RQ-4B Global Hawk High-Altitude Long-Endurance Unmanned Aerial System (UAS)

Executive Summary

- The RQ-4B Block 40/Multi-Platform Radar Technology Insertion Program (MP-RTIP) IOT&E began in September 2015 and completed in January 2016. DOT&E assessed that the system demonstrated the capability to provide exploitable synthetic aperture radar (SAR) and Ground Moving Target Indicator (GMTI) data. The system met joint interoperability requirements. A cybersecurity Adversarial Assessment conducted in conjunction with the IOT&E identified vulnerabilities that are documented in the classified DOT&E IOT&E report. The RQ-4B Global Hawk Block 40 is operationally suitable and can generate and sustain the long-endurance missions necessary to support non-continuous operations representative of the current combat tempo. The RQ-4B Global Hawk Block 40 suitability has significantly improved over both the 2013 RQ-4B Block 40 Operational Utility Evaluation (OUE) and 2010 RQ-4B Block 30 IOT&E results. MP-RTIP sensor stability has also significantly improved since the RQ-4B Block 40 OUE.
- DOT&E approved the Air Force Capstone Test and Evaluation Master Plan (TEMP) in June 2016, which provides an overarching test approach for the system architecture and capability upgrades included in the new program baseline and future modernization programs. DOT&E anticipates the program will develop TEMP annexes according to the requirements and schedule documented in the approved Capstone TEMP.
- The Air Force is currently planning to conduct RQ-4B Block 30/Airborne Signals Intelligence Payload (ASIP) FOT&E in conjunction with the initial phases of the RQ-4B modernization program in FY18. This test will include a re-evaluation of the RQ-4B Block 30 Signals Intelligence (SIGINT) mission capabilities with the ASIP sensor as well as an assessment of previously identified ground station, air vehicle, communication system, interoperability, and cybersecurity shortfalls.

System

- The RQ-4B Global Hawk is a remotely-piloted, high-altitude, long-endurance airborne intelligence, surveillance, and reconnaissance (ISR) system that includes the Global Hawk unmanned air vehicle, various intelligence and communications relay mission payloads, and supporting command and control ground stations.
- The RQ-4B Global Hawk Block 30 system is equipped with a multi-intelligence payload that includes both the Enhanced Integrated Sensor Suite imagery intelligence payload and ASIP SIGINT sensor.
- The RQ-4B Block 40 system is equipped with the MP-RTIP synthetic aperture radar payload designed to simultaneously

collect imagery intelligence on stationary ground targets and track ground-moving targets.
- All RQ-4B systems use line-of-sight and beyond line-of-sight communication systems to provide air vehicle command and control and transfer collected intelligence data to grounds stations for exploitation and dissemination.
- The Air Force Distributed Common Ground System (AF DCGS) supports ISR collection, processing, exploitation, analysis, and dissemination for both Block 30 and 40 RQ-4B Global Hawk systems. The AF DCGS employs global communications architecture to connect multiple intelligence platforms and sensors to numerous Distributed Ground Stations where intelligence analysts produce and disseminate intelligence products.

Mission

- Commanders use RQ-4 Global Hawk reconnaissance units to provide high-altitude, long-endurance intelligence collection capabilities to support theater operations. Units equipped with RQ-4B Global Hawk use line-of-sight and beyond line-of-sight satellite datalinks to control the Global Hawk system and transmit collected intelligence data.
- Operators collect imagery and SIGINT data to support ground units and to identify intelligence-essential elements of information for theater commanders.
- Ground-based intelligence analysts exploit collected imagery, ground-moving target, and SIGINT to provide intelligence products that support theater operations.
- Forward-based personnel can receive imagery intelligence directly from Global Hawk.

Major Contractor
Northrop Grumman Aerospace Systems, Strike and Surveillance Systems Division – San Diego, California

Activity
- As of September 2016, the Air Force has taken delivery of 18 of 21 RQ-4B Block 30 air vehicles and all 11 RQ-4B Block 40 air vehicles, along with 9 Mission Control and 10 Launch and Recovery ground stations.
- The Air Force is currently planning to conduct FOT&E in conjunction with the initial phases of the RQ-4B modernization program in FY18. This test will include a complete re-evaluation of the RQ-4B Block 30 SIGINT mission capabilities with the ASIP sensor as well as an assessment of previously identified ground station, air vehicle, communication system, interoperability, and cybersecurity shortfalls.
- DOT&E approved the Air Force Capstone TEMP in June 2016, which provides an overarching test approach for the system architecture and capability upgrades included in the new program baseline and future modernization programs. DOT&E anticipates the program will develop TEMP annexes according to the requirements and schedule documented in the approved Capstone TEMP.
- The Air Force did not conduct any RQ-4B Block 30 operational testing in FY15. The Air Force continued to sustain operations for 18 Block 30 aircraft at Beale AFB, California, and at forward operating bases in U.S. Pacific Command, U.S. Central Command, and U.S. European Command operating areas.
- The Air Force is currently developing a comprehensive program test strategy and TEMP to correct previously identified RQ-4B Block 30 capability shortfalls and test a series of modernization upgrades. This strategy will identify the next collection of significant RQ-4B Block 30 FOT&E events planned for FY18. Events include re-evaluation of previously identified ASIP/SIGINT mission capability shortfalls, interoperability deficiencies, MS-177 sensor integration, weather radar integration, mission planning upgrades, and other system modernization changes.
- The RQ-4B Block 40/MP-RTIP IOT&E began in September 2015 and completed in December 2015. The Air Force conducted testing in accordance with the DOT&E-approved test plan. DOT&E approved the Block 40 IOT&E test plan in May 2015.

Assessment
- In July 2016, DOT&E published the classified RQ-4B Global Hawk Block 40 IOT&E report based on test results from the RQ-4B Block 40/MP-RTIP IOT&E conducted from September 2015 through January 2016.
  - The system demonstrated the capability to provide exploitable SAR and GMTI data. Both SAR and GMTI data met most operational requirements and provided actionable intelligence products to operational users. However, inadequate training, procedures, tools, communication, and management hindered the ability of the AF DCGS to exploit GMTI data in near real-time.
  - The system met joint interoperability requirements.
  - A cybersecurity Adversarial Assessment conducted in conjunction with the IOT&E identified vulnerabilities that are documented in the classified IOT&E report.
  - The RQ-4B Global Hawk Block 40 is operationally suitable and can generate and sustain the long-endurance missions necessary to support non-continuous operations representative of the current combat tempo. The RQ-4B Global Hawk Block 40 suitability has significantly improved over both the 2013 RQ-4B Block 40 OUE and 2010 RQ-4B Block 30 IOT&E results. However, the Air Force continues to operate the RQ-4B Global Hawk Block 40 at a rate of three missions per week based on the suitability results from the 2010 RQ-4B Block 30 IOT&E. Despite initial expectations (requirements) that called for a single Global Hawk orbit to provide near-continuous on-station coverage for 30 days, the Air Force has since adopted a combat tempo of 3 long duration (approximately 28 hours) sorties a week over 30 days or more.
  - MP-RTIP sensor stability has also significantly improved since the RQ-4B Block 40 OUE.

Recommendations
- Status of Previous Recommendations. The Air Force made progress toward addressing FY15 recommendations. The Air Force completed an RQ-4B Capstone TEMP to guide developmental and operational testing of these systems. The Air Force has not completed a plan to complete the FOT&E for the RQ-4B Block 30 SIGINT mission using the ASIP sensor.
- FY16 Recommendations. The Air Force should:
  1. Develop RQ-4B program Capstone TEMP annexes to guide execution of the RQ-4B Global Hawk Block 30 FOT&E and to define operational test requirements for future Block 30 and Block 40 system upgrades.
  2. Develop a plan to complete the FOT&E for the RQ-4B Block 30 SIGINT mission using the ASIP sensor.
  3. Develop a comprehensive plan to address cybersecurity deficiencies observed during RQ-4B Global Hawk Block 40/MP-RTIP IOT&E.
  4. Develop AF DCGS training, procedures, tools, communication, and management enhancements to allow exploitation of RQ-4B Global Hawk Block 40 GMTI data in near real-time.