MH-139A Grey Wolf

The MH-139A program entered low-rate initial production in March 2023 after achieving Milestone C and is continuing with government-led developmental testing. However, the program still faces several ongoing risks to maintaining the planned IOT&E schedule and meeting operational effectiveness, suitability, and survivability requirements.

SYSTEM DESCRIPTION

The MH-139A Grey Wolf is a dual-piloted, twin-engine helicopter based on the commercial AW139 with added military capabilities in communication, navigation, identification, and survivability.

MISSION

The Air Force intends for the MH-139A to replace the UH-1N to provide rapid transport capability for two primary commands:

- Air Force Global Strike Command (AFGSC) will use the MH-139A to support nuclear security missions by providing emergency security response and convoy escort at Minot AFB, North Dakota; Malmstrom AFB, Montana; and Francis E. Warren AFB, Wyoming.
- Air Force District of Washington will use the MH-139A to provide contingency response, continuity of operations, and executive transport for senior government officials in the National Capital Region.

In addition, MH-139A-equipped units will conduct secondary missions for multiple commands:

- Air Force Materiel Command will provide test range support to Eglin AFB, Florida, and developmental test aircraft from Duke and Hurlburt Fields, Florida.
- Air Force Reserve Command will provide formal flight training at Maxwell AFB, Alabama.
- Air Education and Training Command will provide medical evacuation and support operations to the Air Force Survival School at Fairchild AFB, Washington.

All commands will perform search and rescue via the National Search and Rescue Plan and Defense Support of Civil Authorities.

PROGRAM

MH-139A is an Acquisition Category IB program. DOT&E approved the Alternative LFT&E Strategy in May 2019 and the Milestone C Test and Evaluation Master Plan in January 2023. In February 2023, DOT&E published an observation report to inform the Milestone C decision, which the Air Force executed in March 2023.

The MH-139A acquisition strategy relies on contractor flight testing to obtain a series of civil Supplemental Type Certificate (STC) approvals to expand MH-139A capabilities and support the military flight releases (MFRs) required for government-led developmental and operational flight testing. The number of STCs has grown over the course of the program from five to nine. The most recent additional STC is required by the Air Force's decision to add an environmental conditioning system (ECS) and an additional radio for AFGSC missions. Six of nine STCs have been approved leading to a third MFR in August 2023. An additional STC is required for issuance of the operational MFR needed to begin aircrew training for IOT&E and another STC (with associated MFR) is required to start IOT&E. IOT&E is scheduled to begin in late FY24 to support a full-rate production decision in FY25.

» MAJOR CONTRACTOR

- Boeing Defense, Space & Security – Ridley Park, Pennsylvania

TEST ADEQUACY

The Air Force continued government-led developmental flight testing, which began in August 2022, primarily at Duke Field, Florida. Testing in early FY23 focused on initial demonstrations of military capabilities to inform the Milestone C decision, including the fast-rope insertion/extraction system, military communications, crew-served weapons, the countermeasures dispensing system, and austere landings at Malmstrom AFB, Montana. The Air Force also conducted developmental cyber testing in October 2022, but some components were unavailable or off-limits and will need to be evaluated in operational testing. The Air Force Operational Test and Evaluation Center published an operational assessment report in January 2023, in support of the Milestone C decision, and its eighth periodic report in May 2023. DOT&E's February 2023 observation report highlighted several risks to the program.

Developmental testing in the remainder of FY23 included the mission planning system, gun system modifications, performance and handling qualities, flare effectiveness, additional austere landings, and heavy-weight, high-density-altitude testing. The program expects to complete developmental testing in February 2024.

Contractor ground and flight testing continued at Duke Field and at contractor facilities in Philadelphia, Pennsylvania, in support of the remaining STCs. The six STCs issued to date support a partially expanded flight envelope and integration of most military equipment. Future STCs will complete the full expanded flight envelope, including heavy weight and high-density-altitude operations, along with remaining cabin modifications and equipment additions, including an ECS, an additional radio, and the military transponder.

Delays in the MH-139A retrofit schedule and the required operational MFRs pose a risk to the IOT&E scheduled in 4QFY24. The program does not expect to retrofit existing aircraft for STC testing and operational MFR issuance until 4QFY24. Furthermore, the program is unlikely to have the three aircraft required for IOT&E in the operational configuration until 1QFY25.

The Air Force completed live fire testing of the pilot and crew armor, engine nacelle fire extinguishing system, main gearbox, horizontal tail rotor drive, and the static tests of the main and tail rotor blades in FY23. Testing of flight controls and vertical tail rotor drive systems is ongoing. Planning is underway for ballistic vulnerability, occupant casualty, and low-energy laser analyses, as well as integrated survivability and chemical, biological, and radiological assessments.

Based on the results of the static main rotor blade testing to a specified threat, the Air Force has proposed to forgo dynamic testing of the main rotor blades as an exception to the approved Alternative LFT&E Strategy and instead will rely on comparing the static test results by similarity to other rotor blades. The program has not yet submitted the proposed analysis for DOT&E approval.

As reported last year, the Air Force has not yet conducted the approved testing of the MH-139A against electromagnetic pulse (EMP) as required by the Alternative LFT&E Strategy. In lieu of the approved testing, the Air Force proposed to conduct an analysis of flight-critical systems to determine if MH-139A meets the EMP survivability requirement in the Capability Production Document. The program has not yet submitted their EMP flight-critical analysis plan for DOT&E approval.

The Air Force has not yet released results of the limited infrared (IR) signature testing to support analytical evaluation of the lower hemisphere susceptibility of the MH-139A. The Air Force Dynamic IR Missile Evaluator Lab at Wright-Patterson AFB, Ohio, will use these data to verify and update the MH-139A IR signature models to determine countermeasure effectiveness against threat systems.

PERFORMANCE

» EFFECTIVENESS

While the Air Force has made progress addressing some previously reported deficiencies, both existing and newly identified deficiencies still present a risk to the MH-139A meeting operational effectiveness requirements.
To address previously reported concerns about the cabin layout, the Air Force conducted testing on alternative layouts and newly approved equipment tie-down points. However, the Air Force has not changed the Capability Production Document to align with the proposed cabin configuration.

The Air Force is adding an additional radio to the MH-139A to provide external communications with AFGSC ground forces, but problems with internal communications persist. Tests of alternative connections are ongoing.

The Air Force demonstrated MH-139A austere landing capabilities in snow and on unimproved terrain. The program has imposed restrictions on austere landings while investigating engine ingestion of dust and debris.

Developmental testing of the gun weapon systems showed malfunctions caused by the

ammunition feed system and the spent-brass catch bag. The vendor modified the design of both components and further testing is underway.

The additional radio and particularly the ECS will increase aircraft weight and power requirements. The effects on the full MH-139A flight envelope will not be known until developmental testing is completed.

» SUITABILITY

The program needs to address several challenges for the MH-139A to be operationally suitable. As previously reported, expansion of the MH-139A operating envelope relative to the commercial AW139 baseline may stress powertrain components and increase maintenance requirements.

The Air Force demonstrated the ability to mission plan with the vendor-provided software, but testing revealed some usability issues that pose a risk to meeting both suitability and effectiveness requirements. The vendor-provided software is not authorized for installation on government networks and will require stand-alone computers at each operating location.

Testing of alternative cabin layouts identified potential human factor concerns based on the size and weight capacity of the seat design and placement relative to aircraft structures.

» SURVIVABILITY

The program needs to address several challenges for the MH-139A to be survivable against anticipated threats. Ballistic testing of various components and subsystems has provided valuable information on the damage tolerance of the aircraft as well as armor protection against the specification threat and other operationally representative small arms threats. The contractor started testing of a new fuel cell in September 2023 to determine fuel leakage into the cabin and the potential for dry bay fires. Analysis is ongoing.

RECOMMENDATIONS

The Air Force should:

1. Continue developing plans to correct deficiencies that risk degrading operational effectiveness.
2. Conduct an adequate EMP flight-critical analysis to assess aircraft survivability in expected missions.
3. Ensure that sufficient aircraft in an operationally representative configuration and all associated support equipment consistent with approved concepts of operations are available for the start of IOT&E.
4. Complete the analysis of the performance of the armor and fuel system against ballistic threats.