

Vertical Take-Off and Landing Unmanned Aerial Vehicle (VTUAV) (Fire Scout)

Executive Summary

- The program delayed the planned IOT&E from June 2009 to FY12.
- The program deployed two systems aboard Navy frigates USS *McInerney* in 2010 and USS *Halyburton* in 2011 to conduct Military Utility Assessments. The USS *Halyburton* deployment supported counter-piracy operations off the Horn of Africa and NATO operations in Libya. One MQ-8B was lost to enemy fire while operating over Libya.
- In May 2011, the Navy deployed a land-based Vertical Take-Off and Landing Unmanned Aerial Vehicle (VTUAV) system to Afghanistan in support of ongoing Army operations.
- The time spent training additional operators and maintainers, modifying air vehicles, integrating non-program of record payloads, and a requirement to provide spare parts to three operating locations, delayed the program's efforts to address those deficiencies most likely to threaten successful completion of IOT&E. The current plan is for IOT&E to begin in March 2012.
- Uncertainty between the future of the MQ-8B air vehicle and development of the MQ-8C air vehicle presents the program office with additional planning challenges. This uncertainty results in the lack of a coherent long-range schedule to be ready for IOT&E and field the system.
- The *McInerney* and *Halyburton* deployments identified system deficiencies that the program should correct before widely fielding the system. These deployments demonstrated that the system has potential to provide the commander with a valuable Information, Surveillance, and Reconnaissance (ISR) asset once the program addresses these shortcomings.
- DOT&E submitted an Early Fielding Report on the VTUAV program in June 2011.

System

- The VTUAV is a helicopter-based tactical Unmanned Aerial System comprised of up to three Fire Scout air vehicles with



payloads, a shipboard integrated Ground Control Station with associated tactical datalinks, and the Unmanned Aerial Vehicle Common Automatic Recovery System.

- The VTUAV is intended to have the following capabilities:
 - Combat radius – 110 nautical miles
 - Endurance at combat radius – 3 hours on station
 - Target Identification – Small fast attack boats at 6 km range
 - Initial payload consists of the AN/AAQ-22D Bright Star II electro-optical and infrared imaging system with laser designator

Mission

Aviation detachments equipped with VTUAVs perform reconnaissance, surveillance, target acquisition, and communications relay missions in support of littoral anti-submarine warfare, anti-surface warfare, and mine warfare operations. System deployments during 2011 provided reconnaissance and surveillance to units conducting combat operations ashore.

Major Contractor

Northrop Grumman-Ryan Aeronautical – San Diego, California

Activity

- DOT&E submitted an Early Fielding Report on the VTUAV program in June 2011.
- The program delayed the planned IOT&E from June 2009 to FY12. The program delayed IOT&E because of poor reliability, excessive cautions, warnings, and advisories, and lack of required functionality (dual air vehicle operations and communications relay). The program has corrected the excessive warnings, cautions, and advisories deficiency.
- In September 2011, the VTUAV demonstrated the capability to conduct dual air vehicle operations. Challenges with system reliability and the lack of a dependable communications relay capability continue to delay the IOT&E.
- The program deployed two systems aboard Navy frigates USS *McInerney* in 2010 and USS *Halyburton* in 2011 to conduct Military Utility Assessments. The USS *Halyburton* deployment supported counter-piracy operations off the Horn

of Africa and NATO operations in Libya. One MQ-8B was lost to enemy fire while operating over Libya.

- In May 2011, the Navy deployed a land-based VTUAV system to Afghanistan in support of ongoing Army operations. This land-based system has flown 1,200 hours supporting units within its assigned area of operations.
- Developmental testing during 2011 assessed dual air vehicle operations, communications relay, and correction of the large target location errors that prevent the system from supporting precision targeting.

Assessment

- The *McInerney* and *Halyburton* deployments identified system deficiencies that the program should correct before widely fielding the system. These deficiencies include air vehicle and datalink reliability, incomplete technical publications, spare parts support, pre-deployment training, and the lack of spatial orientation data on payload imagery. These deployments demonstrated that the system has potential to provide the commander with a valuable ISR asset once the program addresses these shortcomings.
- Because of a lack of data, DOT&E cannot comment on the effectiveness or suitability of the VTUAV system in the performance of support operations in Afghanistan.
- Uncertainty between the future of the MQ-8B air vehicle and development of the MQ-8C air vehicle presents the program office with additional planning challenges. This uncertainty results in the lack of a coherent long-range schedule to be ready for IOT&E and field the system. The current plan is to proceed with the MQ-8B acquisition strategy. IOT&E is scheduled to begin March 2012.
- While the program office does not consider over-land operations to be a VTUAV mission, the two 2011 deployments focused on over-land operations. The lack of testing against a land-based target set and standardized tactics, techniques, and procedures within the training curriculum adversely affect system performance in the area of over-land operations in which it will be utilized in the foreseeable future.
- The Test and Evaluation Master Plan (TEMP) approved in 2007 is outdated and does not contain a clear path to successful completion of IOT&E. The TEMP does not clearly define the objectives of near-term testing nor prioritize future upgrades such as search radar and weapons integration.
- The lack of ability to disseminate VTUAV near-real-time imagery off the host frigate limits VTUAV effectiveness. In the foreseeable future, this problem is a function of the

shipboard infrastructure and the Navy's overall command and control system. While not required as part of the program of record, it is an area that the Navy should address to maximize the utility of the VTUAV and other Unmanned Aerial Systems.

- The 2011 USS *Halyburton* military utility assessment and ongoing developmental testing identified the following areas of risk entering the March 2012 IOT&E:
 - The magnitude of the Target Location Error does not support precision attack missions.
 - The limited number of available frequencies and unreliable operation of the communications relay suite hinders conduct of communications relay missions.
 - The system failed to meet reliability and availability threshold values.
- Recent real-world operations demonstrate that VTUAV flight operations will be restricted when operating in other than a benign threat environment. Operations in such an environment require additional real-time intelligence support to increase air vehicle survivability.
- The focus on non-program of record activities between 2010 and 2011, such as the military utility assessments and Afghanistan deployment, slowed developmental testing. The time spent training additional operators and maintainers, modifying air vehicles, integrating non-program of record payloads, and a requirement to provide spare parts to three operating locations, delayed the program's efforts to address deficiencies.

Recommendations

- Status of Previous Recommendations. The program has successfully addressed, or begun to resolve, the previous recommendations.
- FY11 Recommendations. The Navy should:
 1. Develop and validate standard operating procedures and mission requirements for over-land ISR.
 2. Expand the scope of IOT&E significantly to include extensive over-land operations.
 3. Update the TEMP to re-baseline system development.
 4. Conduct an end-to-end review of its command and control network to facilitate the dissemination of near-real-time video.