United States Government Accountability Office

GAO

Report to the Ranking Member, Subcommittee on Defense, Committee on Appropriations, House of Representatives

April 2011

DEFENSE ACQUISITIONS

CH-53K Helicopter Program Has Addressed Early Difficulties and Adopted Strategies to Address Future Risks

GAO-11-332

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GAO Accountability • Integrity • Reliability

Highlights

Highlights of GAO-11-332, a report to the Ranking Member, Subcommittee on Defense, Committee on Appropriations, House of Representatives

Why GAO Did This Study

The United States Marine Corps is facing a critical shortage of heavy-lift aircraft. In addition, current weapon systems are heavier than their predecessors, further challenging the Marine Corps's current CH-53E heavy-lift helicopters. To address the emerging heavy-lift requirements, the Marine Corps initiated the CH-53K Heavy Lift Replacement program, which has experienced significant cost increase and schedule delays since entering development in 2005.

This report (1) determines how the CH-53K's estimates of cost, schedule, and quantity have changed since the program began development and the impact of these changes and (2) determines how the CH-53K's current acquisition strategy will meet current program targets as well as the warfighter's needs. To address these objectives, GAO analyzed the program's budget, schedules, acquisition reports, and other documents and interviewed officials from the program office, the prime contractor's office, the Marine Corps, the Defense Contract Management Agency, and the Office of the Secretary of Defense.

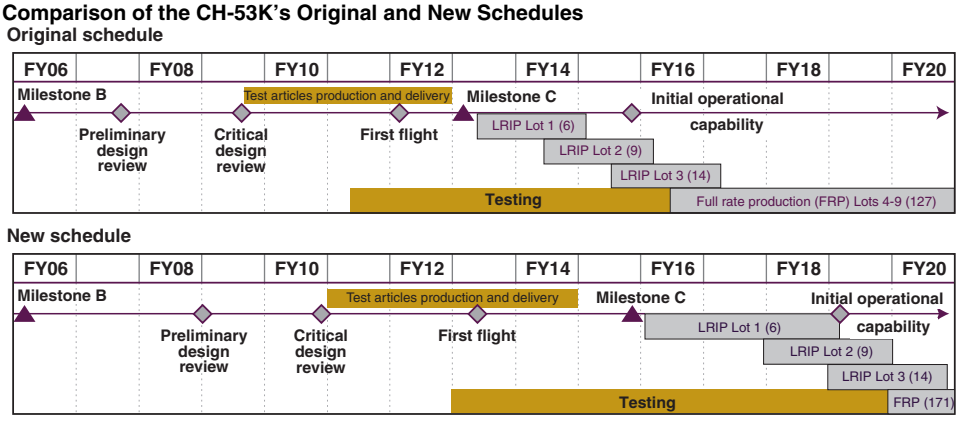
View GAO-11-332 or key components. For more information, contact Michael J. Sullivan at (202) 512-4841 or sullivanm@gao.gov.

What GAO Found

The CH-53K helicopter mission is to provide combat assault transport of heavy weapons, equipment, and supplies from sea to support Marine Corps operations ashore. Since the program began development in December 2005, its total cost estimate has grown by almost $6.8 billion, from nearly $18.8 billion to over $25.5 billion as a result of a Marine Corps-directed quantity increase from 156 to 200 aircraft and schedule delays. The majority of the program's total cost growth is due to added quantities. Development cost growth and schedule delays resulted from beginning development before determining how to achieve requirements within program constraints, with miscommunication between the program office and prime contractor about systems engineering tasks and with late staffing by both the program office and the contractor. The program has also deferred three performance capabilities and relaxed two maintenance-based technical performance metrics in an effort to defer cost. Delivery of the CH-53K to the warfighter is currently scheduled for 2018—a delay of almost 3 years.

The CH-53K program has made progress addressing the difficulties it faced early in system development. It held a successful critical design review in July 2010 and has adopted mitigation strategies to address future program risk. The program's new strategy, as outlined in the President's fiscal year 2012 budget, lengthens the development schedule, increases development funding, and delays the production decision. However, adjustments made to the budget submitted to Congress reduce the program's fiscal year 2012 development funding by $30.5 million (and by a total of $94.6 million between fiscal years 2010 and 2015). According to information contained in the budget, this reduction would result in additional schedule delays to the program of approximately 7 months and a net increase of $69 million to the total development cost estimate. The CH-53K program's new acquisition strategy addresses previous programmatic issues that led to early development cost growth and schedule delays.

Comparison of the CH-53K's Original and New Schedules



LRIP Low-rate initial production **FRP** Full rate production

Source: GAO analysis of United States Marine Corps data.

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United States Government Accountability Office
Washington, DC 20548

April 4, 2011

The Honorable Norman D. Dicks
Ranking Member
Subcommittee on Defense
Committee on Appropriations
House of Representatives

Dear Mr. Dicks:

The United States Marine Corps is facing a critical shortage in the number of Marine expeditionary heavy-lift aircraft, currently its CH-53E helicopters. Although all available decommissioned CH-53E helicopters have been overhauled for use, according to program officials, currently deployed CH-53E aircraft are flying at three times their planned utilization rate. In addition, current weapon systems are heavier than their predecessors, further challenging the Marine Corps's current CH-53E heavy-lift helicopters. To address the emerging heavy-lift requirements, the Marine Corps initiated the CH-53K Heavy Lift Replacement program. The total program is expected to cost significantly more than originally planned and deployment has been significantly delayed. As a result, you asked GAO to (1) determine how the CH-53K's estimates of cost, schedule, and quantity changed since the program began development and the overall impact of these changes and (2) determine how the CH-53K's current acquisition strategy will meet current program targets as well as the warfighter's needs.

To determine how the CH-53K's estimates of cost, schedule, and quantity have changed since the program began development, we received briefings from program and contractor officials and reviewed budget documents, annual Selected Acquisition Reports, monthly status reports, performance indicators, and other data. To identify the CH-53K's current acquisition strategy and determine how this strategy will meet current program targets as well as the warfighter's needs, we reviewed the program's original and current acquisition schedules and test plans. We analyzed the current retirement schedules of the legacy CH-53E fleet and discussed the impact of these retirements on the Marine Corps's heavy-lift requirement with appropriate officials. We interviewed officials with the CH-53K program office; Sikorsky Aircraft Corporation (Sikorsky), the prime contractor; the United States Marine Corps; the Defense Contract Management Agency; and the Office of the Secretary of Defense (OSD). We conducted this performance audit from February 2010 through March

2011 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. A more detailed description of our scope and methodology is included in appendix I.

Background

The CH-53K helicopter mission is to provide combat assault transport of heavy weapons, equipment, and supplies from sea to support Marine Corps operations ashore. The CH-53K is a new-build design evolution of the existing CH-53E and is expected to maintain the same shipboard footprint, while providing significant lift, reliability, maintainability, and cost-of-ownership improvements. Its major improvements include upgraded engines, redesigned gearboxes, composite rotor blades and rotor system improvements, fly-by-wire flight controls, a fully integrated glass cockpit, improved cargo handling and capacity, and survivability and force protection enhancements. It is expected to be able to transport external loads totaling 27,000 pounds over a range of 110 nautical miles under high-hot conditions without refueling and to fulfill land- and sea-based heavy-lift requirements.

Sikorsky was awarded a sole-source contract to develop the CH-53K helicopter because, according to the program office, as the developer of the CH-53E, it is the only known qualified source with the ability to design, develop, and produce the required CH-53 variant. The program entered the system development and demonstration phase of the acquisition process in December 2005 and a $3 billion development contract was awarded to Sikorsky in April 2006. Beginning in 2006, the program experienced schedule delays that resulted in cost increases to the development contract. As a result of the schedule delays and cost growth, in 2009 the program office reported a cost and schedule deviation to its original cost and acquisition program baselines to OSD. However, these increases were

not significant enough to incur what is commonly referred to as a Nunn-McCurdy breach.[1]

In July 2010, the CH-53K program completed what it deemed a successful critical design review (CDR), signaling that it had a stable design and could begin building developmental test aircraft. The program began building the first of five developmental test aircraft in early 2011, plans to make a decision to enter low-rate initial production (LRIP) in 2015, and plans to achieve an initial operational capability (IOC) in 2018.

CH-53K Cost Growth, Schedule Delays, and Deferred Capabilities Will Affect Delivery to the Warfighter

Primarily because of decisions to increase the number of aircraft and other issues, the CH-53K program has experienced approximately $6.8 billion in cost growth and a nearly 3-year delay from original schedule estimates for delivery of IOC. The program started development before determining how to achieve requirements within program constraints, which led to cost growth and schedule delays and resulted in the program delaying its preliminary design review to September 2008, nearly 3 years after development start.[2] In addition, the program received permission to defer three performance capabilities and relax two technical metrics associated with operating and support costs—which we believe are sound acquisition decisions—and will deliver the initial capability to the warfighter in 2018, almost 3 years later than originally planned. In the end, delayed delivery will require the Marine Corps to rely longer on legacy

[1] Section 2433 of title 10, U.S. Code, requires the Department of Defense (DOD) to perform unit cost reports on major defense acquisition programs or designated major defense subprograms. Two measures are tracked: "procurement unit cost" (total funds programmed for procurement divided by the total number of fully configured items to be procured) and "program acquisition unit cost" (total cost of development, procurement, and system-specific military construction divided by the number of fully configured end items to be procured). To eliminate the effects of inflation, costs are expressed in constant base year dollars. If a program exceeds specified cost growth thresholds specified in the law, commonly referred to as a Nunn-McCurdy breach, DOD is required to report to Congress. In certain circumstances, DOD is required to reassess the program and submit a certification to Congress in order to continue the program, in accordance with 10 U.S.C. § 2433a.

[2] The CH-53K program was initiated under the laws and regulations in existence in 2005. DOD's acquisition policy at that time did not require a preliminary design review prior to the start of development. DOD's current acquisition policy (Department of Defense Instruction 5000.02, *Operation of the Defense Acquisition System* (Dec. 8, 2008)) now encourages the completion of a preliminary design review prior to the start of development (during the technology development phase of DOD's acquisition process).

aircraft that are more costly to operate and maintain, less reliable, and less capable of performing the same mission.

The CH-53K program's estimates of cost, schedule, and quantity have significantly grown since development started in December 2005. The Marine Corps now plans to buy a total of 200 CH-53K helicopters for an estimated $25.5 billion, a 36 percent increase over its original estimates. The majority of this increase is due to added quantities. The program's schedule delays have increased the development cost estimate by over $1.7 billion, or more than 39 percent. In 2008, the Marine Corps directed the program to increase its total quantity estimate from 156 to 200 aircraft to support an increase in strength from 174,000 to 202,000 Marines. In February 2011, the Secretary of Defense testified that the number of Marine Corps troops may decrease by up to 20,000 Marines beginning in fiscal year 2015. The Marine Corps has assessed the required quantity of aircraft and determined that the requirement for 200 aircraft remains valid despite the proposed manpower decrease. Primarily as a result of the aircraft quantity increase, the program's procurement cost estimate has also increased by over $5 billion, or 35 percent, from nearly $14.4 billion to over $19.4 billion. The program's average procurement unit cost has increased 4.8 percent. In addition, the program's schedule delays have delayed its ability to achieve IOC until 2018, nearly 3 years later than originally planned. Table 1 compares the program's original baseline estimates of cost, quantity, and major schedule events to current program estimates.

Table 1: Changes in Estimated Costs, Quantities, and Major Events

	Development start	Current status	Increase since initial estimate
Development quantities	4	4	
Procurement quantities	152	196	
Total quantities	156	200	28.2 percent
Cost estimates (then year dollars in millions)			
Development	$4,366.4	$6,082.9	39.3 percent
Procurement	14,399.9	19,443.2	35.0 percent
Total program	$18,766.3	$25,526.1	36.0 percent
Unit cost estimates (then year dollars in millions)			
Program acquisition	$120.3	$127.6	6.1 percent
Average procurement	94.7	99.2	4.8 percent
Major events			
Preliminary design review	June 2007	September 2008	15 months
Critical design review	March 2009	July 2010	16 months
Initial operational capability	September 2015	June 2018	33 months

Source: GAO analysis of Department of Defense data.

Note: Table does not reflect program changes based on the President's fiscal year 2012 budget.

CH-53K Program Started Development Before Determining How to Achieve Requirements and with Late Staffing

The program started development before determining how to achieve requirements within program constraints, which led to cost growth and schedule delays. The CH-53K program originally scheduled its preliminary design review for June 2007, a year and a half after the program began development, and later delayed it to September 2008, nearly 3 years after development start. We have reported that performing systems engineering reviews—including a system requirements review, system functional review, and preliminary design review—before a program is initiated and a business case is set is critical to ensuring that a program's requirements are defined and feasible and that the design can meet those requirements within cost, schedule, and other system constraints.[3]

Problems with systems engineering began immediately within the program because the program and Sikorsky disagreed on what systems engineering

[3] GAO, *Defense Acquisitions: Assessments of Selected Weapon Programs*, GAO-09-326SP (Washington, D.C.: Mar. 30, 2009).

tasks needed to be accomplished. As a result, the bulk of the program's systems engineering problems related to derived requirements. According to an OSD official, the contractor did not account for total design workload, technical reviews, and development efforts. For example, the program experienced problems defining software specifications for its Avionics Management System.[4] While Marine Corps officials commented that requirements are often difficult to define early in the engineering process and changes are expected during design maturation, they noted that in this case the use of a firm fixed-price contract with the subcontractor made it difficult to facilitate changes. As a result, completing this task took longer than the program had estimated and the program's CDR was delayed. In another example, the program has a requirement that the CH-53K be transportable by C-5 aircraft. As with the CH-53E, because of its size, the CH-53K's rotor and main gearbox will be removed from the aircraft's body in order to fit within the height requirements of a C-5. The program office interpreted this as requiring that each CH-53K be shipped in its entirety on a single C-5 aircraft, including the removed rotor and gearbox. However, the contractor interpreted the requirement differently and proposed shipping all rotors and main gearboxes in another C-5 separate from the CH-53K body. Program officials did not accept this interpretation of the requirement and required the contractor to propose a solution in which each CH-53K aircraft would be shipped and arrive in its entirety in a single C-5 aircraft. Marine Corps officials commented that even though this requirement was interpreted differently, it was identified early in the systems engineering process and addressed.

The program office and contractor underestimated the time it would take to hire its workforce, and delays in awarding subcontracts made it difficult for the program to complete design tasks and maintain its schedule. According to an OSD official, while the program officially began development in December 2005, the development contract was not awarded until 4 months later—in April 2006—delaying development start. According to program officials, budget-driven hiring restrictions for government personnel, which included ceilings on the number of government personnel who could be assigned to the program management office, affected the program's ability to hire its workforce at the time the

[4] The Avionics Management System includes the cockpit and mission management system with integrated flight and navigation displays and provides the crew with communication, navigation, surveillance, and air traffic management.

program was initiated. Similarly, program officials told us that the contractor underestimated the amount of time required to locate, recruit, train, and assign qualified personnel to the program. The contractor was also late in awarding contracts to its major subcontractors. To mitigate the risk of production cost growth, the contractor established long-term production agreements with its subcontractors. According to program officials, in these agreements subcontractors committed in advance to pricing arrangements for the production of parts and spares. While the contractor used this strategy to reduce program risk, it resulted in a delay and the major subcontracts were awarded later than needed to maintain the program's initially planned schedule.

CH-53K Program Has Deferred Performance Capabilities and Relaxed Technical Metrics Associated with Operating and Support Costs

In 2010, the CH-53K program received approval from the Joint Requirements Oversight Council (JROC) to defer three performance capabilities that make up a portion of the Net-Ready key performance parameter, and from the Marine Corps to relax two maintenance-based technical performance metrics—both of which we believe are sound acquisition decisions.[5] The Department of Defense's (DOD) decision to defer three performance capabilities was based on consultation among JROC, Headquarters U.S. Marine Corps, Chief of Naval Operations staff, and the program office in 2008, which prompted the CH-53K program office to review the program's requirements and identify potential areas in which to decrease costs. As part of that review, the program office identified several areas where costs could be deferred without decreasing capability, including three communications-related performance capabilities—Link-16, Variable Message Format, and Mode V software—that constituted part of the Net-Ready key performance parameter. Program officials estimated that this will result in over $100 million in cost deferral. Program officials explained that these software capabilities were not removed from the program's road map, but rather have been deferred until after IOC. Originally, the program's Operational Requirements Document called for all three capabilities to be fully integrated in fiscal year 2015. However, one of the capabilities must now be fully integrated no later than 6 months after IOC, which is currently scheduled to occur in 2018, and the other two capabilities must be fully integrated within 2 years

[5] Key performance parameters are those capabilities or characteristics considered most essential for successful mission accomplishment. Failure to meet an Operational Requirements Document key performance parameter threshold can be cause for the concept or system selection to be reevaluated or the program to be reassessed or terminated.

of IOC. Program officials stated that deferment of these capabilities will not affect aircraft interoperability.

Two technical performance metrics were changed because, according to program officials, meeting the original maintenance-based technical performance requirements for Mean Time To Repair[6] and Mean Corrective Maintenance Time for Operational Mission Failures[7] was not cost effective. For example, the CH-53K's rotor blades are designed to have a two-piece design featuring a removable tip. However, the curing time to adhere the blade tip to the blade was driving up the time it would take to remove and replace the blade tip. The contractor proposed meeting the original requirement by moving to a one-piece blade; however, this would increase the program's operating and support costs[8] by approximately $99 per flight hour and increase the logistical footprint of the helicopter. As a result, the program sought and received approval to relax the performance metric associated with replacing the blade tip instead of investing the financial resources necessary to obtain the original metrics or moving to a one-piece blade.

Delayed Delivery of the CH-53K Requires Longer Reliance on Costly and Less Reliable Legacy Aircraft

Because of a nearly 3-year delay in initial delivery of the CH-53K, program officials estimated that it will cost approximately $927 million more to continue to maintain the CH-53E legacy system. Initial delivery of the CH-53K to the warfighter is currently scheduled for 2018, a delay of almost 3 years that will require the Marine Corps to rely on legacy aircraft that are less reliable, more costly to operate and maintain, and less capable of performing the same mission. This delay, coupled with an increased demand for the CH-53E in foreign theaters, led the Marine Corps to pull all available assets from retirement for either reentry into service or to be used for spare parts. Continued reliance on the CH-53E will be costly, as it is one of the most expensive helicopters to maintain in the Marine Corps's

[6] Mean Time To Repair is the average elapsed corrective maintenance time needed to repair all chargeable failures and is measured from the time that the maintenance event begins until the item is ready for operational use.

[7] Mean Corrective Maintenance Time for Operational Mission Failures is the average elapsed corrective maintenance time needed to repair all operational mission hardware failures and is measured from the time that the maintenance event begins until the item is ready for operational use.

[8] Operating and support costs are those program costs necessary to operate and maintain the capability. These costs include military personnel and operations and maintenance costs.

fleet. For example, the drive train of the CH-53E costs approximately $3,000 per flight hour to maintain. In contrast, the program estimates that the drive train for the CH-53K—its largest dynamic system—will cost only $1,000 per flight hour to maintain. In addition, the CH-53K is expected to have improved reliability and maintainability over the CH-53E legacy system. For example, the CH-53K's engine has 60 percent fewer parts than that of the CH-53E, which the program office believes will result in a more reliable engine that is easier and less costly to maintain. In addition, the CH-53K incorporates an aluminum gearbox casing, which will decrease the need for replacement resulting from corrosion.

Delayed delivery of the CH-53K will also affect the ability of the Marine Corps to carry out future missions that cannot be performed by the CH-53E. For example, the CH-53E can carry 15,000 pounds internally compared to 30,000 pounds for the CH-53K. While the CH-53K is expected to carry up to 27,000 pounds externally for 110 nautical miles at 91.5°F at an altitude of 3,000 feet—a Navy operational requirement for high-hot conditions—the CH-53E can only carry just over 8,000 pounds under the same conditions. The increased lift capability of the CH-53K during these conditions may enable it to carry the current and incoming inventory of up-armored vehicles, which are much heavier than their less-armored predecessors. For example, the up-armoring of wheeled military vehicles, such as the High Mobility Multi-purpose Wheeled Vehicle, and the introduction of the Joint Light Tactical Vehicle have resulted in a military inventory with weights that are beyond the weight limits of the CH-53E. According to program officials, without the addition of the CH-53K, the Marine Corps will soon no longer be able to carry and deliver the military's new inventory of wheeled vehicles in high-hot conditions. Figure 1 compares the capabilities and characteristics of the CH-53E and CH-53K.

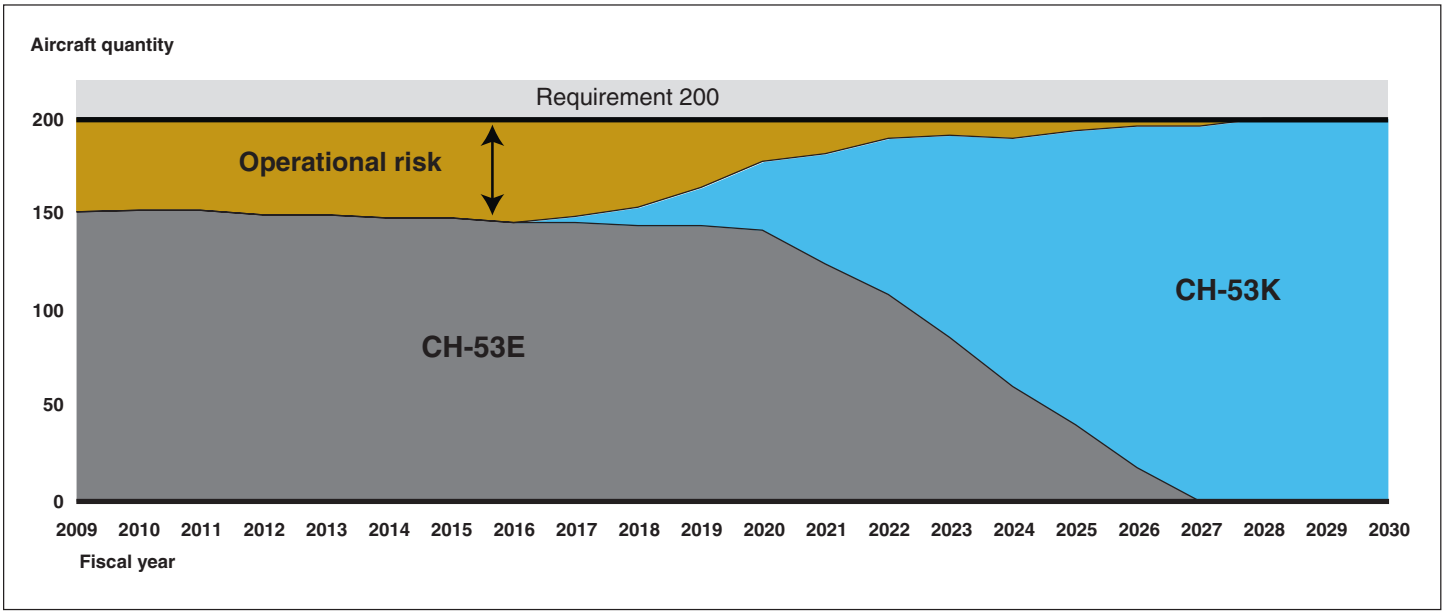
Figure 1: Comparison of CH-53E and CH-53K Capabilities and Characteristics

	CH-53E 	CH-53K 
Average annual operating and maintenance cost per helicopter (FY 2011)	$8 million	$5 million
Internal width	8 feet	9 feet
Empty weight	37,500 pounds	43,750 pounds
Maximum distance	580 nautical miles	507 nautical miles
Maximum speed	172.5 miles per hour	195.6 miles per hour
Maximum internal weight	15,000 pounds	30,000 pounds
Maximum external weight (high-hot)	8,265 pounds	27,000 pounds
Maximum gross weight	73,500 pounds	88,000 pounds

Source: GAO analysis of Department of Defense data; Marine Aviation data (CH-53E photo); 2008 Sikorsky Aircraft Corporation data (CH-53K photo).

The combination of the increase in the quantity of heavy-lift helicopters required to support Marine troop levels and the delayed delivery of the CH-53K to the warfighter has created a requirement gap for heavy-lift helicopters of nearly 50 helicopters (nearly 25 percent) over the next 7 years and represents an operational risk to the warfighter. However, the Marine Corps stated that it is accepting significant risk with the heavy-lift shortfall and will continue to operate under this gap until the CH-53K becomes available. Figure 2, which shows the required aircraft quantities, the current CH-53 series helicopter force structure, and planned CH-53K production, illustrates the operational risk.

Figure 2: Marine Corps Heavy-Lift Helicopter Force Structure



Source: Department of Defense.

CH-53K Program Has Made Progress and Adopted Strategies to Address Future Risk

The CH-53K program has made progress addressing the difficulties it faced early in system development. The program held CDR in July 2010, demonstrating that it has the potential to move forward successfully. The program has also adopted mitigation strategies to address future program risk. The program's new strategy, as outlined in the President's fiscal year 2012 budget, lengthens the development schedule, increases development funding, and delays the production decision by 1 year. However, while the program's new acquisition strategy increases development time to mitigate risk, some testing and production activities remain concurrent, which could result in costly retrofits if problems are discovered during testing.

CH-53K Program Has Made Progress Addressing Earlier Difficulties

The CH-53K program has taken several steps to address some of the shortfalls that the program experienced early in development. For example, the program has addressed its cost growth by revising its cost estimate to align with the current schedule. The program's 2011 budget request fully funded the development program to its revised estimate. The program addressed its early staffing issues by increasing staffing levels beginning in January 2009 and maintained those levels through completion

of CDR. In addition, the program delayed technical reviews until it was prepared to move forward, thereby becoming more of an event-driven rather than a schedule-driven program. An event-driven approach enables developers to be reasonably certain that their products are more likely to meet established cost, schedule, and performance baselines. For instance, the program delayed CDR—a vehicle for making the determination that a product's design is stable and capable of meeting its performance requirements—until all subsystem design reviews were held and more than 90 percent of engineering designs had been released.

In July 2010, the program completed system integration—a period when individual components of a system are brought together—culminating with the program's CDR. With completion of CDR, the program has demonstrated that the CH-53K design is stable—an indication that it is appropriate to proceed into fabrication, demonstration, and testing and that it is expected that the program can meet stated performance requirements within cost and schedule. At the time CDR was held, the program had released 93 percent of its engineering drawings, exceeding the best practice standard for the completion of system integration. According to best practices, a high percentage of design drawings—at least 90 percent—should be completed and released to manufacturing at CDR. Additionally, the program office stated that all 29 major subsystem design reviews were held prior to the start of CDR, and that coded software delivery was ahead of schedule. In the end, the Technical Review Board, the approving authority for CDR, determined that the program was ready to transition to system demonstration—a period when the system as a whole demonstrates its reliability as well as its ability to work in the intended environment—and identified seven action items, none of which were determined by the program office to be critical.

CH-53K Program Has Taken Steps to Address Future Risk

The program has also adopted several mitigation strategies to address future program risk. The program has established weight improvement plans to address risks associated with any potential weight increases and has been able to locate areas where weight reductions can be made. For example, the program worked with the subcontractor responsible for designing and manufacturing the floor of the CH-53K to find areas to reduce weight. The program has also created several working groups to reduce risk to the overall capabilities of the CH-53K. For example, the Capabilities Integrated Product Team, which meets on a monthly basis, was developed to focus on risk relating to the program's requirements. This team comprises officials from the program office; Headquarters U.S. Marine Corps; Marine Corps Combat Development Command; Chief of

Naval Operations staff; the Navy's Commander, Operational Test and Evaluation Force, staff; the operational testing squadron; and the developmental testing squadron. Its members work with the program office to identify, clarify, and resolve mission-related issues and program requirements. In addition, the program holds integrating design reviews every 6 months, freezing the working design in order to hold a system-level review and manage design risk.

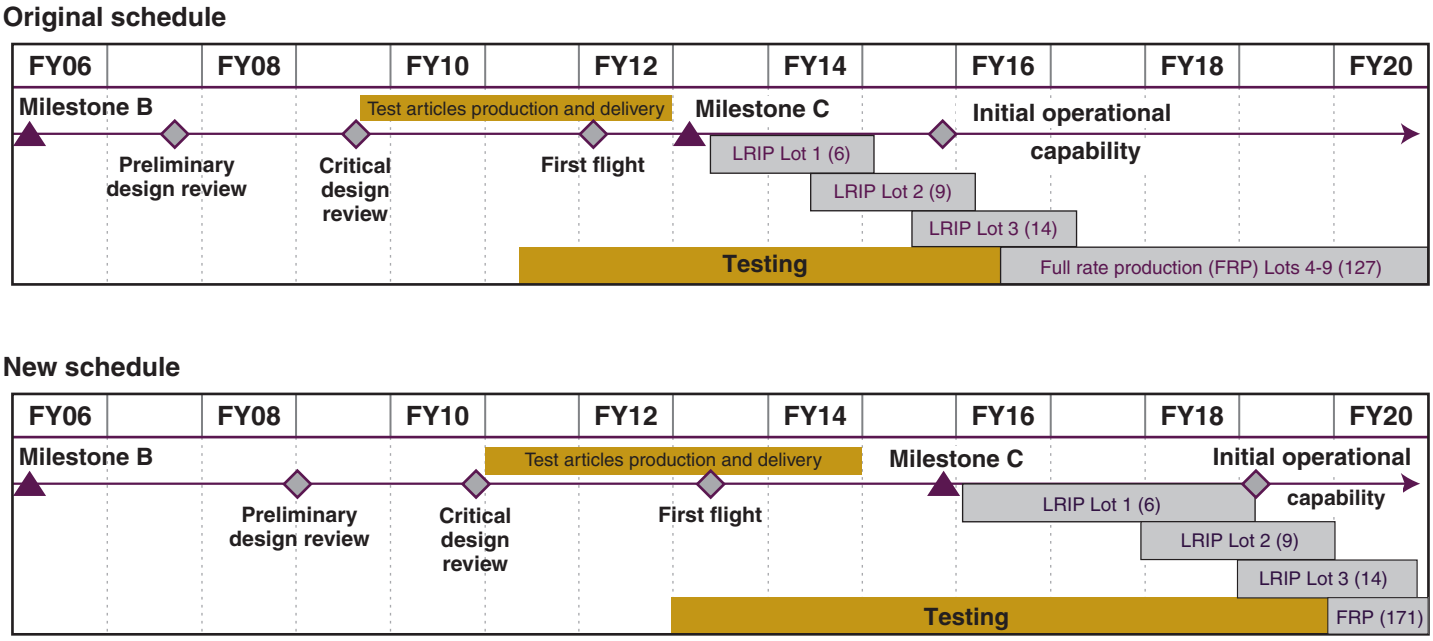
Future CH-53K Program Risk Remains

The CH-53K program's schedule contains overlap, or concurrency, between testing and production. The stated rationale for concurrency is to introduce systems in a timelier manner or to fulfill an urgent need, to avoid technology obsolescence, to maintain an efficient industrial development/production workforce, or a combination of these. While some concurrency may be beneficial to efficiently transition from development to production, there is also risk in concurrency. Any changes in design and manufacturing that require modifications to delivered aircraft or to tooling and manufacturing processes would result in increased costs and delays in getting capabilities to the warfighter. In the past, we have reported a number of examples of the adverse consequences of concurrent testing and delivery of systems and how concurrency can place significant investment at risk and increases the chances that costly design changes will surface during later testing.

The CH-53K program's original schedule contained concurrency between testing and aircraft production. In 2009, reflecting the early difficulties experienced in development, the CH-53K program revised its cost and schedule estimates. This revised schedule would have reduced the program's level of concurrency. For example, while the original program schedule called for developmental testing to be ongoing during the production of all three lots of LRIP, the schedule resulting from the 2009 adjustments called for developmental testing to be ongoing during the first two lots of LRIP. However, the program had concerns that this schedule's allowance of approximately 2 years between final delivery of developmental test aircraft and the beginning of LRIP would create a production gap that could be costly. As a result, the program office was considering accelerating procurement funds in an effort to begin production 1 year earlier than planned and minimize breaks in production. This consideration was negated, however, as a result of a funding cut that the program sustained in the process of formulating the President's fiscal year 2012 budget.

In February 2011, the President's fiscal year 2012 budget was released and outlined changes to the program's budget and schedule. According to a program official, the program's requested budget was reduced by approximately $30.5 million in fiscal year 2012 (and a total of $94.6 million between fiscal year 2010 and fiscal year 2015)—funds to be applied to other DOD priorities. The President's budget reports that while the CH-53K program was fully funded to the OSD Cost Assessment and Program Evaluation Office estimate in the President's fiscal year 2011 budget, the funding adjustments made to the program in the President's fiscal year 2012 budget would result in a net increase of $69 million to the development cost estimate and a schedule delay of approximately 7 months. The new schedule results in later delivery of developmental test aircraft and delays some testing. As a result, according to program officials, the production gap issue has been addressed. Another result, though, is that the program's new schedule maintains a level of concurrency similar to that of the original schedule. Program officials have conceded that concurrency exists within their program, but state that this concurrency will reduce the operational risk of further delaying IOC. In commenting on the risks of concurrency, Marine Corps officials noted that the time allotted prior to the start of production and the small quantity of LRIP planned reduces the risks of costly retrofits resulting from issues identified during developmental test. Figure 3 compares the CH-53K program's original and new schedules.

Figure 3: Comparison of the CH-53K's Original and New Schedules



Legend:

LRIP Low-rate initial production

FRP Full rate production

Source: GAO analysis of United States Marine Corps data.

As the CH-53K program moves forward, it is important that further cost growth and schedule delays are mitigated. The CH-53K program's new acquisition strategy addresses previous programmatic issues that led to early development cost growth and schedule delays.

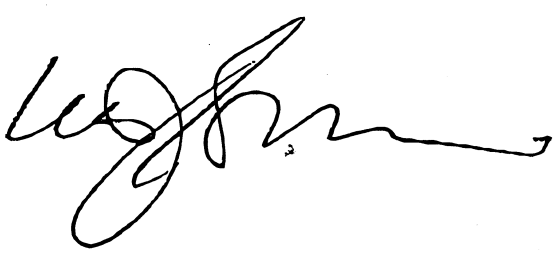
Agency Comments

DOD provided technical comments on the information in this report, which GAO incorporated as appropriate, but declined to provide additional comments.

We are sending copies of this report to the Secretary of Defense; the Under Secretary of Defense for Acquisition, Technology and Logistics; the Secretary of the Navy; the Commandant of the Marine Corps; and the Director of the Office of Management and Budget. The report also is 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 me at (202) 512-4841 or sullivanm@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Staff members who made key contributions to this report are listed in appendix II.

Sincerely yours,



Michael J. Sullivan
Director
Acquisition and Sourcing Management

Appendix I: Scope and Methodology

To determine how the CH-53K's estimates of cost, schedule, and quantity have changed since the program began development, we received briefings by program and contractor officials and reviewed budget documents, annual Selected Acquisition Reports, monthly status reports, performance indicators, and other data. We compared reported progress with the program of record and previous years' data, identified changes in cost and schedule, and obtained officials' reasons for these changes. We interviewed officials from the CH-53K program and the Department of Defense (DOD) to obtain their views on progress, ongoing concerns, and actions taken to address them.

To identify the CH-53K's current acquisition strategy and determine how this strategy will meet current program targets as well as the warfighter's needs, we reviewed the program's acquisition schedule and other program documents, such as Selected Acquisition Reports and test plans. We analyzed the retirement schedule of the legacy CH-53E fleet and discussed the impact of these retirements on the Marine Corps's heavy-lift requirement with appropriate officials. To identify the CH-53K program's current acquisition strategy and to determine how the program plans to meet its new targets and still meet the needs of the warfighter, we obtained from the program—through program documents—the program's revised acquisition plans.

In performing our work, we obtained documents, data, and other information and met with CH-53K program officials at Patuxent River, Maryland, and the prime contractor, Sikorsky Aircraft Corporation, at Stratford, Connecticut. We met with officials from Headquarters Marine Corps, the Office of the Chief of Naval Operations, and the Office of the Secretary of Defense's Cost Assessment and Program Evaluation Office at the Pentagon, Arlington, Virginia. We interviewed officials from the Office of Director of Defense Research and Engineering and the Office of the Under Secretary of Defense for Acquisition, Technology and Logistics, Office of Developmental Testing and Evaluation, in Arlington, Virginia. We also met with officials from the Defense Contract Management Agency who were responsible for the CH-53K program at Stratford, Connecticut. We drew on prior GAO work related to acquisition best practices and reviewed analyses and assessments done by DOD.

To assess the reliability of DOD's cost, schedule, and performance data for the CH-53K program, we talked with knowledgeable agency officials about the processes and practices used to generate the data. We determined that the data we used were sufficiently reliable for the purpose of this report.

We conducted this performance audit from February 2010 through March 2011 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.

Appendix II: GAO Contact and Staff Acknowledgments

GAO Contact

Michael Sullivan (202) 512-4841 or sullivanm@gao.gov

Staff Acknowledgments

In addition to the contact named above, the following staff members made key contributions to this report: Bruce Thomas, Assistant Director; Noah Bleicher; Marvin Bonner; Laura Greifner; Laura Jezewski; and Robert Miller.

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