

MQ-9 Unmanned Aircraft System (UAS)

The MQ-9 Reaper is operationally effective in the killer roll and operationally suitable. The Initial Operational Test and Evaluation (IOT&E) was adequate and executed in accordance with the Director, Operational Test and Evaluation (DOT&E) approved test plan.

System Overview

The MQ-9 Reaper is a remotely-piloted unmanned aircraft system (UAS) using optical, infrared, and radar sensors to find, fix, track, target, engage, and assess critical time-sensitive targets (both stationary and moving). It is designed to autonomously provide persistent, all-weather, time-sensitive hunter and killer capabilities with the Hellfire missile and GBU-12 (500-pound laser-guided) bombs. The MQ-9 system includes ground control stations (GCS) used for launch, flight, and recovery as well as mission control of the sensors and weapons. The MQ-9's primary mission is armed reconnaissance with secondary missions of aerial intelligence gathering and combat search and rescue support.

The Air Force designated three Key Performance Parameters (KPPs) for the Increment I system. The Joint Requirements Oversight Council who validated these KPPs in 2005, and considers them essential to meet UAS capability requirements. The three KPPs are the following:

- Net Ready: The system satisfies protocols designated as critical in the joint integrated network architecture.
- Hunter: The system's capability must allow a targeting solution at the weapon's maximum range.
- Killer: The system must be capable of computing a weapon's release point, passing required information at the required accuracy to the weapon, and reliably releasing the weapon upon command.

Test Adequacy

The Air Force Operational Test and Evaluation Center (AFOTEC) conducted the IOT&E in accordance with the DOT&E-approved test plan. The test was adequate to assess the MQ-9 in the killer role, but the hunter role was not assessed due to immature synthetic aperture radar (SAR) integration. SAR integration and hunter capabilities will be assessed during follow-on testing after system upgrades.

The Air Force Program Executive Officer (PEO) for Aircraft informed the AFOTEC Commander of 14 Increment I CPD threshold requirements being deferred for Follow-On Test and Evaluation (FOT&E) due to system integration or technical maturity. DOT&E concurs with the PEO recommendation that AFOTEC conduct a formal FOT&E to address the 14 deferred items, system upgrades, and deficiencies noted in the IOT&E.

Operational Effectiveness

The MQ-9 system is operationally effective in the killer role. The hunter role performance remains not assessed due to the SAR limitations previously mentioned. Although the SAR was not integrated per the Increment I CPD, it did demonstrate the capability to provide imagery within the CPD threshold. The MQ-9 system is able to deliver weapons to their targets consistently, supporting the killer KPP. AFOTEC observed 35 releases of the GBU-12 (500-pound laser-guided bomb) at varying slant ranges and altitudes. In 29 cases, the GBU-12 impacted and destroyed the target. AFOTEC observed 27 releases of the Hellfire missile at varying slant ranges and altitudes. In 24 cases, the Hellfire impacted and destroyed the target with the aircrew or ground personnel confirming the target destruction.

AFOTEC documented discrepancy reports on specific subsystems of the MQ-9 system. The discrepancies varied in scope from human system interface in the GCS, pilot sensitivities in the landing environment, and ARC-210 ultra-high frequency (UHF) radio performance. The Program Office is committing resources for the correction of these deficiencies.

Operational Suitability

The MQ-9 as a system is operationally suitable. Of the 22 suitability metrics DOT&E and AFOTEC calculated, four of the metrics did not meet or exceed their derived or CPD established metrics. DOT&E considers three of the four metrics which were not met to be not operationally significant. The third metric not met, Mean Time Between Critical Failure (MTBCF), considerably deviated from the requirement of 500 hours, with 32.8 hours MTBCF demonstrated. DOT&E does not believe this to be an achievable metric and recommends that the Air Force consider a more realistic value commensurate with similar weapons systems. Of note, aircrew surveys indicate the MQ-9's inability to accomplish the MTBCF metric did not adversely affect their ability to accomplish their mission.

ANNEX - CONGRESSIONAL REPORTS

The Joint Interoperability Test Command (JITC) conducted the Joint Interoperability Assessment Report during the IOT&E. DOT&E concurs with JITC's assessment that the MQ-9 system complied with the majority of the system requirements, but did not fully meet its Net-Ready KPP. JITC predicts the system will satisfy the Net-Ready KPP in a subsequent evaluation in 2009. DOT&E will monitor and report the results.

Recommendations

In order to fully assess the effectiveness and suitability of the MQ-9 system, the Air Force should complete the following:

- Conduct a formal FOT&E on the 14 deferred Increment 1 capabilities, SAR radar integration, and weapon's upgrades.
- Ensure the integration of the SAR into the GCS allowing effective aircrew use in its intended concept of operations.
- Implement pilot interfaces to minimize the risk of mishaps in the landing environment.
- Verify the correction of deficiencies identified as Category 1 discrepancy reports.
- Reevaluate and consider a more realistic MTBCF metric commensurate with similar weapons systems.
- Conduct operational testing in other than desert-like climates to include maritime, cold weather, and chemical/biological agent conditions.
- Complete successful JITC certification satisfying the Net Ready KPP.