

MQ-4C Triton Unmanned Aircraft System

Executive Summary

- In 1QFY14, USD(AT&L) approved a revised Triton program plan, which projects an operational assessment (OA) occurring in 3QFY15 and a Milestone C in 1QFY15. An updated Acquisition Program Baseline was subsequently approved on July 7, 2014. The revised program schedule has allowed the program to execute additional risk reduction testing prior to conducting the OA.
- The Navy continued several development efforts in FY14, including ground and lab testing of system communications and datalink architectures, and the Multi-Function Active Sensor (MFAS) radar risk reduction flight testing on a Northrop Grumman surrogate test bed aircraft.
- On September 18, 2014, Triton aircraft B-1 was ferried from Edwards AFB, California, to Patuxent River Naval Air Station (NAS), Maryland. Basing of Triton at Patuxent River NAS is a prerequisite for integration of mission systems on the air vehicle, development of the Integrated Functional Capability 2.2 system software, and operational test flights. The movement of the Triton Aircraft from Edwards AFB to Patuxent River NAS was an important milestone for the program.

System

- The MQ-4C Triton Unmanned Aircraft System (UAS) is an Intelligence, Surveillance, and Reconnaissance system-of-systems consisting of the high-altitude, long-endurance MQ-4C air vehicle, sensor payloads, and supporting ground control stations. The MQ-4C system is a part of the Navy Maritime Patrol and Reconnaissance family-of-systems, with capabilities designed to complement the P-8A Poseidon Multi-mission Maritime aircraft.
- The MQ-4C air vehicle design is based on the Air Force RQ-4B Global Hawk air vehicle with significant modifications that include strengthened wing structures and an anti-ice and de-icing system. An air traffic de-confliction and collision avoidance radar system is also planned, but the Navy is no longer pursuing the Air-to-Air Radar Subsystem (AARSS).
- The MQ-4C is equipped with the MFAS maritime surveillance radar to detect, identify, and track surface targets and produce high-resolution imagery. The MQ-4C electro optical/infrared



- sensor provides full motion video and still imagery of surface targets. An Electronic Support Measures system detects, identifies, and geolocates radar threat signals. An Automatic Identification System receiver permits the detection, identification, geolocation, and tracking of cooperative vessels equipped with Automatic Identification System transponders.
- Onboard line-of-sight and beyond line-of-sight datalink systems transmit sensor data from the air vehicle to ground control stations for dissemination to fleet tactical operation centers and intelligence exploitation sites.

Mission

- Commanders use units equipped with MQ-4C to conduct maritime surveillance operations and provide high- and medium-altitude, long-endurance intelligence collection.
- MQ-4C operators detect, identify, track, and assess maritime and littoral targets of interest and collect imagery and signals intelligence information. Operators disseminate sensor data to fleet units to support a wide range of maritime missions to include surface warfare, intelligence operations, strike warfare, maritime interdiction, amphibious warfare, homeland defense, and search and rescue.

Major Contractor

Northrop Grumman Aerospace Systems, Battle Management and Engagement Systems Division – Rancho Bernardo, California

Activity

- Technical problems and budget impacts caused delays in the flight test schedule throughout FY12 and FY13. In 1QFY14, the USD(AT&L) approved the Triton program to re-baseline

the schedule and budget. The current schedule reflects a goal to conduct an OA in 3QFY15 and to reach Milestone C in 1QFY16.

FY14 NAVY PROGRAMS

- Since May 2013, the Navy has completed a total of 16 flights, including the ferry flights from Edwards AFB, with 9 of those flights completed in FY14.
- During the developmental testing and envelope expansion of the Air Vehicle, the Navy continued several development efforts including:
 - Ground and lab testing of system communications and datalink architectures, which are intended to provide risk reduction for mission systems and end-to-end mission flight testing.
 - MFAS radar risk reduction flight testing on a Northrop Grumman surrogate test bed aircraft to identify and resolve potential radar performance problems prior to integration on the MQ-4C air vehicle. The contractor has completed a total of 39 total flights (8 in CY14) and implemented radar software changes to improve sensor stability, maritime target surveillance, tracking performance, and synthetic aperture radar image quality.
- Due to technical difficulties with the AARSS, the Navy is no longer pursuing AARSS as a technical solution to the due regard or “sense and avoid” capability for Triton. The Navy continues to pursue procedural and/or technical solutions to compensate for the loss of the AARSS.
- The Navy has developed a network environment that can be used for operational training and employment. In addition, the Navy has completed construction of the hangar and training spaces required to execute the Triton test program.
- On September 18, 2014, Triton B-1 aircraft was ferried from Edwards AFB, California, to Patuxent River NAS, Maryland.
- The Northrop Grumman MFAS risk reduction flight test program identified several system performance problems for resolution prior to MFAS integration on to the MQ-4C platform. The program has implemented radar software changes to improve sensor stability, maritime target surveillance and tracking performance, and synthetic aperture radar image quality. Other UAS platforms have experienced degradation in performance when sensors move from surrogate platforms to the developmental aircraft. It is likely that some degradation is possible with Triton as well, but the continuing MFAS test flights on the surrogate have reduced the risk of initial integration.
- Traffic de-confliction and collision avoidance provide critical mission capability for operation of the MQ-4C in civil and international airspace in support of global naval operations
- Prior to beginning developmental testing of mission systems, the Navy must also integrate sensors onto the air vehicle at Patuxent River NAS, complete development of the Integrated Functional Capability 2.2 system software, and load it on the Triton system.
- The movement of the Triton air vehicle from Edwards AFB to Patuxent River NAS was an important milestone for the program.

Assessment

- The re-baseline of the program has provided stability to the Triton program and enabled the Navy to execute acquisition and evaluation strategies in FY14, and to execute additional risk reduction testing prior to conducting the OA.
- Developmental testing of the Air Vehicle revealed the following:
 - Ground and lab testing of system communications and datalink architectures are producing early deficiency reports in support of efforts to improve system maturity before mission system flight testing begins.

Recommendations

- Status of Previous Recommendations. The program was re-baselined in December 2013, which affected program scheduling and delayed Milestone C and completion of the Test and Evaluation Master Plan (TEMP) update, as recommended in FY13. The Navy still needs to develop a revised test schedule and TEMP that reflect test delays.
- FY14 Recommendations. The Navy should:
 1. Prepare and submit a TEMP update to DOT&E by the Milestone C decision.
 2. The Navy should complete the planned OA in FY15 in preparation for Milestone C.
 3. During the planned FY15 OA, the Navy should demonstrate tactics and procedures that will enable Triton to descend and operate in medium- and low-altitude environments, in accordance with the MQ-4C Triton Warfighting Concept of Operations.