

Center for Countermeasures

The Center for Countermeasures (the Center) is a joint activity that directs, coordinates, supports, and conducts independent countermeasure/counter-countermeasure (CM/CCM) test and evaluation (T&E) activities of U.S. and foreign weapon systems, subsystems, sensors, and related components in support of DOT&E, weapon system developers, and the Services. The Center's testing and analysis directly supports evaluation of the operational effectiveness and suitability of CM/CCM systems.

Specifically, the Center:

- Performs early assessments of CM effectiveness against threat and DoD systems and subsystems.
- Determines performance and limitations of missile warning and survivability equipment used on rotary wing and fixed wing aircraft, as well as the effectiveness of precision-guided weapon systems and subsystems.
- Develops and evaluates CM/CCM techniques and devices.
- Tests and develops new CMs as they are discovered on the modern battlefield in an operationally realistic environment.
- Provides analysis and recommendations on CM/CCM effectiveness to Service Program Offices, DOT&E, and the Service member.

- Supports Service member experimentation, training, and pre-deployment activities

During FY10, 83 percent of the programs that received support were under DOT&E oversight, and 73 percent of the Center's effort was focused on overseas contingency operations (OCO) support. The majority of the OCO activities involved rotary wing survivability events.

The Center participated in operational/developmental tests for rotary and fixed wing aircraft survivability testing, precision-guided weapons, hostile fire indicator data collection, experimentation tests, and pre-deployment/exercise support related to the CM/CCM mission area.

The Center continued to develop test tools for evaluating Infrared Countermeasure (IRCM) systems. The Center tested, analyzed, and reported on more than 29 DoD systems or subsystems.

The following activities are representative of those conducted by the Center during the past year.

FIXED AND ROTARY WING AIRCRAFT SURVIVABILITY IMPROVEMENTS

Rotary Wing Test Events

Navy: Department of the Navy Large Aircraft Infrared Countermeasure (DoN LAIRCM)

- **Sponsor:** Navy Program Executive Officer, Advanced Tactical Aircraft Protection Systems Program Office (PMA-272)
- **Activity:** The Center provided test assets and crew to perform end-to-end testing of the system at several test locations throughout the year. Platforms participating included CH-53D/E and CH-46E.
- **Benefit:** The assessment of this threat detection and Directed Infrared Countermeasures (DIRCM) system on Navy platforms made use of experience gained testing the Air Force's previously developed DIRCM systems. The testing identified a problem with the system that has been fixed prior to LAIRCM's widespread use.

Army: Reduced Optical Signature Emissions Solution

- **Sponsor:** Department of the Army Technology Applications Program Office (TAPO), Systems Integration and Maintenance Office (SIMO) Aircraft Survivability Equipment Cell
- **Activity:** The Center provided test assets and crew to provide immediate feedback on the effectiveness of flares and flare sequences. This data was used to finalize flare sequences on 160th Special Operations Aviation Regiment rotary wing aircraft.

- **Benefit:** The results of this combined effort resulted in verification of the effectiveness of flare sequences both used on aircraft deployed in-theater and under development.

Marine Corps: Target Sight System (TSS)

- **Sponsor:** Air Test and Evaluation Squadron Nine (VX-9), China Lake, California
- **Activity:** The Center deployed a variety of passive and active CMs. This test provided the aircrew with the opportunity to perform detection, recognition, and identification of targets of interest under operationally realistic conditions.
- **Benefit:** This field test determined the strengths and weaknesses of the TSS to assist the Service member in developing training, tactics, and procedures (TTPs) before fielding the TSS on the AH-1Z platform.

Navy: Distributed Aperture Infrared Countermeasure (DAIRCM) Technology

- **Sponsor:** Naval Research Laboratory
- **Activity:** The Center provided test equipment and crews to support end-to-end open-air T&E of rotary wing aircraft equipped with DIRCM.
- **Benefit:** The DAIRCM prototype testing contributed to critical future Infrared Countermeasure (IRCM) protection of Navy rotary wing aircraft.

Army: Laser Afocal IRCM Scan Mirror (LAISM) Pointer-Tracker

- **Sponsor:** U.S. Army Research Development Engineering Command – Communications Electronics Research, Development, and Engineering Center (RDECOM-CERDEC), Fort Monmouth, New Jersey
- **Activity:** The Center provided test assets and crew to simulate missile signatures and collect jam beam radiation from the prototype laser pointer-tracker. This was the initial missile jamming open range test for LAISM.
- **Benefit:** Sponsors used test results to continue development of the LAISM system.

Joint (Navy lead): Joint and Allied Threat Awareness System (JATAS)

- **Sponsor:** Navy Program Executive Officer, Advanced Tactical Aircraft Protection Systems Program Office (PMA-272)
- **Activity:** The Center provided test assets and crew to perform testing of JATAS installed on the H-60 helicopter.
- **Benefit:** JATAS prototype testing will contribute to critical future IRCM and Hostile Fire Indicator (HFI) protection of Service rotary wing aircraft.

Fixed Wing Test Events

Joint (Army Lead): Joint Cargo Aircraft (JCA)

- **Sponsor:** Operational Test Command (OTC), Aviation Test Directorate
- **Activity:** The Center provided equipment and test crews to evaluate the installed missile warning system and flare effectiveness against simulated missile threats.

- **Benefit:** The results of this verified the effectiveness of the missile warning system and flare sequences.

Air Force: LAIRCM Next Generation Phase II C-17A

- **Sponsor:** 654th Aeronautical Systems Squadron, Wright Patterson AFB
- **Activity:** The Center provided test assets and crew to perform in an open-air environment for end-to-end testing of the LAIRCM Next Generation system installed on the C-17A.
- **Benefit:** This testing contributed to critical protection of Air Force heavy lift capability during OCO operations.

Rotary and Fixed Wing Test Events

Army, Air Force, and Navy: Advanced Strategic and Tactical Infrared Expendables

- **Sponsors:** Naval Surface Warfare Center – Crane Division, Department of the Army, Program Executive Office JCA, Air Force Special Operations Command, and Air Mobility Command
- **Activity:** The Center provided test assets and crew to collect test data on 12 different aircraft against reactive captive infrared (IR) missiles. These tests evaluated new CM sequences, variations of current CM sequences using improved flares, or different flares within the sequences.
- **Benefit:** Sponsors are using these test results on flare sequence effectiveness to enhance the protection of various aircraft against IR Man-Portable Air Defense Systems (MANPADS).

PRECISION-GUIDED WEAPONS CM TEST

Army: Joint Air-to-Ground Missile (JAGM) System

- **Sponsor:** U.S. Army Joint Attack Munition System, JAGM Program Office, Redstone Arsenal, Alabama
- **Activity:** The Center planned, coordinated, and executed a mission to provide a realistic CM environment for the JAGM system.
- **Benefit:** The testing supported the technology development phase of the JAGM System. The data collected by the

developer during the CM environment will be used to develop robust algorithms for the JAGM system to operate in realistic battlefield environments. JAGM will eventually replace the Hellfire, Tube-launched, Optically-tracked, Wire command data link-guided missile (TOW), and Maverick families of missiles.

PRE-DEPLOYMENT EXERCISE SUPPORT AND TTP DEVELOPMENT

- **Red Flag Nellis Exercise** – Nellis AFB, Nevada
- **Enhanced Mohave Viper** – 29 Palms, California
- **HH-60G Combined Search and Rescue Task Force Operational Test and TTP development** – Part 1 (Nellis AFB, Nevada), Part 2 (Oahu, Hawaii)
- **KC-135 Weapons Instructor Course** – Roswell, New Mexico

Sponsors: Various

Purpose: The Center provided equipment and subject matter expertise to observe aircraft sensor/ASE systems and crew reactions in a simulated threat/CM environment.

Benefit: Presentation of simulated surface-to-air (SAM) missiles and CMs in an operational environment assists the Service member in developing TTPs for use in OCO.

SERVICE MEMBER SURVIVABILITY INITIATIVES

Hostile Fire Indicator (HFI)

- The Center is involved in many HFI efforts, including hosting symposiums and workshops, as well as participating in test programs, T&E standards development, test methodology development, data collection, and several U.S. military and international defense initiatives. The following activities are representative of the Center's HFI efforts:
 - The Center held two HFI symposia and workshops that included current HFI program briefings, break-out coordination sessions, and DoD and International partner information exchange. This CCM-led initiative provides a venue for cross Service discussion on the common issue of Service member protection from hostile fire in theater.
 - CCM supported one combined IRCM and HFI test – JATAS (see above).
 - The Center conducted three data collection efforts: Event 1- Yuma, Arizona; Event 2- White Sands Missile Range, New Mexico; Event 3- Aberdeen, Maryland. The focus of these three events was to collect data on systems deploying Hostile Fire Indicating Systems. The systems could be either a retrofit capability of already fielded missile warning systems or more advanced acoustic HFI systems. The data collected will provide a basis for testing and evaluating more complex future hostile fire indicating systems.
 - The Center continued development of a Hostile Fire Signature (HSIG) Model Project to support HFI T&E and modeling and simulation programs - The HSIG Model project is sponsored by the T&E Threat Resources Activity (TETRA), and will develop a physic-based electro-optical (EO) model that produces a muzzle flash and hard body signatures. The model will support HFI T&E and Modeling and Simulation programs.

- The Center is developing a HFI Test Methodology Handbook to provide the T&E community with guidance for planning, executing, and reporting HFI tests. This handbook provides background on HFI systems, HF threats, as well as discusses all aspects of testing.

Joint Countermeasures Test and Evaluation Working Group (JCMT&E WG)

The Center has established and is continuing to coordinate on-going ASE T&E requirements definition of COCOM and Service CM requirements, and CM requirements identified in the Aircraft Survivability Equipment Joint Analysis Team Roadmap. The ASE T&E includes passive and active warning systems, expendables, active jammers, man-portable, vehicle-mounted guided surface-to-air missiles, unguided hostile-fire munitions, and similar threat systems. Additionally this group will determine T&E gaps in the ASE CM test and evaluation community across the Services. Currently the Center is coordinating a JCMT&E charter, organization, and operational concept between Director, Developmental Test and Evaluation (DDT&E) and DOT&E.

Rotary Wing Survivability Task Force

In a July 2009 Memo, the Director, Defense Research and Evaluation (DDR&E) created a \$200 Million effort to improve helicopter survivability. The Center (as DOT&E's representative), in partnership with the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD (AT&L)), continues to coordinate plans for near and far term solutions to helicopter survivability. The goal of this task force is to identify and rapidly mitigate shortfalls in survivability of rotary wing aircraft.

THREAT SIMULATOR TEST AND EVALUATION TOOLS

The Center has continued to develop tools for test and evaluation of IRCM systems funded by USD(AT&L) Test Resource Management Center, Central Test and Evaluation Investment Program Office. Currently, the Center is working on the following test tools:

- Towed Aerial Plume Simulator (TAPS) is used to resolve shortfalls of emulating spatial/temporal signatures for testing missile warning systems (MWS) and IRCM systems. This tool has the ability to test aircraft at various airspeeds, cover

a greater portion of the operational battle space and to test in a realistic IR clutter environment. TAPS was designed to support the operational testing of LAIRCM NexGen.

- Multi-Spectral Sea and Land Test Simulator (MSALTS) is a small mobile missile simulator that can fire while on the move and simulate all current tier-one missile threats. It is designed to provide simulated signatures for the new and more capable missile warning systems such as LAIRCM NexGen, DoN LAIRCM, and JATAS.

