

**OPERATIONAL TEST AND EVALUATION REPORT**  
**ON THE**  
**PREDATOR**  
**MEDIUM-ALTITUDE ENDURANCE**  
**UNMANNED AERIAL VEHICLE**

**I. EXECUTIVE SUMMARY**

I have completed my evaluation of the Predator Medium Altitude Endurance (MAE) Unmanned Aerial Vehicle (UAV) as required by Section 2399, Title 10, United States Code. This report assesses the adequacy of the operational testing and evaluates the overall operational effectiveness and suitability of the system. The Predator is not a covered program for live fire test and evaluation under Section 2366, Title 10, United States Code.

Operational testing of the Predator was adequate for the conclusions reached in this assessment.

As tested, the Predator UAV system is not operationally effective or suitable. This judgment rests primarily on an operational assessment against the user's standards for effectiveness and suitability as reflected in the requirements process. The disparity between the apparently successful fielded system and a system that did not perform well in the initial operational test and evaluation (IOT&E) is largely attributable to the fact that the fielded system is tasked and operated well within known limitations such as effective time-on-station (ETOS), weather restrictions, expected threats, and expected accuracy and dissemination abilities. Additionally, the operators in the field have developed workarounds, somewhat effective but often cumbersome, for many system deficiencies.

The Air Force Operational Test and Evaluation Center (AFOTEC) found the Predator "to be effective, but not without limitations and difficulties" and "suitable though reliability and maintainability problems persist." While both AFOTEC and DOT&E agree on the limitations and difficulties encountered by the Predator system, the

different conclusions about operational effectiveness are a result of DOT&E's perception that the system's limitations have a substantial negative impact on the Predator's ability to conduct its missions as described in the operational requirements document.

Although fielded operations prove that Predator has utility in certain mission environments, the IOT&E highlighted numerous shortcomings that limit its effectiveness. If uncontested by weather, threats, or other factors that introduce tactical uncertainty, a deployed Predator unit is capable of surveillance, reconnaissance, and battle damage assessment missions. However, poor target location accuracy, ineffective communications, and limits imposed by relatively benign weather, including rain, negatively impact missions such as strike support, combat search and rescue, area search, and continuous coverage. The cumulative effect of the system's limitations renders Predator not operationally effective in meeting the mission requirements delineated by the Key Performance Parameters (KPPs) and the Operational Requirements Document (ORD). The operational concept in the ORD is "to operate and sustain the system for 30 days," providing "around-the-clock (24-hour continuous) reconnaissance support to the commanders." The intent of continuous support is to include operations "under adverse weather conditions, in areas where enemy defenses have not been adequately suppressed, open ocean, and contaminated environments." Additionally, the intent is for the system to conduct missions in the area extending "from the forward line of own troops (FLOT) (normally located 100 to 150 NM from the Operating Base) to the rear of the second echelon (up to 400 NM from the Operating Base)."

The Predator sensor suite can only provide the desired performance during daylight or for slant ranges below the required 30,000 feet, and it cannot operate in less than ideal weather or sustain operations under conditions requiring chemical/biological protective posture. Furthermore, the system is unable to provide reliable, effective communications through the aircraft, as required, or meet the target location accuracy requirement under operational conditions (at slant ranges greater than 10,000 feet). The system demonstrated target location errors approximately twice what the accuracy requirement allows under operational conditions.

AFOTEC found that the system did not meet reliability or maintainability requirements and had a high preventative maintenance burden. AFOTEC also identified inadequate fault detection procedures, inadequate technical orders, cumbersome access to internal system components, particularly the engine, and inaccurate fuel quantity measurements. AFOTEC concluded, however, that the system is operationally suitable. They cited the ability to rapidly disassemble and reassemble the system (in less than 12

hours), adequate air and ground transportability, and the ability to maintain approximately 78 percent ETOS for the conditions of the IOT&E (i.e., ranges less than 200 nautical miles and sufficient downtime because of weather to complete required maintenance). AFOTEC also found Integrated Logistics Support and Human Systems Integration sufficient.

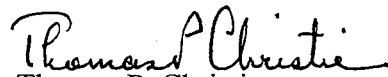
DOT&E, on the other hand, found that the system is currently unable to provide the required level of continuous coverage (75 percent ETOS) at the required operating range (up to 400 nautical miles); data extrapolated from the test suggest that 60 percent ETOS can be obtained at 400 nautical miles, if relief-on-station procedures are used. However, the procedures were exacting and confusing, immature, and developed solely for the IOT&E. The 57<sup>th</sup> Operations Group Commander restricted Predator from flying using relief-on-station shortly after the test concluded. The lack of relief-on-station procedures, combined with poor reliability, renders the system unable to meet the ETOS requirement of 75 percent (excluding weather downtime) at the ORD-required range of 400 nautical miles.

Furthermore, DOT&E found that the frequency of required preventative maintenance is incongruous with the aircraft's expected sortie length. Maintainability was affected by technical orders that were found inadequate by the maintainers. Additionally, a lack of in-depth system design makes the system not user friendly and difficult to learn, impacting training and mission effectiveness. Sixteen mission critical deficiency reports were cited at the end of IOT&E, many of which were related to human factors issues. DOT&E finds the system to be not operationally suitable when considered against the required 30-day continuous operations tempo because of the serious deficiencies in reliability, maintainability and human factors design.

The Joint Interoperability Test Command (JITC) has not yet certified the Predator system for interoperability in accordance with DoD Directive 4630.4 and DoD Instruction 4630.8 because of untested critical requirements. JITC certified only three of seven critical interfaces; the remaining interfaces have not been made available for JITC evaluation.

Originally developed as an Advanced Concept Technology Demonstration (ACTD) program (1994–1996), Predator transitioned to an Acquisition Category (ACAT) II program in August 1997. The United States Atlantic Command (USACOM) was the operational user representative for the Predator during the ACTD period and determined that the ACTD process had accomplished its task to put a militarily useful system into the

field quickly. However, the transition process did not take full advantage of operational assessments (1995–2000) that identified key system shortfalls, many of which were repeated in this IOT&E. Development efforts did not correct many previously identified deficiencies. If the Predator system is to be effective and suitable in accordance with the ORD-structured mission capability, the shortfalls identified in this IOT&E must be addressed.

  
Thomas P. Christie  
Director