VH-92A Presidential Helicopter Replacement Program

Executive Summary

- The VH-92A program is progressing on schedule with excellent teamwork and open communication among all agencies involved.
- The Navy has two VH-92A Engineering Development Model (EDM) aircraft and two System Demonstration Test Article (SDTA) aircraft to support government-led integrated testing at Naval Air Station (NAS) Patuxent River, Maryland. This effort includes the integration of the Mission Communications System (MCS) designed by Naval Air Systems Command (NAVAIR) at St. Inigoes, Maryland.
- The Navy conducted an operational assessment (OA) from March 1 through April 9, 2019. Results of the OA supported a Milestone C decision on May 30, 2019.
- Cybersecurity testing on VH-92A included a Cooperative Vulnerability and Penetration Assessment and Adversarial Assessment by the Commander, Operational Test and Evaluation Force Cyber Test Team; and a Cyber Risk Assessment conducted by NAVAIR. Cybersecurity testing of the MCS has been conducted by a U.S. Government Agency.
- The VH-92 program completed the LFT&E program in accordance with DOT&E-approved test plans. DOT&E summarized the preliminary VH-92A survivability assessment in the DOT&E OA report. DOT&E will deliver the final survivability evaluation in FY20 to support Initial Operational Capability.

System

- The VH-92A is a dual-piloted, twin-engine helicopter based on the Sikorsky S-92A. The program will maintain the VH-92A Federal Aviation Administration (FAA) airworthiness certification throughout its lifecycle.
- The VH-92A aircraft will replace the current Marine Corps fleet of VH-3D and VH-60N helicopters flown by Marine Helicopter Squadron One (HMX-1) to perform the presidential airlift mission.
- The VH-92A will operate worldwide in day, night, or adverse weather conditions. The VH-92A will be air transportable to remote locations via a single Air Force C-17 cargo aircraft.
- The government-designed MCS will provide the ability to conduct simultaneous short- and long-range secure and non-secure voice and data communications. The MCS will provide situational awareness by exchanging information with outside agencies, organizations, and supporting aircraft. Lockheed Martin in Owego, New York, installs the MCS hardware and baseline software and conducts systems checks as part of VH-92A production.
- Lockheed Martin will conduct final interior finishing and aircraft painting at Owego to complete the VH-92A for delivery.

Mission

- Marine HMX-1 will use the VH-92A aircraft to provide safe and timely transport of the President of the United States and other parties as directed by the White House Military Office.
- HMX-1 will operate the VH-92A from commercial airports, military airfields, Navy ships, and austere sites throughout the world.

Major Contractor

Sikorsky Aircraft Corporation, a Lockheed Martin Company – Stratford, Connecticut

Activity

- EDM-1 and EDM-2 are at NAS Patuxent River supporting the test program. As of September 30, 2019, the two EDMs have accumulated 328.3 flight hours since delivery to Patuxent River. SDTAs-1 and -2 have been delivered to Patuxent River and have flown 60.5 hours. SDTA-3 is due to deliver in November 2019 and SDTA-4 in May 2020.
- NAVAIR at St. Inigoes, Maryland, is continuing development of the MCS software. Systems integration laboratories,

which replicate the MCS for development, test, and training, are operational and MCS software development is on schedule.
- On September 22, 2018, aircrew from the HMX-1 VH-92A Operational Test Team conducted 14 landings on the White House South Lawn. HMX-1 used observations from these landings to inform the OA in March 2019.
- The Navy completed the first phase of integrated developmental/operational testing for 150 flight hours at Patuxent River.
- During integrated testing, HMX-1 maintainers participated in an air transportability assessment. This assessment used draft procedures and the proposed set of ground support equipment to disassemble, reassemble, and load VH-92A aircraft on a C-17. The transportability assessment involved loading the VH-92A ground support equipment on C-130 and MV-22 aircraft that enable the VH-92A to self-deploy.
- DOT&E participated in an Independent Technical Risk Assessment (ITRA) on February 26 – 28, 2019. The USD(R&E) conducted the ITRA in accordance with statute and policy to support the Milestone C decision. The ITRA team conducted site visits at the Program Office in Patuxent River on February 26, 2019, and the Lockheed Martin Facility in Owego, New York, on February 28, 2019.
- The Commander, Operational Test and Evaluation Force conducted the OT-B1 OA with HMX-1 personnel at NAS Patuxent River from March 1 through April 9, 2019. Testing was conducted in accordance with DOT&E-approved test plans. DOT&E published an OA report in May 2019.
  - HMX-1 pilots, crew chiefs, and communications system operators flew 43.1 flight hours over the course of 16 missions. Each mission conducted an operationally representative Administrative Lift or Contingency Operations mission to landing zones used within the National Capital Region, including the White House South Lawn, Camp David, the Naval Observatory, Marine Corps Air Facility Quantico, Joint Base Anacostia-Bolling, Joint Base Andrews, and Naval Air Station Norfolk.
  - Representatives from the following White House support agencies participated in flight and ground events during the OA:
    - United States Secret Service
    - White House Military Office
    - White House Communications Agency
    - White House Medical Unit
- Cybersecurity testing consisted of the following events:

VH-92A aircraft
  - A Cooperative Vulnerability and Penetration Assessment and Adversarial Assessment of the VH-92A aircraft conducted by the Commander, Operational Test and Evaluation Force Cyber Test Team
  - A Cyber Risk Assessment conducted by NAVAIR

Mission Communications System (MCS)
  - Version 3.0 scans conducted by a U.S. Government Agency in a Systems Integration Laboratory
  - Version 2.0 testing done by a U.S. Government Agency
  - Cyber Risk Assessment conducted by Johns Hopkins University Applied Physics Laboratory
- HMX-1 has taken delivery of all training devices and courseware. HMX-1 expects that courseware and trainer refinements implemented over the next year will provide for a mature system to support IOT&E.
- DOT&E completed a preliminary evaluation of the VH-92A live fire test data.

Assessment
- The program is on track to meet program milestones. Maintenance of FAA airworthiness certification is a key emphasis area.
- The VH-92A provides increased speed, range, and number of passengers compared to in-service aircraft (VH-3D and VH-60N). This increased performance provides greater mission flexibility. Pilots stated that VH-92A autopilot features are a significant improvement over those in the in-service aircraft.
- During the OA, the VH-92A experienced a high number of nuisance faults during the start sequence that delayed its launch. The program is working to resolve these faults.
- The VH-92A meets maintainability metrics for maintenance-hours per flight hour and mean corrective maintenance time. While the aircraft meets threshold values for operational availability, this metric does not capture observed shortcomings associated with MCS inflight availability.
- Reliable communications are needed for Administrative Lift and Contingency Operations missions to support the Office of the President. MCS version 3.1 is currently in development, and will be installed prior to FY20 IOT&E to address these requirements.
- The transportability assessment demonstrated that VH-92A aircraft, support equipment, and personnel fit on C-17, C-130, and MV-22 aircraft as required. While the transportability assessment did not include a formal timed event, HMX-1 marines identified several areas that could improve the loading and unloading process.
- The program is working to meet the Net Ready Key Performance Parameter for the MCS to connect to the Crisis Management System. Security protocol changes enacted after MCS design finalization required development of a near-term solution to support the OA in parallel with a permanent solution to support the IOT&E.
- DOT&E reported on the preliminary VH-92A survivability evaluation in an operationally representative environment in the classified section of the OA report. Final survivability assessment of the VH-92A will include an assessment of available developmental and operational data, as well as modeling and simulation outputs. DOT&E will deliver the final survivability assessment in FY20 to support Initial Operational Capability.

Recommendations

The Navy should address the following recommendations from the May 2019 DOT&E OA report:

1. Perform MCS Version 3.0 integrated testing using the OA communications scripts to aid in early identification of deficiencies.
2. Develop MCS connectivity metrics and rationale to allow for determining the operational effects of system shortcomings that might arise during IOT&E.
3. Collect in-service aircraft Administrative Lift and Contingency Operations mission data to allow for a comparative assessment between VH-92A and in-service aircraft during IOT&E.
4. Review the definition and threshold value for the Mean Time Between Operational Mission Failures to account for differences in Administrative Lift and Contingency Operations missions.