

Combat Rescue Helicopter (CRH)

Executive Summary

- The Combat Rescue Helicopter (CRH) is currently in the Engineering and Manufacturing Development (EMD) phase, with first flight of an EMD aircraft scheduled for February 2019.
- Qualification testing of many components of the aircraft have uncovered technical deficiencies that the Program Office is working to resolve. As a result, the program will begin flight test and operational assessment (OA-2) with a large number of CRH-specific systems in non-operationally representative configurations. The Program Office will be unable to provide CRH-specific information on these components to the Milestone Decision Authority in advance of the Milestone C decision, scheduled for September 2019.
- Qualification testing for components undergoing live fire testing revealed multiple design and manufacturing deficiencies for many components that may adversely affect the development schedule.

System

- The CRH (mission-design-series HH-60W) is a new-build, dual-piloted, multi-engine rotary-wing aircraft based on the in-production Army UH-60M helicopter.
- The CRH is intended to replace the aging fleet of Air Force HH-60G as its Combat Search and Rescue Aircraft.
- The CRH is intended to be able to fly a combat radius of at least 195 nautical miles (nm) without aerial refueling and conduct a hover out-of-ground effect (HOGE) at its mid-mission gross weight for its mission profile.
- The CRH will have susceptibility and vulnerability reduction features equivalent to or better than the current HH-60G aircraft:
 - Crew and cabin armor, self-sealing fuel cells that do not suffer catastrophic damage from high-explosive incendiary rounds, and crew and passenger crashworthy seating



- CRH-unique AN/APR-52 radar warning receiver (RWR) to detect infrared (IR), radio frequency (RF), and laser threats
- Three crew-served forward and side-firing self-protection weapons: the GAU-2, GAU-18, and the GAU-21

Mission

- Units equipped with the CRH will recover isolated personnel from hostile or denied territory, day or night, in adverse weather, and in a variety of threat spectra from terrorist attacks to chemical, biological, radiological, and nuclear threats.
- Secondary missions include humanitarian missions, civil search and rescue, disaster relief, medical evacuation, and non-combatant evacuation operations.

Major Contractor

Sikorsky Aircraft, a Lockheed Martin Company – Stratford, Connecticut

Activity

- EMD 1 and 2 aircraft are completing build at the Sikorsky facility in Stratford, Connecticut. EMD 1 is expected to be complete October 17, 2018, and EMD 2 is expected to be complete November 9, 2018. First flight is scheduled to occur with EMD 2 in February 2019.
- The 704th Test Group completed live fire testing of the flight crew armored seat in March 2018.
- Qualification testing for the fuel cell to demonstrate self-sealing capability occurred in October 2017 for Phase I article testing and September 2018 for full-scale production-representative fuel bladder testing.
- Qualification testing for the cabin and cockpit armor occurred in February and June 2018.
- Qualification testing for the primary aircrew seating occurred in May 2018 and August 2018.
- Qualification testing for the seat track pallet occurred in August 2018.
- Qualification testing for the primary rescue hoist began June 18, 2018, with 3 of 26 sub-tests complete, including a safety of flight vibration test which failed.

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- Qualification testing for the gun mount began September 4, 2018; with 1 of 26 sub-tests complete, a safety of flight vibration test which failed.
- Qualification testing for the digital RWR began March 30, 2018. The software testing for qualification has not begun, although it has been successfully tested in the Integrated Demonstrations and Applications Laboratory.
- Testing has been performed in accordance with the DOT&E-approved Alternate LFT&E Strategy.
- Operational test planning for OA-2 has been in accordance with the DOT&E-approved Milestone B Test and Evaluation Master Plan (TEMP) from April 2015.

Assessment

- Due to delays in production and in acquiring necessary data to support the airworthiness technical authority review, including incomplete results stemming from qualification testing failures, first flight has slipped from October 2018 to February 2019 at the earliest.
- The current plan to begin flight testing in 2QFY19 in support of a September 2019 Milestone C decision means it is unlikely that the tactical mission kit, Link 16, digital RWR, rescue hoist, gun mount and systems, fuel cells, armor, and primary aircrew seating will be in an operationally representative configuration when testing begins. As these systems are still undergoing design changes, the Milestone Decision Authority will have limited information on HH-60W-unique components to support an informed Milestone C decision.
- Fuel cell qualification testing demonstrated several design and manufacturing deficiencies that need to be resolved:
 - The current design exceeds the weight allowance.
 - The design does not meet the Military Detail (MIL-DTL) for normal temperature, cold temperature, or self-sealing performance versus some threats. The Program Office intends to proceed with modified criteria which will allow some fuel cell leakage to be considered a pass of the specification.
 - Manufacturing control and process deficiencies have delayed and impaired testing. For example, test articles

have not been manufactured to design; articles that are design compliant show significant variation from article to article, which may adversely affect the weights and vulnerabilities of the operational fuel cells.

- Phase II qualification testing significantly damaged a production-representative live fire test aircraft structural component, the repair of which may further delay live fire fuel cell testing several months or necessitate a change in the LFT&E Strategy if the article cannot be repaired.
- Cabin and cockpit armor qualification testing has failed twice, necessitating redesigns and remanufactures. The current redesign, which still requires retest, will increase armor weight by as much as 60 pounds (21 percent) beyond the expected allocation and may not be available in time for initial flight test. The Program Office is considering tailoring the qualification test pass criteria to minimize the weight impact in some areas of the aircraft.
- The primary aircrew seat qualification testing included multiple failures. The program intends to redesign the seat and use an alternate seat qualified on the HH-60G during initial flight test in order to meet the schedule.
- The seat track pallet is being redesigned based upon analysis of crash test data. This will delay live fire testing of this component by approximately 3 months and may require repeat qualification testing.
- As of October 2018, analysis is insufficient to assess success on the limited qualification testing for the primary rescue hoist.

Recommendations

The CRH Program Office should:

1. Adjust the program schedule to ensure that CRH-specific hardware is available for the upcoming operational assessment to enable an operationally meaningful and adequate system in support of the Milestone C decision.
2. Given the proposed changes to system specification requirements, determine if the CRH will be more survivable than the HH-60G, as required by the Capabilities Development Document.