United States Government Accountability Office

GAO

Report to Congressional Committees

May 2006

# UNITED STATES COAST GUARD

# Improvements Needed in Management and Oversight of Rescue System Acquisition


GAO-06-623

May 2006

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Highlights

Highlights of GAO-06-623, a report to congressional committees

# UNITED STATES COAST GUARD

# Improvements Needed in Management and Oversight of Rescue System Acquisition

## Why GAO Did This Study

Search and rescue—one of the United States Coast Guard's (USCG) oldest missions and highest priorities—involves minimizing loss of life, injury, and property damage by aiding people and boats in distress. In September 2002, USCG contracted to replace its search and rescue communications system—installed in the 1970s—with a new system known as Rescue 21. However, the acquisition and initial implementation of Rescue 21 has resulted in significant cost overruns and schedule delays.

GAO's objectives in reviewing the Rescue 21 program were to (1) assess the reasons for the significant cost overruns and implementation delays; (2) evaluate the viability of the revised cost and schedule estimates; and (3) evaluate the impact of the implementation delays.

## What GAO Recommends

GAO recommends that the Commandant of USCG ensure that executive-level management oversees Rescue 21's progress toward cost and schedule milestones and manages risks; establishes milestones to complete an integrated baseline review; and develops revised cost and schedule estimates. The Department of Homeland Security agreed with the recommendations and has begun to implement them; however, the department expressed concerns with selected aspects of the report.

www.gao.gov/cgi-bin/getrpt?GAO-06-623. To view the full product, including the scope and methodology, click on the link above. For more information, contact David A. Powner at (202) 512-9286 or pownerd@gao.gov or Stephen L. Caldwell at (202) 512-9610 or caldwells@gao.gov.

## What GAO Found

Key factors that contributed to Rescue 21 cost overruns and schedule delays were inadequacies in requirements management, project monitoring, risk management, contractor cost and schedule estimation and delivery, and executive-level oversight (see table). Accordingly, the estimated total acquisition cost for Rescue 21 has increased from $250 million in 1999 to $710.5 million in 2005, and the timeline for achieving full operating capability has been delayed from 2006 until 2011. USCG officials agreed that improvements need to be made to the management of the Rescue 21 project, and they are taking steps to address some of these issues.

USCG's current acquisition cost estimate of $710.5 million is not viable. Our analysis of contractor performance trends indicates that additional overruns will likely bring the total acquisition cost to $872 million, unless critical changes are made. Additionally, USCG's schedule is uncertain due to on-going contract item renegotiations and pending decisions regarding vessel asset tracking functionality. Finally, further cost increases may result from the variability of costs for tower preparation and construction. To improve its current cost and schedule estimates, USCG plans to complete an integrated baseline review after contract items are renegotiated; however, a date for completing this review has not been established.

The delays in deploying Rescue 21 could affect sites awaiting modernization. For example, key functionality, such as improved direction finding and improved coverage, will not be available for a significant period of time, and legacy equipment may fail, requiring costly repairs and upgrades to address coverage gaps and other operational issues.

**Key Factors in Rescue 21 Cost Overruns and Schedule Delays**

| | |
|---|---|
| Requirements management | USCG did not follow a rigorous requirements management process and testing revealed incomplete and poorly defined requirements. |
| Project monitoring | USCG did not effectively use earned value management data to measure performance and take corrective action on negative trends. |
| Risk management | USCG did not always effectively mitigate and communicate risks. |
| Contractor cost and schedule estimation and delivery | The contractor created a schedule that underestimated the time required to complete key tasks, and development took longer than planned, which led to delays in testing. |
| Executive-level oversight | USCG stated that it had an executive-level oversight process that included semiannual and key decision point reviews. However, there is no evidence that these reviews of Rescue 21 occurred before 2005. |

Source: GAO.

# Contents



**Abbreviations**

| | |
|---|---|
| DHS | Department of Homeland Security |
| EVM | earned value management |
| NDRS | National Distress and Response System |
| OMB | Office of Management and Budget |
| USCG | United States Coast Guard |

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**United States Government Accountability Office**
**Washington, DC 20548**

May 31, 2006

The Honorable Harold Rogers
Chairman
The Honorable Martin Sabo
Ranking Member
Subcommittee on Homeland Security,
Committee on Appropriations
House of Representatives

The Honorable Olympia Snowe
Chairman
The Honorable Maria Cantwell
Ranking Member
Subcommittee on Fisheries and Coast Guard,
Committee on Commerce, Science and Transportation
United States Senate

The United States Coast Guard (USCG) is currently replacing its 30-year-old search and rescue communications systems with a new system known as Rescue 21. Rescue 21 will be used not only for search and rescue, but it will support other USCG missions, including those involving homeland security. However, Rescue 21 has had significant cost overruns and schedule delays. As a result of these delays, completion of Rescue 21 deployment nationwide—originally scheduled for fiscal year 2006—has been delayed until fiscal year 2011, and its total acquisition cost has risen from $250 million in 1999 to its current estimate of $710.5 million.[1] In addition to the cost overruns and schedule delays, Rescue 21 may not be deployed with all of the functionality originally promised. For example, functionality for vessel asset tracking was not deployed as part of the initial operating capability due to the system's inability to meet original requirements, and USCG is now considering alternative strategies for this functionality. Also, there has been a reduction in promised improvements to limit communications gaps; originally, Rescue 21 was intended to limit communications gaps to 2 percent—now the target is less than 10 percent.

[1]In April 2006, the Department of Homeland Security approved a new acquisition program baseline for Rescue 21 with a total acquisition cost of $730.2 million after decreasing certain functionality.

This report responds to your request that we (1) assess the reasons for the significant implementation delay and cost overruns against the original Rescue 21 proposal, (2) evaluate the viability of the USCG's revised cost and implementation schedule, and (3) evaluate the impact of Rescue 21's implementation delay on USCG's field units that are awaiting the modernization of antiquated communications equipment.

On March 27, 2006, we provided your staff with a briefing on the results of our study. The slides from that briefing are included in this report as appendix I. The purpose of this report is to formally publish the briefing slides and officially transmit our recommendations to the Commandant of USCG.

To assess the reasons for the implementation delay and cost overruns of Rescue 21, we analyzed current and previous program documents, including current and previous acquisition plans, cost estimates, status reports, schedules, promised functionality, earned value management (EVM)[2] data, and cost analyses. We also interviewed key officials and contractors. To evaluate the viability of the USCG's revised cost estimate and implementation schedule, we analyzed program cost and schedule documents, cost estimating methodologies, and changes to development and deployment plans. To identify factors that could affect the program baseline in the future, we assessed the prime contractor's performance related to cost and schedule. We applied established earned value analysis techniques to data from contractor cost performance reports that spanned a 26-month period—from October 2003 to December 2005—to show trends in cost and schedule performance and to estimate the likely costs at the completion of the prime contract. To evaluate the impact of Rescue 21's implementation delay, we reviewed reports on legacy system failures and anticipated failures and interviewed field officials responsible for overseeing legacy system operations at 11 field units, the Maintenance and Logistic Commands for the Pacific and Atlantic Areas, and Rescue 21 users at the two initial operating regions.

[2]EVM is a project management tool that integrates the investment scope of work with schedule and cost elements for investment planning and control. This method compares the value of work accomplished during a given period with that of the work expected in the period. Differences in expectations are measured in both cost and schedule variances. The Office of Management and Budget (OMB) requires agencies to use EVM as part of their performance-based management system for any investment under development or with system improvements under way.

We performed our work at USCG headquarters and at selected field units and communications centers from December 2005 through March 2006, in accordance with generally accepted auditing standards.

In summary, we made the following major points in our briefing:

- Key factors that contributed to Rescue 21 cost overruns and schedule delays were shortcomings in requirements management, project monitoring, risk management, contractor cost and schedule estimation and delivery, and executive-level oversight. Among the points we made were that USCG did not effectively use EVM data to measure performance and take corrective actions; USCG, while identifying, analyzing, and prioritizing risks, did not always mitigate and communicate risks; and USCG stated that it had an executive oversight process that included semiannual and key decision point reviews. However, there is no evidence that these reviews of Rescue 21 occurred before 2005. USCG agreed that improvements need to be made in the management of the Rescue 21 project, and it is taking steps to address some of these issues.

- The USCG's current acquisition cost estimate of $710.5 million is not viable: based on our analysis of contractor performance trends and the renegotiation of 91 contract items for site deployment, we forecast a cost overrun of approximately $161 million, which will likely bring total acquisition costs to $872 million, unless critical changes are made. Also, the USCG's schedule is uncertain because of the continuing contract item renegotiations and decisions regarding vessel asset tracking functionality. Finally, these additional factors may increase costs and delay schedules: (1) the variability of costs for tower preparation and construction and (2) site reorganization.[3] USCG realizes that it needs to improve its cost and schedule management and has plans to complete an integrated baseline review for the contract items as they are renegotiated; however, a date for completing this review has not been established.

- The delays in deploying Rescue 21 could have several effects: (1) key functionality, such as improved direction finding and improved coverage, will not be available for a significant period of time; (2) legacy equipment may fail, requiring costly repairs; and (3) legacy equipment may require upgrades to address coverage gaps and other operational issues. For example, USCG instituted a moratorium on upgrades to the legacy system

[3]USCG is currently reorganizing its field units into new, integrated, and standardized organizations referred to as sectors.

because Rescue 21 was to replace the equipment. However, despite the moratorium, according to USCG officials, some field units have upgraded their legacy systems to address operational challenges. Upgrades such as these would result in higher costs, especially at field units scheduled for implementation at a later date.

## Recommendations for Executive Action

To more effectively manage the remaining development and deployment of Rescue 21, we recommend that the Commandant of USCG ensure that USCG executive-level management implements the following three recommendations:

- Oversee the project's progress toward cost and schedule milestones and management of risks.
- Establish a milestone to complete Rescue 21's integrated baseline review, to include all renegotiated contract items.
- Use the results of this baseline review to complete a revised cost and schedule estimate.

## Agency Comments and Our Evaluation

In providing written comments on a draft to this report, the Department of Homeland Security's (DHS) Director of the Departmental GAO/Office of the Inspector General Liaison Office concurred with our recommendations and stated that USCG would continue to aggressively pursue the recommendations in the GAO report in order to ensure that Rescue 21 provides critical life-saving capabilities and that the acquisition is effectively managed. DHS stated that it was currently addressing our recommendations and provided examples of efforts to date. Specifically, DHS and USCG increased oversight with quarterly flag officer/vice president-level program reviews and periodic DHS Joint Requirements Council and Investment Review Board reviews in October 2005 and plan to initiate monthly progress reviews of the project schedule beginning in June 2006.

Regarding the cost of Rescue 21, DHS stated that it had recently revised its acquisition program baseline. The revised total acquisition cost for Rescue 21 is $730.2 million, which was achieved by adjusting several performance parameters and terminating the contractor's option to provide vessel subsystem components. DHS plans to achieve this capability through other means. However, we continue to stress the importance of our recommendation that calls for the completion of an integrated baseline

review. If performed correctly, an integrated baseline review will provide insight into the risks associated with the $730.2 million estimate and the extent to which the estimate is achievable.

DHS agreed that USCG has responsibilities for managing schedule delays and cost overruns in major acquisition projects and with our findings regarding the contractor's inability to manage cost and schedule. DHS stated that the root cause for the systems deployment delays and costs overruns was poor estimates and failed performance by the contractor. The department, however, raised concerns with four of our findings regarding USCG management and oversight and provided us with some additional information regarding these findings that did not fully address our concerns. Therefore, we continue to believe that shortcomings in USCG's management and oversight of Rescue 21 contributed to cost overruns and schedule delays. USGC concerns and our response associated with each of the four areas follows.

First, DHS stated that our findings on requirements management are not consistent with our previously reported 2003 findings that USCG did have a process for managing requirements and it cited various requirements management documents. Our current finding states that USCG did not follow rigorous requirements management processes for Rescue 21—not that the USCG did not have a process—and is therefore consistent with our previous report. DHS also stated that testing revealed that requirements were clearly defined. However, as stated in our briefing, a USCG usability and operability assessment of Rescue 21 stated that most of the operational advancements envisioned for the project were not achieved, and these problems could have been avoided by including user requirements in the contract. DHS's response also cites software and hardware defects that can be attributed to shortcomings in requirements management, providing further support for our finding that USCG did not follow a rigorous requirements management process.

Second, DHS disagreed with our finding that they did not effectively use EVM data to measure performance and take corrective actions. Evidence showing USCG actions to address schedule delays from EVM data was not provided to us during our review. On May 8, 2006, 6 weeks after the briefing on March 27, 2006, DHS provided documentation showing that some actions were taken by USCG in 2004. However, this is nearly a year after the EVM data began showing schedule slippages in March 2003 and after the Rescue 21 project missed its initial operating capability date of September 2003. Further, DHS stated that the contractor undertook a significant reorganization of its management structure in response to its

concerns related to cost and schedule performance. Because this information was not mentioned to us during our discussions with either USCG or the contractor during our review, on May 15, 2006, we contacted both the contractor's Rescue 21 project manager and contract manager to clarify the reorganization statement. These individuals told us that changes in contracting personnel were due to internal movement between ongoing contracts and did not constitute a reorganization.

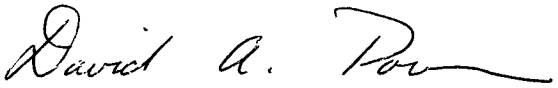
Third, DHS disagreed with our finding that risks were not always mitigated and communicated. DHS stated that there were various reports and meetings where risks were reported and discussed. Documentation for some of these reports and meetings was provided to us on May 8, 2006. Furthermore, as stated in the briefing, there were examples of risks that were not effectively mitigated or communicated. The Human System Interface (HSI) work group referred to in the agency's response was established only in 2005, after Rescue 21 had shown significant HSI issues in its final operational testing and evaluation phase. Effective risk management would have identified and addressed risks earlier in the system life cycle.

Finally, DHS disagreed with our finding that there was no evidence to support its statement that there was executive-level management oversight prior to 2005. During our review, DHS cited a list of semiannual and key decision point reviews, dating from 2002 to 2005; however, as stated in our briefing, it did not provide evidence of the pre-2005 briefings. On May 8, 2006, DHS provided some evidence that these meetings occurred; however, based on our review of the documentation, it was unclear which executives attended these meetings and, therefore, whether the appropriate executives were in attendance. Furthermore, the department did not provide evidence showing executive direction to mitigate risks or address problems. Finally, the department stated that it had increased oversight in October 2005 by establishing quarterly flag officer/vice president-level program reviews and periodic DHS Joint Requirements Council and Investment Review Board reviews. This additional oversight provides further support for our finding on the lack of executive level oversight prior to 2005. DHS also challenged our finding that executive-level monitoring of the risk mitigation activities that resulted from the 2005 meetings did not occur, citing various monitoring activities that occurred. However, it did not provide evidence of the monitoring activities.

DHS also provided technical comments that were incorporated in this report where appropriate. DHS's written comments are reprinted in appendix II.

We are sending copies of this report to the Secretary of Homeland Security, the Commandant of the United States Coast Guard, and other interested parties. We will make copies available to others on request. In addition, the report will be available at no charge on the GAO Web site at http://www.gao.gov.

If you or your staff have any questions concerning this report, please contact David A. Powner at (202) 512-9286 or by e-mail at pownerd@gao.gov or Stephen L. Caldwell at (202) 512-9610 or by e-mail at caldwells@gao.gov.



David A. Powner
Director, Information Technology Management Issues

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# Appendix I: Briefing Slides


## Management and Oversight Improvements Needed for Coast Guard's Rescue 21 Acquisition

**Briefing for**

**the House Committee on Appropriations, Subcommittee on Homeland Security**

**and**

**the Senate Committee on Commerce, Science and Transportation, Subcommittee on Fisheries and Coast Guard**

**March 27, 2006**


## Briefing Overview

Introduction

Objectives, Scope, and Methodology

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Objective 1: Reasons for Cost Overruns and Schedule Delays

Objective 2: Revised Cost and Schedule Estimates

Objective 3: Delay in Implementation

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Recommendations

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## Introduction

Search and rescue is one of the United States Coast Guard's (USCG) oldest missions and highest priorities. The search and rescue mission includes minimizing the loss of life, injury, and property damage by aiding people and boats in distress.

The National Distress and Response System (NDRS) is the legacy communications component of USCG's search and rescue program. However, the 30-year-old system has several deficiencies and is difficult to maintain, according to USCG officials. In September 2002, the USCG contracted with General Dynamics Decision Systems (General Dynamics) to modernize and replace the NDRS with a system called Rescue 21.

In October 2005, due to significant cost increases and schedule delays associated with the Rescue 21 program, the Chairman and Ranking Member of the House Appropriations Subcommittee on Homeland Security requested that we evaluate the Rescue 21 program.

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## Objectives, Scope, and Methodology

As agreed, our objectives were to

- assess the reasons for the significant implementation delay and cost overruns against the original Rescue 21 proposal;
- evaluate the viability of the USCG's revised cost and implementation schedule; and
- evaluate the impact of Rescue 21's implementation delay on the USCG's field units that are awaiting the modernization of antiquated communications equipment.

To assess the reasons for the implementation delay and cost overruns of Rescue 21, we analyzed Rescue 21 documents, including current and previous acquisition plans, cost estimates, status reports, schedules, promised functionality, earned value management (EVM)[1] data, and cost analyses. We also interviewed key officials and contractors involved in the development and deployment of Rescue 21.

[1]EVM is a project management tool that integrates the investment scope of work with schedule and cost elements for investment planning and control. This method compares the value of work accomplished during a given period with that of the work expected in the period. Differences in expectations are measured in both cost and schedule variances. OMB requires agencies to use EVM as part of their performance-based management system for any investment under development or with system improvements under way.

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## Objectives, Scope, and Methodology

To evaluate the viability of USCG's revised cost estimate and implementation schedule, we analyzed current program cost and schedule estimates, cost estimating methodologies, and changes to development and deployment plans. To identify factors that could affect the program baseline in the future, we assessed the prime contractor's performance related to cost and schedule. We applied established earned value analysis techniques to data from contractor cost performance reports that spanned a 26-month period, from October 2003 to December 2005, to show trends in cost and schedule performance and to estimate the likely costs at the completion of the prime contract.

To evaluate the impact of Rescue 21's implementation delay, we reviewed reports on legacy system failures and anticipated failures as well as documentation from USCG sites regarding problems associated with the system. We also interviewed field officials responsible for overseeing legacy system operations at 11 field units. We visited five of these field units (Humboldt, California; San Francisco, California; New Orleans, Louisiana; Mobile, Alabama; and Miami, Florida) and interviewed officials by telephone at six other locations (Honolulu, Hawaii; Guam, Territory of Guam; Detroit, Michigan; Valdez, Alaska; Kodiak, Alaska; and Juneau, Alaska). These locations were selected based on coverage gaps previously identified and their significance to search and rescue and homeland security operations.

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## Objectives, Scope, and Methodology

We also interviewed Maintenance and Logistic Commands for the Pacific and Atlantic Areas and Rescue 21 users at the initial operating sites at the Atlantic City and Eastern Shore communications centers. We compared planned Rescue 21 functionality with what was actually delivered.

We performed our work at USCG headquarters and selected field units and communications centers from December 2005 through March 2006, in accordance with generally accepted auditing standards.

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## Results in Brief

Key factors that contributed to Rescue 21 cost overruns and schedule delays were shortcomings in requirements management, project monitoring, risk management, contractor cost and schedule estimation and delivery, and executive-level oversight. USCG agreed that improvements need to be made in these areas and is taking steps to address these issues.

The Coast Guard's current acquisition cost estimate of $710.5 million is not viable: our analysis of contractor performance trends indicates that additional cost overruns will likely bring total acquisition costs to $872 million unless critical changes are made. This includes a significant number of contract items that have not been completed as planned and must now be renegotiated. Also, USCG's schedule, which now shows full operating capability in 2011—5 years behind the originally scheduled date of 2006—is not finalized because of the continuing contract item renegotiations and decisions regarding vessel asset tracking functionality. Finally, these additional factors may increase costs: (1) the variability of costs for tower preparation and construction and (2) site reorganization.[2] USCG realizes that it needs to be more effective in managing costs and schedule and has plans to complete an integrated baseline review for the contract items as these are renegotiated; however, a date for completing this review has not been established. In addition, USCG plans to begin monthly reviews of the project schedule and to incrementally deploy to future Rescue 21 sites.

[2] USCG is in the process of reorganizing its field units into new integrated and standardized organizations, referred to as sectors.

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## Results in Brief

The delays in deploying Rescue 21 could have several effects:

- key functionality, such as improved direction finding and improved coverage, will not be available for a significant period of time;
- legacy equipment may fail, requiring costly repairs; and
- legacy equipment may require upgrades to address coverage gaps and other operational issues.

We are recommending that the Secretary of Homeland Security direct the Commandant of the United States Coast Guard to ensure that executive-level management oversees the project's progress toward cost and schedule milestones and manages risks. In addition, we recommend that executive-level management establish a milestone to complete its integrated baseline review and revise its cost and schedule estimates.

In providing oral comments on a draft of this briefing, the Coast Guard Assistant Commandant for Acquisition stated that the briefing fairly represented Rescue 21 risks and ongoing activities to address program management and other issues. He also stated that this briefing would be used as input to take corrective actions to improve program management.

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## Background
## Rescue 21 Description

The NDRS is USCG's primary VHF communications system, important to the USCG's search and rescue program as well as its homeland security mission. However, the USCG has reported that NDRS—much of which was installed in the 1970s—has several critical deficiencies:

- numerous gaps in communications coverage—in some areas the Coast Guard cannot hear calls from mariners in distress or communicate with other USCG vessels;
- limited direction-finding capabilities and no digital selective calling capabilities;[3]
- no effective way to track USCG assets that conduct search and rescue;
- limited interoperability with other federal and state communications systems; and
- no means for protected communication.

Rescue 21's primary functions are to provide USCG with communication for maritime search-and-rescue functions—such as monitoring distress calls from boaters and coordinating the response or rescue. It is intended to replace NDRS, and will be a short-range communications system reaching about 20 nautical miles. The system will include VHF-FM radios, communications towers, and hardware and software at USCG sites as well as on Coast Guard vessels. This system also, in addition to search and rescue, provides support to homeland security missions. USCG's acquisition directorate, under the Assistant Commandant for Acquisition, is responsible for managing the Rescue 21 acquisition.

[3] A digital selective calling radio has the ability to send a mayday signal that identifies the vessel and, when connected to a Global Positioning System, sends the vessel's location. This occurs on channel 70.

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## Background
## Rescue 21 Description

In September 2002, USCG awarded an indefinite delivery, indefinite quantity[4] contract to General Dynamics for developing and implementing Rescue 21. The contract and original schedule called for the following:

- two initial Coast Guard regions to operate the new system with full functionality—referred to as initial operating capability—scheduled for September 2003 and
- continued deployment to additional locations through 2006.

According to the Coast Guard contract with General Dynamics, the Rescue 21 system is to

- allow continuous, uninterrupted communications on Channel 16;[5]
- limit the number of communication coverage gaps to less than 10 percent in the United States (originally this was to less than 2 percent);
- provide direction finding and digital selective calling to locate boaters;
- allow USCG to track its mobile assets, such as vessels;
- allow communication with other federal and state systems;
- allow protected communication of sensitive information; and
- archive voice and data communications and make them instantly accessible.

A table showing the capabilities of NDRS and Rescue 21 follows.

[4] An indefinite-delivery, indefinite-quantity contract provides for an indefinite quantity, within stated limits, of supplies or services during a fixed period of time. The government schedules deliveries or performance by placing orders with the contractor. 48 C.F.R. §16.504

[5] According to USCG officials, Channel 16, which is analogous to 911, is the channel designated for the use of distressed boaters to gain assistance in an emergency.

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## Background
## Rescue 21 Planned Capabilities

### Comparison of Rescue 21 Capabilities with Legacy System

| | Capabilities | Existing NDRS | Rescue 21 |
|---|---|---|---|
| **Monitor distress calls** | Continuous, uninterrupted Channel 16 Guard | no | yes |
| | Channel 70 digital selective calling and direction finding | no | yes |
| | Communications coverage | Unknown; numerous gaps | 90-98% coverage to 20 nautical miles from the shore |
| **Alert response assets** | Automatic vessel asset tracking | no | to be determined |
| | Data communications (between vessels and stations) | no | to be determined |
| **Coordinate response activities** | Public safety interoperability | no | yes |
| | Full coverage protected communications | no | yes |
| | Geographic display | no | yes |
| | Number of simultaneous communications channels | 1 | 6 |

Source: U.S. Coast Guard.

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## Background
## Rescue 21 Components

Key components of Rescue 21—some of which appear in the following diagram—are

- communications centers (46) that contain operator workstations and electronic equipment;
- antenna towers (322);
- other equipment and/or infrastructure that could be used on vessels or remote facilities, including communication lines and radio equipment; and
- disaster recovery assets (not pictured). A disaster recovery asset is a smaller antenna tower and equipment similar to a remote facility. It is portable so that it can be moved to locations as needed.

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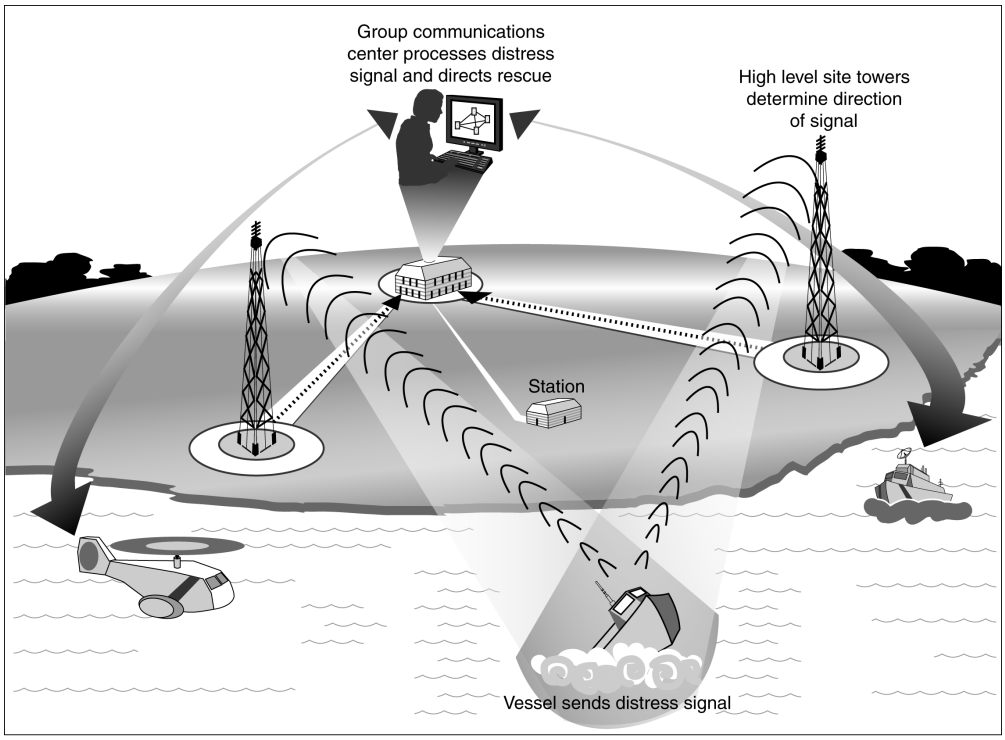
## Background
## Rescue 21 Components




Source: GAO analysis of U.S. Coast Guard data.

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## Background
## Previous GAO Work

In September 2003, we reported that USCG's original schedule for reaching initial operating capability by September 2003 had been postponed and that it had yet to finalize a new schedule.[5] This postponement was due, in part, to the development of the system taking longer than planned.

We also determined that USCG postponed key tests and the initial operating capability because of the delays in software development, and we highlighted risks associated with its plan to compress and overlap key tests as a result of the delays. In addition, schedules for key tests and deliverables, including test plans, were still not complete.

We recommended that the Secretary of the Department of Homeland Security direct the Commandant of the United States Coast Guard to

- establish a new schedule for critical testing phases and initial operating capability and
- ensure that milestones were established for completing test plans for formal qualifications testing, system integration testing, and operational testing and evaluation and that test plans address all requirements for the system.

Following our report, key test schedules were revised and milestones and test plans were developed.

[5] GAO, *Coast Guard: New Communications System to Support Search and Rescue Faces Challenges*, GAO-03-1111 (Washington, D.C.: Sept. 30, 2003).

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## Background
## Rescue 21 Schedule Delays

However, further delays occurred during testing.[6] For example,

- Formal qualification testing, originally expected to begin in February 2003 and end in March 2003, actually began in January 2004 and ended in June 2004—15 months behind schedule. At that time, only 4 of the 235 allocated requirements were validated and performance issues in several areas, including fault management, archive/restore, and channel performance, were found that required additional work. Formal qualification testing was repeated in June 2004, at which time the remaining 231 allocated requirements were validated.

- System integration testing, originally expected to begin in April 2003 and end in May 2003, actually began in August 2004 and ended in December 2004—19 months behind schedule. Additional software defects were found during this time and USCG decided to have the contractor concurrently fix the system integration testing problems while going into the operational test and evaluation phase.

[6] Rescue 21 tests include: formal qualification testing, which demonstrates that the system meets contract performance specifications; system integration testing, which demonstrates that the system is fully functional at USCG stations; and operational testing and evaluation, which is conducted by the USCG and ensures that the system satisfies contract performance requirements and is ready to be deployed at other USCG locations.

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## Background
## Rescue 21 Schedule Delays

- Operational test and evaluation, originally intended to begin in July 2003 and to end in August 2003, actually began in January 2005 and ended March 2005—19 months behind schedule. Further software defects were found, and USCG also requested additional changes to the human systems interface based on operator comments. The changes to the human systems interface were prioritized into three builds, the first of which was required by USCG before it would approve initial operating capability. The remaining two builds are being negotiated with the contractor and represent additional development. Finally, it was determined that the vessel portion of Rescue 21 did not meet performance requirements.

  Because of the delays in development and testing, the date for initial operating capability was delayed from September 2003 to December 2005. Full operating capability, which was originally scheduled for fiscal year 2006, was delayed to fiscal year 2011.

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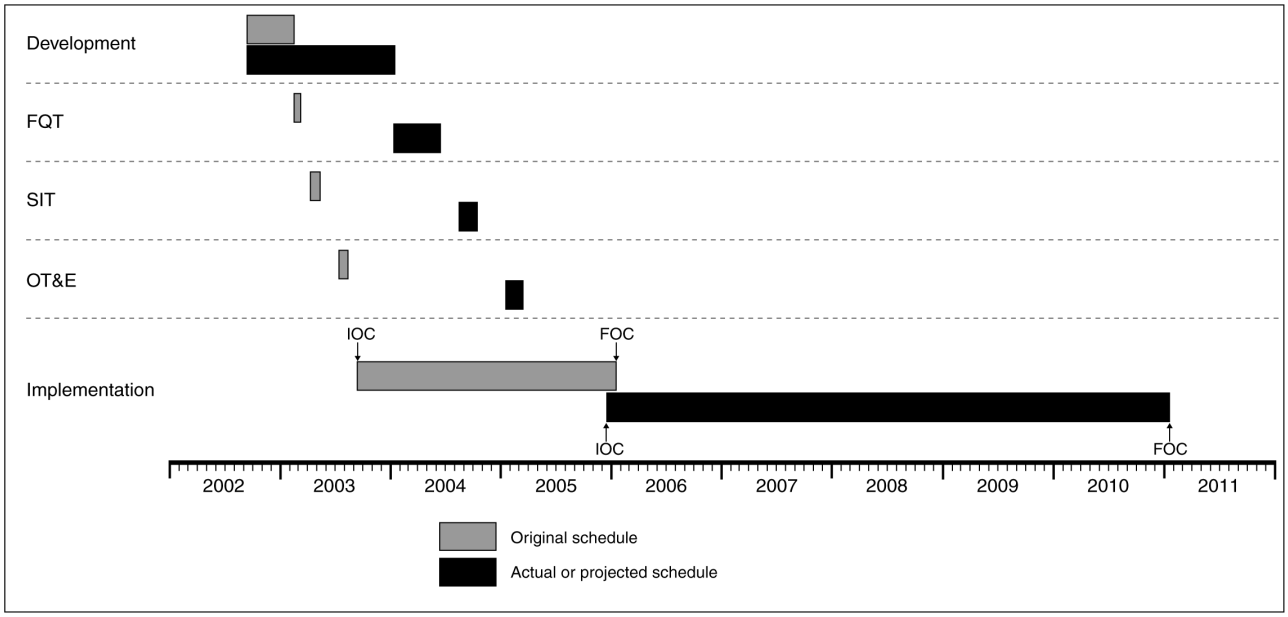
Background
Rescue 21 Schedule Delays

## Development and Implementation Schedule




Source: GAO analysis of U.S. Coast Guard data.

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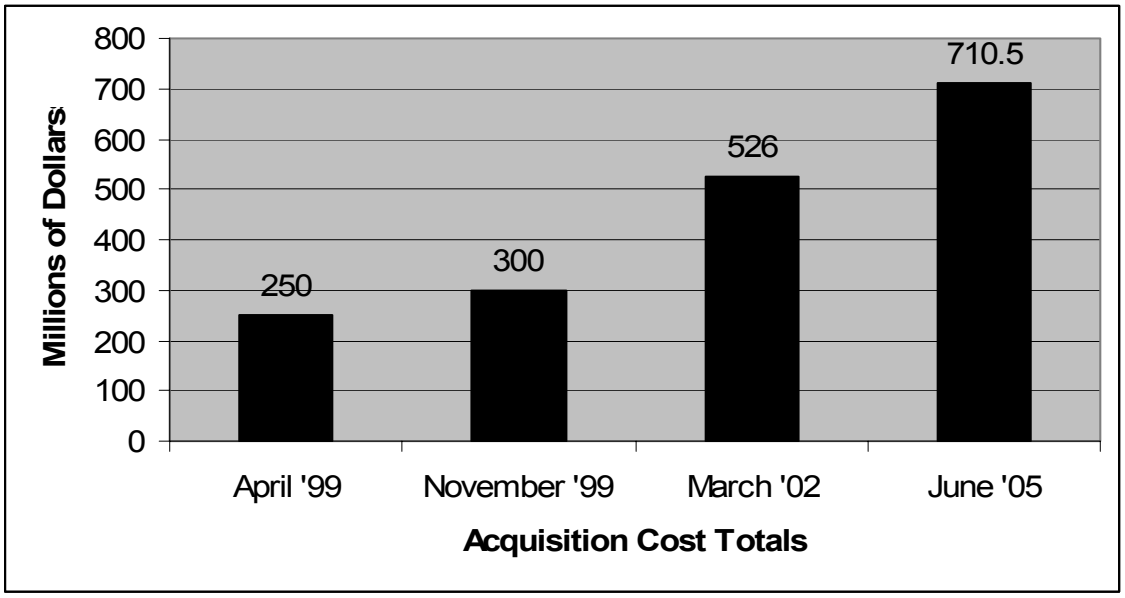
## Background
## Rescue 21 Cost Growth

Rescue 21's total acquisition cost estimate has increased from $250 million to $710.5 million over a 6-year period, as shown in the following chart.




Source: U.S. Coast Guard Acquisition Project baseline data.

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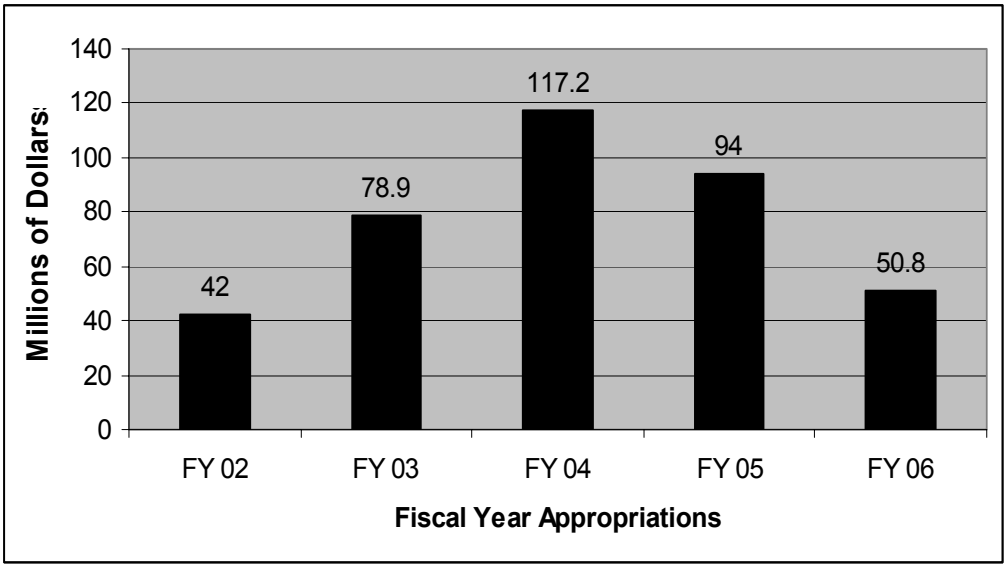
## Background
## Rescue 21 Appropriations

Rescue 21 has been appropriated a total of $382.9 million for development since award of the contract in fiscal year 2002.




Source: U.S. Coast Guard data.

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## Background
## Rescue 21 Current Status

Rescue 21 was deployed on December 20, 2005, with an initial operating capability[7] and is being used at two regions (Atlantic City, New Jersey, and Chincoteague, Virginia). The deployment included all the station functionality and equipment that

- allowed continuous, uninterrupted communications on Channel 16;
- limited the number of communication coverage gaps;
- provided direction finding and digital selective calling to locate boaters;
- allowed radio communication with other federal and state officials;
- allowed protected communication of sensitive information; and
- archived voice and data communications and made them accessible in real time.

However, functionality for vessel asset tracking and data transfer plus an expanded vessel communications suite was not delivered as planned. This was deferred because the contractor could not meet the original contract requirements for simultaneous communications. In January 2006, a stop work order was issued on the vessel tracking and data transfer functionality for 90 days. USCG and the Department of Homeland Security (DHS) are currently determining whether Rescue 21 should complete development of the vessel functionality or consider other sources for that functionality.

[7]USCG also uses the term "ground sub-system" for the functionality and equipment deployed to the stations in the initial operating capability regions. The functionality and equipment that was to be deployed to the vessels associated with these stations, which was not delivered as scheduled, is referred to as the "vessel sub-system".

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## Background
## Rescue 21 Current Status

The current schedule calls for the deployment of Rescue 21 to four low-rate initial production sites during 2006.[8] In addition, according to USCG officials, they are currently revalidating implementation plans for the first 15 of the remaining 40 sites. These first 15 of the remaining 40 sites are approved for deployment and are currently scheduled to be completed by fiscal year 2009. Completion of the remaining 25 sites with full operating capability is currently scheduled for fiscal year 2011.

However, some development activity remains. First, there are two remaining builds of enhancements to the human systems interface, with the second build scheduled for completion in October 2006 and the third in March 2007. Second, a decision is pending on how to implement vessel asset tracking and data transfer functionality.

[8] USCG intends to use these low-rate initial production sites to test Rescue 21 capabilities in various geographical climates.

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## Objective 1
## Reasons for Cost Overruns and Schedule Delays

Key factors that contributed to Rescue 21 cost overruns and schedule delays were shortcomings in requirements management, project monitoring, risk management, contractor cost and schedule estimation and delivery, and executive-level oversight. USCG agreed that improvements need to be made in these areas and is taking steps to address these issues.

To effectively manage major IT programs, organizations should use sound acquisition and management practices to minimize risks and thereby maximize a project's ability to be delivered on time, within budget, and with promised functionality. Such practices have been identified by leading organizations, such as the Software Engineering Institute, the Chief Information Officer's Council, and in our prior work analyzing best practices in industry and government.

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## Objective 1
## Reasons for Cost Overruns and Schedule Delays

**Requirements management**
Requirements management includes processes for eliciting, documenting, verifying and validating, and managing requirements through the system life cycle.

The Coast Guard did not have a rigorous requirements management process. Although the USCG developed high-level requirements for Rescue 21, it relied solely on the contractor to manage these requirements. According to USCG acquisition officials, they took this approach because of the performance-based contract vehicle. However, our experience in reviewing major systems acquisitions has shown that it is important for government organizations to exercise strong leadership in managing requirements, regardless of the contracting vehicle.

In addition to not effectively managing requirements, testing revealed numerous problems linked back to incomplete and poorly defined user requirements. For example:

- A USCG usability and operability assessment of Rescue 21 stated that most of the operational advancements envisioned for the system were not achieved and concluded that these problems could have been avoided by including user requirements in the contract.

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## Objective 1
## Reasons for Cost Overruns and Schedule Delays

**Requirements management (continued)**

- A key requirement stated, “Provide a consolidated regional geographic display.” The contractor provided a capability based on that statement, but during testing the USCG operators felt the maps did not display sufficient detail. Such discrepancies led to an additional statement of work defining required enhancements to the system interface (e.g., screen displays).

After these initial problems, USCG recognized the need for an orderly process to review changes that could have a significant impact to cost, schedule, and performance. Specifically, in October 2005, USCG established a Configuration Control Board to control changes to Rescue 21 requirements.

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## Objective 1
## Reasons for Cost Overruns and Schedule Delays

**Project monitoring**
A key project monitoring activity uses earned value management (EVM) techniques to track the progress of work completed against project cost and schedule estimates.

USCG did not effectively use EVM data in order to measure performance and take corrective action. The Coast Guard has received EVM cost performance reports that identified problems on a regular basis from Booz Allen Hamilton.[9] However, USCG did not take action on these reports. For example, the March 2003 report indicated that, given the number of slipped tasks and small remaining time, it was unlikely that the contractor would be able to recover the schedule deadlines; the September and October 2003 reports described the contractor's performance as rapidly worsening. Nevertheless, USCG did not take action in response to these reports.

[9] USCG contracted Booz Allen Hamilton to assist with program management for Rescue 21.

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## Objective 1
## Reasons for Cost Overruns and Schedule Delays

**Risk management**
An effective risk management process identifies potential problems before they occur, so that risk-handling activities may be planned and invoked as needed across the life of the product and project in order to mitigate adverse impacts on achieving objectives. Key activities include identifying and analyzing risks, assigning resources, developing risk mitigation plans and milestones for key mitigation deliverables, briefing senior-level managers on high-priority risks, and tracking risks to closure.

USCG's management process includes identifying, analyzing, and prioritizing risks; establishing mitigation strategies; and assigning responsibility for addressing risks. However, USCG did not always mitigate and communicate risks. For example:

- In 2003, USCG identified software development as a high risk to Rescue 21's schedule. However, despite early acknowledgment of this risk, it was not mitigated and ultimately became one of the primary drivers for the increase in costs.
- USCG did not communicate risks to partners when applicable**.** During our review, the contractor stated that it was unaware of the items in the USCG risk list that related to the contractor's performance.

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## Objective 1
## Reasons for Cost Overruns and Schedule Delays

**Contractor cost and schedule estimation and delivery**

The contractor underestimated the time for development and testing of Rescue 21 and established an integrated project schedule that it could not meet.

- Development took longer than planned, which led to delays in testing. Subsequently, testing phases were not completed on schedule.
- Additionally, the initial estimate for completing a regional site deployment was 12 months. The new estimate of 24 months is considered to be more realistic for executing the same tasks.

The contractor did not always provide personnel in a timely manner or with the knowledge and skills required to complete the project.

- According to USCG information, it took longer than expected to obtain developers and subcontractors for Rescue 21.
- According to USCG documentation, support personnel involved in initial site surveys were minimally qualified and had limited civil engineering and environmental analysis skills.

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## Objective 1
## Reasons for Cost Overruns and Schedule Delays

**Executive oversight and governance**
Office of Management and Budget and GAO guidance call for agencies to establish IT investment management boards comprised of key executives to regularly track the progress of major systems acquisitions. These boards should have documented policies and procedures for management oversight of IT projects and systems and should be able to adequately oversee the project's progress toward cost and schedule milestones and their risks. The board should also employ early warning systems that enable it to take corrective actions at the first sign of cost, schedule, and performance slippages.

USCG told us that it had an executive oversight process that included semi-annual and key decision point reviews. However, there is no evidence that these reviews of Rescue 21 occurred before 2005.

Rescue 21 oversight meetings commenced in 2005, but executive management did not take action in response to the risks and problems presented. For example, briefings given to the USCG Acquisition Review Council and the Department of Homeland Security (DHS) Investment Review Board for key decision point 3 approval identified numerous high-level and moderate risks and DHS officials requested additional actions, but executive-level monitoring to ensure the adequacy and completion of risk mitigation activities did not occur.

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## Objective 1
## Reasons for Cost Overruns and Schedule Delays

### Recent Efforts by USCG to Improve Rescue 21 Management

USCG has recently begun to address several of the key factors that led to cost overruns and schedule slippages.

According to the Assistant Commandant for Acquisition, the USCG plans to improve the capabilities of the Acquisition Office by obtaining more technical assistance to help manage requirements, monitor project performance, and mitigate risks, among other things. For example, USCG intends to begin monthly reviews of the project schedule in June 2006 to track actual against planned milestones and to use earned value management data to improve its oversight of cost and schedule performance.

Regarding contractor performance, USCG stated that it was difficult to manage the project effectively from headquarters and that the distance between USCG and the contractor delayed decisions. As a result, in November 2005, USCG established a Project Resident Office adjacent to the contractor's facility. This office's responsibilities include overseeing nationwide regional site implementation; monitoring contractor performance; managing risks; establishing closer communication and coordination with the contractor to minimize contract changes and control cost growth; and monitoring shipping and delivery of Rescue 21 equipment.

USCG has also increased the visibility of Rescue 21 at the executive level by establishing quarterly meetings between the USCG Assistant Commandant for Acquisition and the vice president of the contractor. These meetings may facilitate greater executive-level involvement in Rescue 21.

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## Objective 2
## Revised Cost and Schedule Estimates

Coast Guard's current acquisition cost estimate of $710.5 million is not viable. Our analysis of contractor performance trends indicates that there will likely be additional cost overruns that will bring the total acquisition cost to $872 million unless critical changes are made. This includes a significant number of contract items that have not been completed as planned and must now be renegotiated. Also, USCG's schedule is uncertain and will likely change due to the continuing contract item renegotiations and decisions regarding vessel functionality. Negotiations for contract items for the first 15 full-rate production regions continues and is expected to be completed by June 2006. Subsequently, contract items to deploy Rescue 21 to the remaining 25 full-rate production regions must also be renegotiated.

Finally, additional factors may increase costs, such as the variability of costs for tower preparation and construction and site reorganization.[10]

[10] USCG is in the process of reorganizing its field units into new integrated and standardized organizations, referred to as sectors.

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## Objective 2
## Revised Cost and Schedule Estimates

As of June 2005, the current acquisition cost estimate to reach full operational capability in 2011 for Rescue 21 is $710.5[11] million.

Based on our analysis of contractor performance trends (using contractor EVM data[12]), we forecast a cost overrun of approximately $161 million. The total acquisition costs could be as high as $872 million.

The current cost estimate does not take into account contract items that are being renegotiated. There are 91 contract items for site deployment that have expired and have to be renegotiated. According to USCG, based on their experience with the cost overruns at the IOC sites, costs for each of the contract item listed below will increase:

- regional implementation plans
- regional infrastructure preparation
- regional system installation

Coast Guard officials agreed with our analysis of projected cost overruns.

[11] This estimate reflects only the acquisition component and does not include operations & maintenance. The total life cycle cost estimate is approximately $1.6 billion.
[12] We used contractor-provided data that reflected work from October 2003 to December 2005.

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## Objective 2
## Revised Cost and Schedule Estimates

USCG's schedule is also uncertain and will likely change.

- The current project schedule is uncertain because of the 91 contract items that must be renegotiated. USCG estimates that this renegotiation will be completed for its first 15 full-rate production regions in June 2006. Contract items for the remaining full-rate production regions—intended to be addressed in two additional groups—are to be negotiated at a later date.

- There is also uncertainty regarding Rescue 21 vessel functionality. Initial plans for Rescue 21 included functionality to allow USCG to track its vessels and to allow data transfer between vessels and group communications centers plus an expanded vessel communications suite. This functionality is now being deferred while USCG and DHS decide whether to complete development of its contractor-developed solution or use a different solution such as the Automatic Identification System[13] for asset tracking and data transfer on vessels. This decision is currently expected by the end of April 2006.

[13]The Automatic Identification System is a Coast Guard project to develop a new system that will be used to monitor and track vessels traveling to and through US waters.

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## Objective 2
## Revised Cost and Schedule Estimates

Additional issues may also contribute to further cost overruns and schedule delays.

**Variability in infrastructure preparation costs.** According to USCG officials, there is significant variation in total costs for antenna towers. Additional costs can be incurred in building a tower and significant schedule delays can occur. Further, environmental concerns may further delay tower construction. For these reasons, there is significant potential for cost overruns and schedule slippages in tower construction.

**Site reorganization.** New site command centers are to be established throughout USCG, based on a new standard organization model. There is no guarantee that current sites will have the same functions that they have now. For example, the Eastern Shore group will become a site with the communication center at Hampton Roads. The equipment at the Eastern Shore GCC will be moved to Hampton Roads and sites will be reconfigured to the new arrangement. Therefore, rework may be needed when the site centers are finalized.

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## Objective 2
## Cost and Schedule Management

USCG has plans to improve its cost and schedule management in the future. For example:

- USCG intends to conduct an integrated baseline review of the contractor's cost and schedule estimates after it completes renegotiation of expired contract items for the deployment to the first 15 full-rate production regions. This baseline review is currently expected to begin in the June 2006 time frame and is supposed to validate the accuracy of the Rescue 21 schedule. However, there is no completion date for the baseline review. USCG also intends to complete another baseline review of the schedule once the contracts for the remaining 25 full-rate production sites are renegotiated.

- USCG intends to conduct full-rate production site deployment incrementally as it expects this gradual deployment to improve its ability to manage cost and schedule. The contracts for the first group of 15 regions are currently being negotiated; contracts for the second set of 11 regions and third set of 14 regions will be addressed afterwards.

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## Objective 3
## Delay in Implementation

The effects of the delays in deploying Rescue 21 include (1) key functionality, such as improved direction finding and improved coverage, will not be available; (2) potential failure of legacy equipment requiring costly repairs; and (3) potential for further upgrades to the legacy system and resulting costs, despite a moratorium on upgrades.

**Key functionality to production sites will be delayed.** Originally, Rescue 21 was to be deployed nationwide by fiscal year 2006. The current schedule shows full deployment in fiscal year 2011, five years behind schedule. This will result in a significant implementation delay for many field units**.** Personnel at the two initial operating capability stations acknowledged that Rescue 21 provides significantly improved functionality compared to the legacy system. For example, according to these personnel, Rescue 21's direction finding capability—which allows USCG to locate boaters in distress–is significantly more accurate as well as more reliable than the legacy system. As a result, until Rescue 21 is deployed, field units with the legacy system will continue to be at risk of performing larger and potentially more costly searches due to limited direction finding capabilities.

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## Objective 3
## Delay in Implementation

Until Rescue 21 is deployed, field units will likely continue to experience communication coverage gaps, which limits their ability to hear boaters in distress. However, the impact of coverage gaps varies depending on the availability of local partners to conduct search and rescue, or vessels to relay distress calls. Personnel at one field unit explained that they rely on a marine patrol unit to conduct searches in a coverage gap area, whereas at another site, the USCG field unit is the only resource available to conduct search and rescue operations. Nevertheless, until Rescue 21 is fully deployed, missed mayday calls—and the potential for lives lost—creates uncertainty about the legacy system's reliability and reduces operators' confidence in the system.

**Potential for failure of legacy equipment requiring costly repairs.** The legacy system is about 30 years old and is difficult to maintain. Until Rescue 21 is deployed, legacy equipment will continue to be at high risk for failure; these failures could result in costly repairs. Some USCG maintenance officials questioned whether legacy equipment will continue to function until Rescue 21 is fully deployed, especially in field units scheduled for later implementation. Field units could also experience higher costs resulting from the need to replace equipment and reengineer parts that are no longer manufactured. In addition, maintenance expertise needed to repair the antiquated equipment is limited and, as a result, repairs are not always timely.

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## Objective 3
## Delay in Implementation

**Further upgrades to the legacy system to address operational issues could occur, despite a moratorium on upgrades.** The USCG instituted a moratorium on upgrades to the legacy system because Rescue 21 was to replace the equipment. However, with units facing delays of up to 5 years, USCG may decide that the risk to its operations is sufficiently high that it should upgrade or install new legacy equipment rather than wait to receive the new system. In certain cases, this has already occurred, despite the moratorium. For example, USCG officials reported that they upgraded a console at one unit to mitigate operational challenges, and installed a new antenna at a second unit to address coverage gaps. Additional upgrades such as these would result in higher costs, especially at field units scheduled for later implementation.

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## Conclusions

Although USCG plans to improve its capabilities in a number of areas to better manage the remaining development and deployment of Rescue 21 by establishing executive-level meetings with the prime contractor, it is imperative that key executives aggressively monitor costs and schedule performance and mitigate risks so the remaining development and deployment of Rescue 21 is effectively managed and delivered.

USCG's current acquisition cost estimate is not viable and its schedule is uncertain and likely to change. USCG has plans to complete an integrated baseline review, but it has not established a target completion date. Without the results of this review, the cost and schedule estimate cannot be completed.

If deployment of Rescue 21 continues to be delayed, Coast Guard sites and services will be impacted in several ways. First, key functionality, such as improved direction finding and improved coverage of coastal areas, will not be available as planned. Coast Guard personnel at these sites will continue to use outdated legacy communications systems for search and rescue operations and coverage of coastal regions will remain limited. In addition, these delays could result in costly upgrades to the legacy system to address communications coverage gaps as well as other operational concerns.

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## Recommendations

To more effectively manage the remaining development and deployment of Rescue 21, we recommend that the Commandant of the United States Coast Guard ensure that executive-level management implements the following three recommendations:

- oversee the project's progress toward cost and schedule milestones and manage risks,
- establish a milestone to complete Rescue 21's integrated baseline review, to include all renegotiated contract items, and
- use the results of this review to complete a revised cost and schedule estimate.

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## Agency Comments

In providing oral comments on a draft of this briefing, the Coast Guard Assistant Commandant for Acquisition stated that the briefing fairly represented Rescue 21 risks and ongoing activities to address program management and other issues. He also stated that this briefing would be used as input for them to take corrective actions to improve program management.

Regarding the status of the vessel asset tracking and data transfer functionality that was deferred, the Assistant Commandant stated that he expects this functionality to be addressed with the Automatic Identification System, rather than by Rescue 21. This decision is pending Department of Homeland Security concurrence.

Coast Guard did not concur with our statements regarding executive oversight. They stated that, prior to 2005, there were briefings to executive management, such as the key decision point and semi-annual meetings. However, as previously stated, there is no evidence that these executive-level meetings occurred.

The Coast Guard also provided specific technical comments, which we have incorporated into the briefing as appropriate.

# Appendix II: Comments from the Department of Homeland Security

U.S. Department of Homeland Security
Washington, DC 20528

Homeland Security

May 12, 2006

Mr. David A. Powner
Director
Information Technology Management Issues
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Mr. Powner:

Thank you for the opportunity to review and comment on the Government Accountability Office's (GAO's) draft report entitled *UNITED STATES COAST GUARD: Improvements Needed in Management and Oversight of Rescue System Acquisition* (GAO-06-632). This draft report includes briefing slides presented on March 27, 2006 to the House Committee on Appropriations, Subcommittee on Homeland Security and the Senate Committee on Commerce, Science and Transportation, Subcommittee on Fisheries and Coast Guard.

While we agree with GAO's three recommendations contained therein, and are in the process of implementing each recommendation, we do have substantial concerns with several parts of the report and the briefing.

We agree that the Coast Guard is responsible for managing schedule delays and cost overruns in major acquisition projects. The following program management improvements to control cost and schedule have been initiated by the Department of Homeland Security (DHS) and the Coast Guard:

- Established an on-site Coast Guard Project Resident Office for increased contractor oversight. (Aug 2005).
- Ordered full rate production regions incrementally to improve control (Sep 2005).
- Implemented Alpha Contracting for improved communications between the government and contractor to streamline the process (Sep 2005).
- Implemented fixed price maintenance contracts after initial year (Sep 2005).

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- Increased oversight with quarterly Flag Officer/Vice President level program reviews and periodic DHS Joint Requirements Council (JRC) and Investment Review Board (IRB) reviews (Oct 2005).
- Issued a *Terminate for Convenience of the Government* letter to the contractor on all vessel initiatives as a cost mitigating strategy (April 2006)
- Will conduct Integrated Baseline Reviews (IBR) for Full Rate Production to better identify and control cost beginning Aug 2006.
- Will conduct monthly reviews of project schedule with the contractor beginning June 2006.

As reflected above, many of the cost and schedule concerns raised by the report have since been addressed. Accordingly, the project's APB (acquisition program baseline) for cost, schedule, and performance have been revised. For instance, the total acquisition cost parameter is $730.2M (vice $872M, as estimated by GAO) which has been achieved by adjusting several performance parameters. Additionally, on April 21, 2006, the Coast Guard issued a notice of termination for convenience, canceling General Dynamics' option to provide all vessel sub-system (VSS) components. The Coast Guard anticipates that this work will be handled organically or by another contractor or a combination of both.

The shortcomings cited in the GAO report, however, do not adequately emphasize the root cause of the RESCUE 21 system deployment delays and overruns. As confirmed by GAO's findings on page 27 of the briefing, the contractor:

- underestimated the time for development and testing of RESCUE 21 and could not meet its own established integrated project schedule, and
- failed to consistently provide personnel in a timely manner or with the knowledge and skills required to complete the project.

General Dynamics' inability to meet the technical performance within its proposed schedule was due to challenges in software development. The Coast Guard was fully aware of the problem the contractor was experiencing and made a conscious decision during the software development phase to offset cost and schedule to ensure technical performance was not compromised for this critical life-saving system.

The GAO draft report highlights five key factors that contributed to RESCUE 21 cost overruns and schedule delays. As noted above, the Coast Guard agrees with GAO's fourth factor regarding "**Contractor Cost and Schedule Estimation and Delivery**." However, the remaining key factors are not accurate in important aspects and the Coast Guard provides the following facts and rationale (the following citations reflect the revisions GAO made to the draft report as a result of subsequent discussions with the Coast Guard):

**Requirements Management: GAO "Coast Guard did not effectively manage requirements and testing revealed incomplete and poorly defined requirements."**

This draft report does not recognize well-established Coast Guard processes and is not consistent with the GAO's previous acknowledgement of these processes (Report GAO-03-1111). The Coast Guard's requirements management process is outlined in the Major Systems Acquisition Manual (MSAM COMDINST M4150.2) Chapter 3 "Requirements Management Process," which includes development of the:

- Mission Capability Gap Analysis documented in the Mission Analysis Report (MAR) dated 19 May 1994.
- Broad Mission and Capability Need documented in the Mission Needs Statement (MNS) dated 18 Apr 1995, updated 14 May 1998, and most recently revalidated 12 Apr 2005.
- Mission Oriented Capabilities documented in the Preliminary Operational Requirements Documents (PORD) dated 19 Nov 1997, and the Operational Requirements Document (ORD)1dated 19 Jul 1999, updated 20 Aug 2001, and most recently revalidated 12 Apr 2005.
- System Specific Capabilities documented in the Performance Specification (P-Spec) dated 8 Feb 2002.

The Coast Guard maintains that such requirements as, "receive a 1 watt transmission from 2 meters above the water 20NM offshore" and "Direction finding (DF) to within +/- 2 degrees", demonstrate the specificity of the RESCUE 21 system requirements, as documented in the Performance Specification.

Moreover, field testing demonstrated that the requirements were clearly defined and that such testing is the appropriate mechanism to verify whether General Dynamics' design met the contractual requirements of the Performance Specifications.

- General Dynamic's software design (and to a certain degree the contractor's hardware configuration design) included over 200 defects that required correction and re-testing for conformance to requirements prior to acceptance by the Coast Guard. These defects were documented in the Formal Qualification Testing

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[1] With respect to the ORD, the GAO draft report (Page 2) states, "Also, originally, Rescue 21 was intended to limit communications gaps. However, recent information indicates that while the Coast Guard has a goal of achieving 2 percent gaps to the extent possible, constraints may limit their ability to meet this goal. Coast Guard further stated that limiting gaps to 2 percent was only a goal, its threshold gap level was 10 percent or less." The Coast Guard has not made any reduction in coverage requirement since the ORD (Operational Requirements Document) was approved in 2001. The ORD specifies a communications coverage *goal* of 98% and *threshold* of 90%. The goal of the Coast Guard is to achieve 98% communications coverage to the maximum extent possible. In discrete cases, where environmental, historical preservation, geography or other external factors may constrain communication coverage to something less than 98%, the established threshold of 90% as documented in the ORD will be met. In no case will the project deploy less than 90% communications coverage unless a waiver is approved (only considered in rare situations where the cost of covering a particular area is grossly disproportionate to the potential benefits).

(FQT) and System Integration Testing (SIT) plans; both of which were provided to GAO.

- While General Dynamics ultimately met the system requirements as a result of their efforts to correct defects and retest performance, the Coast Guard determined that the functionality of the system could be improved by incorporating human systems interface (HSI) enhancements proposed by the users. Given the life-saving nature of the RESCUE 21 system, the Coast Guard believes that the decision to offset schedule for greater HSI performance was prudent, and in the end ensures the Coast Guard can adequately serve the American public.

**Project Monitoring: GAO "Coast Guard did not effectively use earned value management data to measure performance and take corrective action on negative trends."**

Since award of the Phase II contract to General Dynamics in September 2002, the Coast Guard established an Earned Value Management (EVM) work group comprised of Coast Guard officials with support from Subject Matter Experts from Booz Allen Hamilton. Together, this group was responsible for reviewing the monthly Cost Performance Reports (CPR) submitted by General Dynamics, conducting analyses to determine performance trends and developing monthly Performance Measurement Reports.

In accordance with the performance-based, performance-specification nature of the Phase II contract, the RESCUE 21 Project Manager (PM) employed the recommendations of the Coast Guard EVM work group to highlight to General Dynamics' upper management their poor performance (e.g., inability to maintain cost and schedule performance within the variance thresholds). The PM further requested that General Dynamics institute corrective actions to reverse the negative performance trends. General Dynamics clearly acknowledged the challenges they were facing in designing the system as documented in their Nov 2002 CPR:

*From General Dynamics Source Document ID: PIA 16276/A008-002A (Nov 2002):*

- "The schedule variance was primarily attributable to the Software Development account"
- "The program's critical path continues to be driven by the software development effort..."

The following excerpts are from formal correspondence the Coast Guard submitted to General Dynamics and this information was provided to GAO as evidence of concrete actions taken by the RESCUE 21 PM in light of the EVM data:

*From Coast Guard Source Document ID: PIA 16276/A008-017 (Feb 2004):*

- "The CG is extremely concerned about the current and cumulative cost/schedule performance trends and status related to the cost plus CLINs. There are several key issues that must be addressed in order to provide insight into the contractor's commitment to control cost overruns and recover from schedule delays."

- "The variance reporting must be expanded to provide more insight into ongoing and future risk mitigation and recovery plans related to cost control and schedule recovery."

*From Coast Guard Source Document ID PIA 16276/A008-022 (Jul 2004):*

- "The USCG is very concerned that the information reflected on the CPR is not being used by GDDS as a management tool to make informed decisions and manage risk."

In response to Coast Guard concerns, in June 2004 General Dynamics undertook a significant re-organization of its management structure as a corrective action in an attempt to better manage cost and schedule performance.

**Risk Management: GAO "Coast Guard did not effectively mitigate and communicate risks."**

In addition to the process for managing risks as documented in RESCUE 21's Risk Management Plan, risks are discussed and reported during the Project Management Reviews (PMR), Semi-Annual briefs, Performance Measurement Reports, Monthly Acquisition Reports, Coast Guard Acquisition Review Council (CGARC) and IRB meetings, and various weekly/monthly workgroup meetings. During each PMR, risks affecting cost, schedule, logistics, and technical performance are communicated to all General Dynamics and Coast Guard teams and follow on discussions are held to validate the mitigation actions, ownership, and planned dates for closure.

For example, the risk associated with software development was communicated, and actions were taken to mitigate "TECHNICAL PERFORMANCE" risk. This risk was assigned top priority, given the life-saving aspect of RESCUE 21. Mitigation actions included (i) establishment of an HSI workgroup comprised of Coast Guard and General Dynamics personnel to discuss and resolve issues, (ii) assignment of a member of the Coast Guard team to the General Dynamics' facility for 6 months to facilitate issue resolution, (iii) establishment of a contract modification to include enhancements to the system proposed by the Coast Guard operational community, (iv) development of a plan of action and milestones to implement the HSI enhancements.

**Executive-Level Oversight: GAO "Coast Guard stated that it had an executive oversight process that included semi-annual and key decision point reviews. However, there is no evidence that these reviews of Rescue 21 occurred before 2005."**

Early in the audit, the Coast Guard provided oral evidence as to the existence of senior leader executive oversight, upon which GAO requested documentary evidence. The Coast Guard later provided GAO staff a CD containing the semi-annual and key decision reviews dating from 2002 thru 2005. These reviews included:

| Date | Executive Governance & Oversight Presentation |
|---|---|
| Jan 2002 | Key Decision Point 2 (milestone decision) |
| Oct 2002 | Semi-Annual Presentation to Coast Guard Acquisition Review Council (CGARC) |
| Aug 2003 | Semi-Annual Presentation to CGARC |
| Feb 2004 | Semi-Annual Presentation to CGARC |
| July 2004 | Semi-Annual Presentation to CGARC |
| Apr 2005 | Key Decision Point 3 CGARC |
| Jun 2005 | Key Decision Point 3 DHS Investment Review Board |

Additionally, throughout this period the RESCUE 21 Project Manager provided status updates on cost, schedule, technical performance and risks to executive management for oversight via established weekly reports to the Acquisition Director; Monthly Acquisition Reports to the Commandant; Quarterly Acquisition Reports to Congress (as approved by DHS and OMB); annual reports to Congress and Business Case Exhibit 300 to the Office of Management and Budget (OMB) as well as periodic milestone decision reviews to the CGARC and DHS Joint Requirements Council (JRC)/Investment Review Board (IRB).

Page 28 of the GAO briefing states that "executive management did not take action in response to the risks presented" at the DHS IRB in Jun 2005. To the contrary, the Top Ten project risks were presented to the CGARC in Apr 2005 in preparation for the DHS IRB. The Vice Commandant (in his role as the Coast Guard Acquisition Executive) led the discussion regarding ongoing mitigation actions for the risks identified. A number of these risks were successfully mitigated and closed, and the remaining risks were highlighted in the DHS JRC/IRB investment review process. The DHS Deputy Secretary specifically addressed the cost, environmental, real estate and vessel subsystem risks in his Acquisition Decision Memorandum of 23 Jun 2005.

The Department greatly appreciates the efforts of the GAO audit team and acknowledges that the scope of the evaluation was broad, requiring the review and analysis of a myriad of project plans and documentation within an extremely compressed timeline to meet Congressional deadlines. The Coast Guard will continue to aggressively pursue the recommendations of the GAO report in order to ensure RESCUE 21 provides critical life-saving capabilities, and that the acquisition itself is effectively managed.

Thank you again for the opportunity to comment on this draft report and we look forward to working with you on future homeland security issues.

Sincerely,

Steven J. Pecinovsky
Director
Departmental GAO/OIG Liaison Office

# Appendix III: GAO Contacts and Staff Acknowledgments

## GAO Contacts

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## Staff Acknowledgments

In addition to the contacts named above, Joel Aldape, Lisa Canini, Carol Cha, Nancy Glover, Dawn Hoff, Tonia Johnson, George Kovachick, Freda Paintsil, Karl Seifert, and Kim Zelonis made key contributions to this report.

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