

Global Hawk High Altitude Endurance Unmanned Aerial Vehicle, RQ-4

Executive Summary

- Global Hawk Block 10 performance, as observed through developmental test and deployed operations, indicated fixes are needed to improve imagery processing and communications.
- Development of a new Global Hawk air vehicle continues to progress towards a first flight of the larger, heavier aircraft that is intended to support greater payloads for the Block 20, 30, and 40 systems.
- The Air Force is developing a new program baseline following the June 2006 Nunn-McCurdy Certification. Documentation should include a Test and Evaluation Master Plan (TEMP) that complies with the test strategy worked out with DOT&E in the certification process.

System

- Global Hawk is a long-range surveillance and reconnaissance system.
- The Global Hawk system includes:
 - An Unmanned Aerial Vehicle (UAV) capable of high-altitude (above 60,000 feet) and long endurance (greater than 24 hours) operations
 - Launch/recovery ground station and mission control ground station
- The current Block 10 payload includes infrared, optical sensors, and synthetic aperture radar, all of which image ground targets and areas of interest.
- Ground crews use satellite and radio communications to control the air vehicle and transmit collected data.
- The Global Hawk mission control ground station receives, processes, and transmits imagery to distributed ground stations for exploitation to meet the theater commander's intelligence needs. Signals intelligence will be processed in a similar manner.
- The program plans to produce improved air vehicles (Blocks 20, 30, and 40) capable of greater payloads that add:
 - Improved imagery intelligence (Block 20)



- Multi-Intelligence: Imagery and Signals intelligence (Block 30)
- Radar surveillance (Block 40)

Mission

- A unit equipped with this system would provide surveillance and reconnaissance imagery to the theater commander's exploitation assets, such as the Distributed Common Ground Station. Ground personnel assigned to exploit the collected material then develop the intelligence products to support theater operations.
- It enables persistent intelligence gathering when other assets are not available through long-range and long-loiter capability.
- The theater intelligence network tasks Air Force Global Hawk reconnaissance squadron detachments to collect imagery in order to answer essential elements of information identified by the theater commander.

Activity

- The Air Force Operational Test and Evaluation Center continued the operational assessment of the Block 10 system (imagery intelligence), which began in FY05. The following events were completed:
 - Observation of deployed operations
 - A maintenance demonstration
 - An information assurance assessment

- The Air Force plans to complete the Block 10 assessment in November 2006, after conducting missions to ranges in Alaska and Florida. These missions, which will image targets in various environments, will use new production ground segment software.
- The program office continued Block 10 developmental testing in parallel with the operational assessment. Major efforts

included communications, navigation, and crosswind landing testing.

- Block 20 developmental testing is building to a first flight of the new air vehicle, which has been slipped from November 2006 to January 2007. Ground testing included power-on functionality checks by the contractor, taxi tests, wind tunnel tests, and ultimate load testing on major components of the aircraft structure.
- The Air Force proposed a TEMP revision in September 2006. A revised TEMP is needed for the new program baseline, following the June 2006 Nunn-McCurdy certification.

Assessment

- Though fielded, the performance of the Block 10 system indicated the system lacked maturity in several areas:
 - Communications problems delayed the initial deployment (as reported in the FY05 annual report) requiring continued trouble shooting and test.
 - Deployed operations were temporarily halted after the discovery of a disbonded fuel bracket in one of the deployed aircraft's wings; this reduced availability of the system until all aircraft were inspected and fixed.
- Image processing problems affecting image quality, which were seen during the pre-deployment assessment flights in August 2005, were again observed. Time delays in ground station to exploitation station dissemination appear to have been corrected, however.
- The maintenance demonstration highlighted the dependency on contractor maintenance. Only a relatively small number of tasks could be demonstrated. The lack of spares, support equipment, and technical order data used to conduct military unit level maintenance at Beale AFB, California, has impaired the development of an organic maintenance capability.
- Testing and analysis leading to first flight of the Block 20 air vehicle uncovered a failure condition that could result in lateral instability of the aircraft. To correct the lateral instability problem, the contractor is modifying the new air vehicle design to add ventral fins as well as changing the flight control software.
- As part of the Nunn-McCurdy certification process, DOT&E identified to the Defense Acquisition Executive several necessary improvements to the operational test and evaluation strategy and the need to control the expansion of low-rate initial production quantities.

Recommendations

- Status of Previous Recommendations. The Air Force has made progress in Block 10 operational assessment events in accordance with one of the DOT&E recommendations, but the following recommendations remain valid.
 - FY05 #2: Contrary to DOT&E's recommendation to conduct a review and correct deficiencies in the intelligence, surveillance, and reconnaissance network in which Global Hawk operates, no comprehensive review has taken place, nor is one known to be planned by the Air Force. The Air Force's final assessment of Block 10, expected to be complete early in 2007, may provide more insight into deficiencies in the network.
 - FY05 #3: In response to DOT&E's recommendation that low-rate initial production quantities should not be increased until after an adequate IOT&E of the Block 20 and Block 30 systems, the proposed acquisition strategy authorizes three additional lots of systems but reduces annual quantities of air vehicles to five per year until FY09.
- FY06 Recommendations. The Air Force should:
 1. Establish mission and levels of performance for Block 20, 30, and 40 systems when first acquired and fielded; and, ensure the evaluation framework for each Block uses these thresholds.
 2. Conduct Block 20/30 IOT&E (including a multi-intelligence Block 30 system) for the purpose of receiving a Beyond Low-Rate Initial Production report from DOT&E before a full-rate production of the Block 30 system and fielding of the Block 20 system. Conduct a Block 40 IOT&E for the same purpose.
 3. Establish a central government-managed archive of Global Hawk test and operational performance data and reports.
 4. Revise the TEMP so that it provides a detailed, resourced, and integrated test plan that incorporates all Global Hawk test and evaluation activities, and complies with the test strategy agreed to in the Nunn-McCurdy certification process.