

Common Infrared Countermeasures (CIRCM)

Executive Summary

- The Army accomplished laboratory tests, free flight live missile tests, and flight tests as part of an operational assessment that concluded in August 2018. DOT&E provided the Army a classified operational assessment of the Common Infrared Countermeasure (CIRCM) system to inform the Army September 2018 Milestone C decision.
- In general, the CIRCM system performed as intended. The pointer/trackers slewed to the missile locations designated by the missile warning system and the lasers provided effective jamming.
- Operational flight tests did not provide enough hours to assess the CIRCM system reliability requirement; however, system reliability to date indicates CIRCM is on track to meet the requirement at the conclusion of IOT&E.

System

- The CIRCM system is a defensive system for aircraft, which is designed to defend against surface-to-air infrared missile threats.
- The system combines the Army's legacy Common Missile Warning System (CMWS) consisting of ultraviolet missile warning sensors and electronics control unit (ECU) with the CIRCM system consisting of two lasers, two pointer/trackers, and a system processor unit. If CMWS detects a probable threat to the aircraft, it passes the tracking information for that possible threat to the CIRCM processor, which directs the pointer/trackers to slew to and jam the threat with laser energy. Simultaneously, the CMWS processor continues to evaluate the possible threat to determine if it is a real threat or a false alarm. If CMWS declares the detection to be an actual threat, it notifies the aircrew through audio alerts and a visual display on the aircraft Multi-function Display (MFD) in the cockpit, while also releasing flares as a secondary countermeasure.

Activity

- The Army accomplished the following testing to support an operational assessment of the CIRCM system:
 - Operational-mode testing of CMWS and CIRCM to determine system performance timelines at the Integrated Threat Warning Laboratory (ITWL), Wright Patterson AFB, Ohio, from October 18, 2017, through April 17, 2018.
 - Closed-loop hardware-in-the-loop (HWIL) simulations to show the effects of the CIRCM system on actual threat missile system hardware at the Guided Weapons Effects Facility (GWEF), Eglin AFB, Florida, from November 6, 2017, through August 13, 2018.

Electronics Control Unit



Electro-optical Sensors

System Processor Unit



Pointer/Trackers

Common Missile Warning System (CMWS)

Common Infrared Countermeasures (CIRCM)

Mission

- Commanders employ Army rotorcraft equipped with the CIRCM system to conduct medium and heavy lift logistical support, medical evacuation, search-and-rescue, armed escort, and attack operations. Commanders employ Army fixed-wing aircraft equipped with the CIRCM system to conduct personnel transport, electronic warfare, and logistic support.
- During Army missions, the CIRCM system is intended to provide automatic protection for fixed- and rotary-wing aircraft against shoulder-fired, vehicle-launched, and other infrared missiles.

Major Contractor

Northrop Grumman, Electronic Systems, Defensive Systems Division – Rolling Meadows, Illinois

- CIRCM laser and jam code performance evaluations at various missile engagements for selected missile threats with and without flare interaction at the Threat Signal Processor in the Loop (T-SPIL), Naval Air Station China Lake, California, from January 18, 2018, through May 13, 2018.
- Flight tests against missile simulators and in ultraviolet and infrared environmental clutter at Redstone Arsenal, Alabama; U.S. Army White Sands Missile Range, New Mexico; and Houston, Texas, from May 9 through July 31, 2018.

FY18 ARMY PROGRAMS

- Free flight missiles fired at CIRCM system hardware (not installed in aircraft) at U.S. Army Dugway Proving Ground, Utah, from June 22 through July 28, 2018.
- The Army conducted most testing in accordance with the DOT&E-approved test plan but requested deferring littoral and snow clutter environmental testing until IOT&E. DOT&E approved the request.
- DOT&E provided the Army a classified operational assessment of the CIRCM system testing to inform the Army September 2018 Milestone C decision.

Assessment

- In general, the CIRCM system performed as intended. The pointer/trackers slewed to the missile locations designated by the missile warning system and the lasers provided effective jamming.

- The CIRCM system reliability requirement is 214 hours mean time between operational failures, which allows for a 95 percent chance of completing a typical 11-hour mission. The operational flight tests did not include enough hours to assess the 214-hour requirement. However, flight test data to date indicates CIRCM is on track to meet the requirement at the conclusion of IOT&E with a current measured reliability of 115 hours.

Recommendation

1. The Army should continue to collect reliability flight hours and make system improvements as necessary to ensure the system meets its reliability requirement.