

AIR FORCE PROGRAMS

RQ-4A Global Hawk Unmanned Aerial Vehicle (UAV)

The Global Hawk Unmanned Aerial Vehicle (UAV) system is a theater commander's asset designed to satisfy surveillance and reconnaissance shortfalls. The Global Hawk UAV is to provide high-resolution synthetic aperture radar (SAR) and electro-optical/infrared (EO/IR) imagery at long-range with long loiter times over target areas. Signals intelligence (SIGINT) capability is also being developed. Potential Global Hawk UAV missions cover the spectrum of intelligence collection capabilities to support joint combatant forces in worldwide peace, crisis, and wartime operations.

The Global Hawk UAV program began as an advanced concept technology demonstration in 1995 under the Defense Advanced Research Projects Agency management and, in October 1998, transitioned to the Air Force systems program office at Wright-Patterson Air Force Base, Ohio. The program Milestone II decision in March 2001 approved entry into engineering and manufacturing development as well as low-rate initial production. Subsequent acquisition decisions in March 2002 and December 2002 have re-baselined the program, adopting a spiral acquisition approach and increasing the number of low-rate initial production air vehicles from six to nineteen. The September 2000 Operational Requirements Document was updated to reflect the new program, and it was approved in October 2002 by the Joint Requirements Oversight Council.

The Global Hawk UAV system comprises an air vehicle component with air vehicles, sensor payloads, avionics, and data links; a ground segment with a launch and recovery element (LRE); a mission control element (MCE) with embedded ground communications equipment; a support element; and trained personnel.

The Global Hawk UAV is optimized for high altitude, long range and endurance; it is to be capable of providing 28 hours of endurance while carrying 3,000 pounds of payload and operating at 65,000 feet mean sea level. The integrated sensor suite consists of SAR, EO, and IR sensors. Each of the sensors provides wide area search imagery and a high-resolution spot mode. The radar also has a ground moving target indicator mode. A limited initial SIGINT capability will be incorporated prior to the IOT&E in FY06, while a more capable system in development will be integrated in production aircraft in the years that follow. The Global Hawk UAV is intended to operate autonomously using a satellite data link (either Ku or UHF) to send sensor data from the aircraft to the MCE. The common data link can also be used for direct down-link of imagery when the UAV is operating within line-of-sight of users with compatible ground stations.

The ground segment consists of the MCE for mission planning, command and control, and image processing and dissemination; the LRE for controlling launch and recovery; and associated ground support equipment. By having separable elements in the ground segment, the MCE and the LRE can operate in geographically separate locations, and the MCE can be deployed with the supported command's primary exploitation site. Both ground segments are contained in military shelters with external antennas for line-of-sight and satellite communications with the air vehicles.

TEST & EVALUATION ACTIVITY

An updated Test and Evaluation Master Plan (TEMP) was approved by DOT&E in March 2003 to support the new spiral acquisition. The TEMP outlines a set of test phases with increasing scopes, tied to technology integration and a defined set of the



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Operational Requirements Documents. Two mission-level dedicated operational tests are scheduled to precede the Defense Acquisition Board-level review: an FY04 operational assessment (OA) prior to an in-process review, and an FY06 IOT&E prior to the full-rate production decision. An FOT&E and a second IOT&E follow for the full-SIGINT and Multi-platform – Radar Technology Insertion Program configurations, respectively. Phases of developmental test/operational test (DT/OT) are scheduled between dedicated OT&E phases. These DT/OT phases are systems-level evaluations that support yearly Configuration Control Board decisions on technology integration into production lots, as well as entry into OT&E.

During FY03, no operational testing was conducted. One Global Hawk was deployed to support Operation Iraqi Freedom, flying 16 combat missions March 8 - May 2, 2003. Combined Test Force activities at Edwards Air Force Base, California, consisted of developmental testing to support Operation Iraqi Freedom, pilot training support, technical order validation and verification, support for a U.S.-German demonstration of a European Aeronautic Defence and Space (EADS) Company SIGINT sensor, delivery and checkout flight of two new air vehicles, and initial Spiral 1 developmental testing.

Another ACTD air vehicle, AV-7, was delivered in February 2003. After a period of modifications and check flights, Global Hawk Advanced Synthetic Aperture Radar System Improvement Program (AIP) radar data was first collected in August 2003. Spiral 1 capabilities are to be incorporated and tested on AV-7 to support development, Configuration Control Board decisions, and entry into the FY04 OA. Spiral 1 capabilities include a new mission management computer and a sensor processing computer. The new systems are PowerPC-based to address diminishing manufacturing source issues with the current systems and provide greater computing power, and a more robust, open architecture. While the existing mission management software was ported, the decision was made to use the AIP software developed for the U-2, which runs on PowerPC. Spiral 1 also includes improved communications and equipment designed to meet the Global Air Traffic Management requirement and provide the ability to fly in all classes of airspace.

TEST & EVALUATION ASSESSMENT

This past year, flight testing continued to compete with operations for both test and development resources. Limited engineering and manufacturing development flight testing has occurred to date. The first sensor flight of AV-7, which was anticipated in January 2003, took place in August. Because of issues discovered with the AIP spot mode (image quality and target geo-accuracy), the program has decided to develop a hybrid version of the SAR processing software, porting the ACTD spot modes to the new hardware and combining them with the AIP wide-area modes.

EO/IR testing has lagged the radar because of a lack of availability of test items. Spiral 1 EO/IR units were accelerated and delivered in ACTD configuration to support Operation Enduring Freedom. The upgrade of these EO/IR units to Spiral 1 configuration was delayed because the units were dedicated to operations. As a result, delivery of the first Spiral 1 configuration EO/IR unit is not expected until the end of 2004, limiting test time prior to the OA.

The schedule to reach the OA in the late summer 2004 is challenging. Besides development testing, Global Hawk activities include several demonstrations prior to then, as well as the effort to stand up the squadron at Beale Air Force Base, California, and maintain operational readiness. The demonstrations include two overseas deployments: the German EADS SIGINT demonstration and a Pacific Command forward-operating location demonstration.