while the HC-130J offered more capability than the HC-130H, and a longer expected life cycle, budgetary concerns prevent retiring all the older aircraft in favor



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of HC-130Js. Instead, a hybrid plan was proposed to maintain 11, instead of the currently planned 16, HC-130Hs and to increase the numbers of HC-130Js from the currently planned 6 to 11. However, the Coast Guard has not yet taken the additional actions needed to purchase additional HC-130Js. Officials stated that any additional acquisitions would necessitate a revalidation of HC-130J requirements and resubmission of much of the asset's documentation, including baselines and test plans.

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## Coast Guard Continues to Improve Acquisition Workforce and Develop Means to Further Reduce Vacancies

The Coast Guard sought a systems integrator at the outset of the Deepwater Program in part because its workforce lacked the experience and depth to manage the acquisition internally. As the Coast Guard assumes the role of system integrator it is important that it understand its needs and builds an acquisition workforce to manage the Deepwater Program. One key method the Coast Guard uses is a workforce planning model, modified from a model developed by the Air Force, to improve its estimates of workforce needs. According to Coast Guard officials, input from project managers is used in the model to estimate current and future needs for key personnel such as project managers, contracting officials, and business and financial managers. Officials stated that the output of the model is then discussed in a forum of all the project managers, and requests for additional personnel are then developed and forwarded for inclusion in the budget.

Since our last report, the Coast Guard has begun to implement initiatives aimed at further reducing its acquisition workforce gap. One such initiative is the acquisition professional career program, a 3-year internship program that targets engineering and business students for development as civilian acquisition personnel. As of July, the Coast Guard had approximately 20 interns supporting contracting and other program management areas. The career entry opportunity program is another initiative meant to attract qualified employees to the Coast Guard while also promoting career growth for current Coast Guard employees. Participants in the program receive on-the-job training for 2 to 3 years in a variety of positions within the acquisition directorate and, upon completing the program, are permanently placed in positions in the Coast Guard's acquisition community. Officials said they are also attempting to obtain direct hire authority to streamline the hiring process and avoid delays in placing new hires. Along with enhancing its recruiting and improving its hiring process for civilian personnel, officials discussed how they are attempting to make employment in the acquisitions area more appealing for military personnel by developing an acquisition career path

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that offers opportunities for advancement similar to other uniformed career paths within the Coast Guard.

The Coast Guard has had some success in narrowing the acquisition workforce gap we have reported on in the past. Officials stated that by the end of fiscal year 2009, 11 percent of the Coast Guard's civilian acquisition workforce positions remained unfilled, down from the 16 percent that the Coast Guard reported for April 2009.<sup>16</sup> In its fiscal year 2010 budget, however, the acquisition directorate received an additional 100 government positions that must be filled. Officials stated that 25 percent of these new positions were going to be allocated to the Offshore Patrol Cutter program, due to the need for more staff as the program prepares to award a design and construction contract, and 40 percent were going to different sponsors and technical authorities that support the acquisition directorate. This increase in number of positions has had an effect on the Coast Guard's current vacancy rate. As of April 2010, the Coast Guard had a total of 951 government acquisition workforce positions, consisting of 556 civilian positions and 395 military positions. Of these 951 positions, 190 were vacant as of April 2010, leaving a workforce gap of approximately 20 percent.

Although workforce gaps remain, the Coast Guard has increased the number of certifications for the acquisition officials it has in place for areas such as program management, business management, and systems engineering. These officials are required to complete specialized training in their respective acquisition career fields in order to manage or execute acquisition contracts at various dollar thresholds. Since April 2009, the Coast Guard reports that it has increased the total number of certified acquisition officials in a number of these types of fields from 593 to 862, an approximately 45 percent increase. The number of certified program managers alone rose from 357 in April 2009 to 601 in June 2010, for an increase of about 68 percent.

Although the Coast Guard is attempting to close its acquisition workforce gaps it faces challenges—like many federal agencies that acquire major systems—in recruiting and retaining a sufficient number of government employees in acquisition positions such as contract specialists, cost estimators, system engineers, and program management support. When these gaps cannot be filled, contractors are often used to support the work

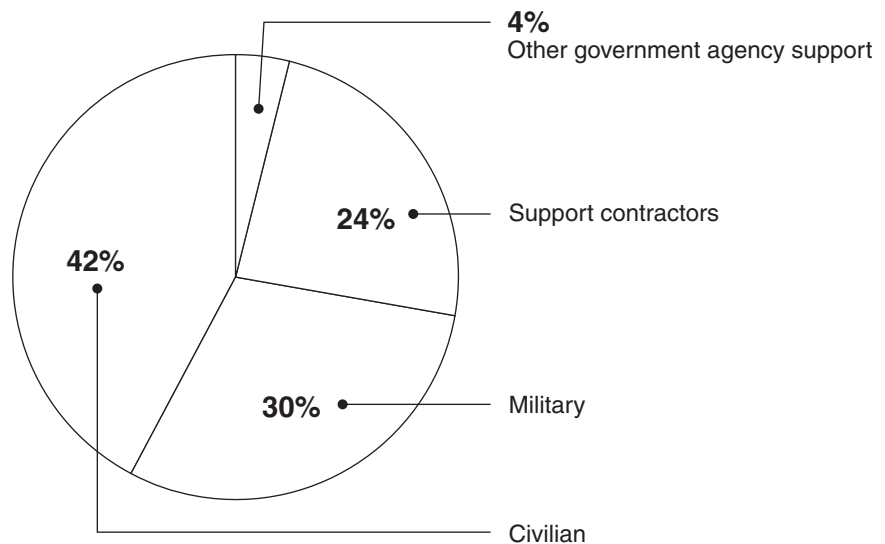
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<sup>16</sup> [GAO-09-682](#).

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performed by government staff. For example, the Coast Guard has used support contractors to perform life-cycle cost estimates and to assist in the drafting of program documentation. As shown in figure 3, support contractors made up 24 percent of the acquisition workforce as of April 2010.

**Figure 3: Acquisition Workforce, as of April 2010**



Source: GAO analysis of Coast Guard data.

The Coast Guard acknowledges that the use of support contractors puts it at risk for potential conflicts of interest and the possibility of these contractors functioning in roles that closely support inherently governmental functions. To address conflicts of interest, all solicitations and contracts include appropriate clauses where a potential for conflict may exist, according to Coast Guard officials, and staff are trained on how to identify and manage conflicts of interest. Further, the Coast Guard has made efforts to ensure that support contractors do not perform inherently governmental work. These efforts include releasing guidance to define inherently governmental roles and the roles of government staff in overseeing contractors and ensuring appropriate oversight and approval of work performed.

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## Conclusions

In creating new baselines for individual asset cost, schedule, and performance, the Coast Guard has deepened its understanding of the

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resources needed and capabilities required on an asset level in a manner that improves oversight and management of the Deepwater Program. As it does so, it is also becoming increasingly clear that the baselines for cost, schedule, and performance established in 2007 cannot be achieved. Because the Coast Guard has not revalidated its system-level requirements, it lacks the analytical framework needed to inform Coast Guard and DHS decisions about asset trade-offs in the future. In the absence of recommendations from the fleet mix analysis, it remains unclear what number of assets are required to meet the Coast Guard's needs or what trade-offs in capabilities or mission goals are required to control costs in a fiscally constrained environment.

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## Recommendation for Executive Action

To capitalize on the increase in knowledge gained by creating new baselines for Deepwater assets, and to better manage acquisitions of further assets and capabilities, we recommend that the Commandant of the Coast Guard complete, and present to Congress, a comprehensive review of the Deepwater Program that clarifies the overall cost, schedule, quantities, and mix of assets that are needed to meet mission needs and what trade-offs need to be made considering fiscal constraints, given that the currently approved Deepwater baseline is no longer feasible.

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## Agency Comments and Our Evaluation

We provided a draft of this report to the Coast Guard and DHS. DHS provided oral comments via an e-mail stating that it concurred with the recommendation. The Coast Guard provided technical comments, which we incorporated into the report as appropriate.

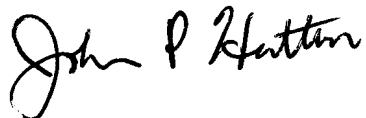
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We are sending copies of this report to interested congressional committees, the Secretary of Homeland Security, and the Commandant of the Coast Guard. This report will also be available at no charge on GAO's Web site at <http://www.gao.gov>.

If you or your staff have any questions about this report or need additional information, please contact me at (202) 512-4841 or [huttonj@gao.gov](mailto:huttonj@gao.gov).

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Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Staff acknowledgments are provided in appendix II.

A handwritten signature in black ink that reads "John P. Hutton". The signature is written in a cursive style with a large, stylized initial "J".

John P. Hutton  
Director  
Acquisition and Sourcing Management

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# Appendix I: Scope and Methodology

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In conducting this review, we relied in part on the information and analysis in our past work, including reports completed in 2008 and 2009.<sup>1</sup> Additional scope and methodology information on each objective of this report follows.

To assess changes to the Department of Homeland Security (DHS) and Coast Guard acquisition policies, processes, and approach related to Deepwater since our July 2009 report we reviewed DHS' *Acquisition Directive 102-01, Acquisition Guidebook 102-01-001*, Directive 026-06 on test and evaluation, as well as acquisition decision and other memoranda. We also reviewed the Coast Guard's *Major Systems Acquisition Manual (MSAM)*, Requirements Generation and Management Process, and other policy documents. We also interviewed senior acquisition directorate officials, representatives of the Coast Guard's capabilities directorate, and representatives of Coast Guard's technical and support authorities. We also interviewed program and project managers to discuss the effect of the policies and processes on Deepwater assets and spoke with DHS officials about the department's major acquisition review process and reporting requirements. To determine the contractual status of Deepwater assets we reviewed Coast Guard contracts and acquisition strategies and spoke with contracting and acquisition officials. In addition, we met with contractor and Coast Guard officials at Northrop Grumman facilities in Pascagoula, Mississippi and with Bollinger officials in Lockport, Louisiana. We also met with Coast Guard officials at the Aviation Logistics Center in Elizabeth City, North Carolina; Surface Fleet Logistics Center in Curtis Bay, Maryland; Lockheed Martin facilities in Moorestown, New Jersey; and the Command and Control Engineering Center in Portsmouth, Virginia to discuss their role in upgrading and maintaining Deepwater assets.

To assess whether the Deepwater Program is meeting baselines for cost, schedule, and performance, we reviewed the Deepwater Program's 2007 baseline and compared it to the revised baselines for individual assets that have been approved to date. We also interviewed senior acquisition directorate officials and program and project managers to discuss how the Coast Guard is developing new acquisition program baselines for individual assets and how the process used differs from that in the 2007

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<sup>1</sup> GAO, *Coast Guard: As Deepwater Systems Integrator, Coast Guard Is Reassessing Costs and Capabilities but Lags in Applying Its Disciplined Acquisition Approach*, [GAO-09-682](#) (Washington, D.C.: July 14, 2009) and GAO, *Change in Course Improves Deepwater Management and Oversight, but Outcome Still Uncertain*, [GAO-08-745](#) (Washington, D.C.: June 24, 2008).

baseline, such as the basis for cost estimates. In addition we reviewed the life-cycle cost estimates for selected assets. We also reviewed operational requirements documents for selected assets in various stages of the development and production processes to understand the major drivers of cost growth, schedule delays, and capability changes. We interviewed acquisition directorate officials and program and project managers to discuss options for controlling cost growth by making trade-offs in asset quantities and/or capabilities, as well as some of the potential implications of unplanned schedule delays. We also interviewed Coast Guard officials and analyzed documentation for the fleet-mix analysis and follow-on studies being conducted by the capabilities directorate. In addition we met with Navy and Coast Guard officials at the U.S. Navy's Commander Operational Test and Evaluation Force in Norfolk, Virginia to discuss their role in conducting operational testing.

To assess the Coast Guard's efforts to manage and build its acquisition workforce, we reviewed Coast Guard information on government, contractor, and vacant positions. We supplemented this analysis with interviews of acquisition directorate officials, including contracting and Office of Acquisition Workforce Management officials and program and project managers to discuss current vacancy rates and the Coast Guard's plans to increase the size of the acquisition workforce. We also reviewed documentation and interviewed senior acquisition directorate officials about the use of support contractors and oversight to prevent contractors from performing inherently governmental functions. We reviewed documentation such as the updated *Acquisition Human Capital Strategic Plan* and discussed workforce initiatives, challenges, and obstacles to building an acquisition workforce, including recruitment and difficulty in filling key positions.

We conducted this performance audit between October 2009 and July 2010 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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# Appendix II: GAO Contact and Acknowledgments

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For further information about this report, please contact John P. Hutton, Director, Acquisition and Sourcing Management, at (202) 512-4841 or [huttonj@gao.gov](mailto:huttonj@gao.gov). Other individuals making key contributions to this report include Michele Mackin, Assistant Director; J. Kristopher Keener; Matthew Alemu; Kelly Bradley; and Kristine Hassinger.



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# Related GAO Products

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*Coast Guard: Observations on the Requested Fiscal Year 2011 Budget, Past Performance, and Current Challenges.* [GAO-10-411T](#). Washington, D.C.: February 25, 2010.

*Coast Guard: Better Logistics Planning Needed to Aid Operational Decisions Related to the Deployment of the National Security Cutter and Its Support Assets.* [GAO-09-497](#). Washington, D.C.: July 17, 2009.

*Coast Guard: As Deepwater Systems Integrator, Coast Guard Is Reassessing Costs and Capabilities but Lags in Applying Its Disciplined Acquisition Approach.* [GAO-09-682](#). Washington, D.C.: July 14, 2009.

*Coast Guard: Change in Course Improves Deepwater Management and Oversight, but Outcome Still Uncertain.* [GAO-08-745](#). Washington, D.C.: June 24, 2008.

*Coast Guard: Observations on Changes to Management and Oversight of the Deepwater Program.* [GAO-09-462T](#). Washington, D.C.: March 24, 2009.

*Status of Selected Assets of the Coast Guard's Deepwater Program.* [GAO-08-270R](#). Washington, D.C.: March 11, 2008.

*Coast Guard: Status of Efforts to Improve Deepwater Program Management and Address Operational Challenges.* [GAO-07-575T](#). Washington, D.C.: March 8, 2007.

*Coast Guard: Status of Deepwater Fast Response Cutter Design Efforts.* [GAO-06-764](#). Washington, D.C.: June 23, 2006.

*Coast Guard: Changes to Deepwater Plan Appear Sound, and Program Management Has Improved, but Continued Monitoring Is Warranted.* [GAO-06-546](#). Washington, D.C.: April 28, 2006.

*Coast Guard: Progress Being Made on Addressing Deepwater Legacy Asset Condition Issues and Program Management, but Acquisition Challenges Remain.* [GAO-05-757](#). Washington, D.C.: July 22, 2005.

*Coast Guard: Preliminary Observations on the Condition of Deepwater Legacy Assets and Acquisition Management Challenges.* [GAO-05-651T](#). Washington, D.C.: June 21, 2005.

*Coast Guard: Deepwater Program Acquisition Schedule Update Needed.* [GAO-04-695](#). Washington, D.C.: June 14, 2004.

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**Related GAO Products**

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*Contract Management: Coast Guard's Deepwater Program Needs Increased Attention to Management and Contractor Oversight.*  
[GAO-04-380](#). Washington, D.C.: March 9, 2004.

*Coast Guard: Actions Needed to Mitigate Deepwater Project Risks.*  
[GAO-01-659T](#). Washington, D.C.: May 3, 2001.

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