

Extended Range Multi-Purpose (ERMP) Unmanned Aircraft System (UAS) Quick Reaction Capability

Executive Summary

- In response to the Secretary of Defense's directive to increase intelligence, surveillance, and reconnaissance support in Iraq and Afghanistan, the Army is deploying two early versions of the Extended Range Multi-Purpose (ERMP) Unmanned Aircraft System (UAS) for operational use.
- Deployment of the ERMP Quick Reaction Capability 1 and 2 (QRC 1 and 2) is taking place prior to completion of IOT&E and the full-rate production decision. The QRC 1 unit completed deployment in August 2009. The Army plans to test the QRC 2 capability in May and June of 2010 and deploy the QRC 2 unit in August 2010.
- The Army conducted testing of QRC 1 capability in conjunction with training for unit deployment to Iraq.
- DOT&E completed an Early Fielding Report in September 2009, assessing the QRC 1 unit's ability to accomplish its wartime mission and its performance demonstrated in testing.



System

- The QRC UAS is an early version of the ERMP UAS program of record system.
- The QRC unit has 17 military personnel and 24 Contractor Field Service Representatives.
- The ERMP QRC 1 system consists of the following major components:
 - Four unmanned aircraft each with an electro-optical/infrared, with a Laser Range Finder/Laser Designator, sensor payload
 - Two Ground Control Stations designated as the One System Ground Control Station
 - Two Tactical Common Data Links/Ground Data Terminals
 - One Satellite Communications Ground Data Terminal
 - One General Atomics "Legacy" Ground Control Station with two C-Band Ground Data Terminals
- The QRC 1 system uses the legacy MQ-1 Predator Ground Control Station for all ground and maintenance operations and

in case of emergency, loss of data link, or malfunction of the Automated Take-off and Landing System.

- The QRC 1 platoon did not deploy to Iraq with a Synthetic Aperture Radar/Ground Moving Target Indicator capability. The Army intends to add this capability as an in-theater upgrade.

Mission

- The QRC 1 unit is to provide reconnaissance, surveillance, target acquisition, and communications relay 22 hours per day to the supported Army Division, based on the Division commander's priorities and scheme of maneuver.
- The QRC 1 unit can participate in cooperative attack missions using the laser designator.

Prime Contractor

- General Atomics Aeronautical Systems, Inc., Aircraft Systems Group, Poway, California

Activity

- In response to the Secretary of Defense's directive to increase intelligence, surveillance, and reconnaissance support in Iraq and Afghanistan, the Army is deploying two early versions of the ERMP UAS for operational use.
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IOT&E and the full-rate production decision. The QRC 1 unit completed testing in FY09 and completed deployment in August 2009. The Army plans to test the QRC 2 capability in May and June of 2010 and deploy QRC 2 unit in August 2010.

ARMY PROGRAMS

- The Army conducted testing of QRC 1 in accordance with the DOT&E-approved Test and Evaluation Master Plan and test plan.
- The Army conducted a Product Manager for Medium Altitude Endurance UAS sponsored Customer Test, which included 106 flight hours and 30 missions. The Army Operational Test Command conducted the test at the contractor's facility in El Mirage, California, with reconnaissance, surveillance, and target acquisition missions flown over nearby Edwards AFB, California.
- The Army performed system-level Climatic and limited Air Vehicle Electromagnetic Environmental Effects testing on the QRC and the ERMP program of record system.
- Ongoing Engineering Development Testing of the program of record system includes contractor subsystem and system-level testing and interoperability testing.
- DOT&E completed an Early Fielding Report in September 2009 assessing the QRC 1 unit's ability to accomplish its war time mission and its performance as demonstrated in testing. The report was used as the basis for DOT&E input into the upcoming ERMP program of record Milestone C decision scheduled for February 2010.
- During testing, the unit conducted a total of 15 notional Hellfire or artillery engagements. The crews did not employ live ordnance during the Customer Test or in the training preceding the test. The QRC 1 unit conducted the notional cooperative engagements correctly, except for three occasions where procedural mistakes might have resulted in errant Hellfire or artillery fire.
- The design of the Ground Control Station shelter has a number of conditions that reduce operator efficiency and increases operator stress and fatigue.
 1. The payload video is presented to the payload operator on a small 6 x 7 inch window that cannot be adjusted/enlarged without removing all other data elements from the computer screen. This small field of view makes it difficult to conduct reconnaissance tasks and identify targets.
 2. The air conditioning vents located above and behind the operators blast cold air on the heads and necks of the operators. Because the air conditioner must be operated at all times to keep the avionics (which are in front of the operators) cool, the operators wear skull caps, gloves, and jackets to stay warm, even when the outside temperatures exceed 95 degrees Fahrenheit.
 3. The workspace allotted to each operator is limited. Operators reported inadequate space for manuals, checklists, mission orders, personal equipment, and legroom.
 4. All operators share the three headsets that come as subcomponents of the Ground Control Station. The headset microphone is directly in front of the operator's mouth collecting germs. Several of the operators got sick during the Customer Test, perhaps as a result of sharing these headsets and/or the blowing cold air described above.

Assessment

- The Customer Test was an excellent example of combining training and testing to support a rapid fielding initiative.
- The unit effectively employed the system during the Customer Test. Based on test results, the unit will provide an increased reconnaissance, surveillance, target acquisition capability.
- During the Customer Test, the aircraft and sensor payload met reliability requirements. Use of the redundant Legacy Ground Control Station offset poor Ground Control Station reliability. Overall QRC 1 system availability observed during testing met requirements.
- The QRC 1 unit was able to successfully complete missions using line-of-sight Tactical Common Data Links in spite of incomplete development and integration of the ERMP system. The ability to encrypt the Tactical Common Data Link to support secure communications is in development.
- Development of the Satellite Communications data link between the Ground Control Station and the aircraft is not complete. The unit was not able to demonstrate beyond line-of-sight connectivity during test.
- The Communications Relay Package was capable of providing non-secure and secure radio communications between two ground-based radio systems with limited range. The QRC unit was not able to use the Communications Relay Package to establish secure communications between the Ground Control Station and any other station.
- The QRC 1 unit demonstrated effective target detection and recognition capability using the electro-optical/infrared sensor with Laser Range Finder/Designator payload. The measured mean target location error of 31 meters (taken from 53 target reports) did not meet the 25 meter requirement. This could decrease the effectiveness of precision munitions engagements.

Recommendations

- Status of Previous Recommendations. This is the first annual report for this program.
- FY09 Recommendations. The Army should:
 1. Complete system qualification and QRC unit training for cooperative engagements with helicopters with Hellfire missiles, and artillery "call for fire" missions with an artillery unit with live rounds before use in combat.
 2. Complete development and integration of more reliable secure Tactical Common Data Links and Satellite Communications links for Ground Control Station operations.
 3. Improve the Ground Control Station reliability and implement the Ground Control Station reliability growth program. Improve the Ground Control Station shelter design.
 4. Fix the Communications Relay Package system so that it works in both secure and non-secure modes at the required operational ranges.