

NORTHROP GRUMMAN*Electronic Systems*

Test and Training Range Threat Simulator



CEESIM's Commonality - Test and Training Range CEESIM provides emitter and scenario compatibility with other CEESIM systems. As a member of the Northrop Grumman Amherst Systems family of simulators, it generates signals with the same high fidelity as full-scale laboratory CEESIMs. All known EW emitters can be simulated to the highest level of accuracy.

The Combat Electromagnetic Environment Simulator (CEESIM) is ideally suited for use on electronic warfare (EW) test and training ranges to verify the performance of airborne/shipboard EW equipment and to train operators in the presence of real-world electronic environments. Configured for range applications, CEESIM enables operators to generate dense, tactically correct threat environments that have the high-fidelity realism demanded by today's combatants and EW equipment. It also allows real-time reprogrammability for changing threat characteristics during engagement exercises. With CEESIM, these can be dynamically programmed to accurately reflect current intelligence data on threat deployment and tactics for 'train as you fight' realism.

All CEESIM functions can be remotely controlled, which enables implementation of realistic integrated air defense system (IADS) tactics using unmanned CEESIM-based systems coordinated from a central control site. Compatibility for joint

force theater-level exercises is provided via distributed interactive simulation and high-level architecture (DIS/HLA) protocols. These allow range CEESIMs to be linked with other remotely located assets in a coordinated test or training exercise.

Types of EW Systems Tested

- Radar Warning Receivers (RWR)
- Electronic Support Measures (ESM)
- Electronic Countermeasure (ECM)
- Towed Radar Decoy (TRD)
- SIGINT systems installed on aircraft, ships, or ground vehicles

Typical Applications

- Developmental Test and Evaluation (DT&E)
- Operational Test and Evaluation (OT&E)
- Operator, aircrew, squadron and joint forces training
- Tactics development in open air ranges
- Airborne threat simulator pods

Test and Training Range Threat Simulator



Threat Generator
Emitter (TGE)



RES



MRES

Description

Existing EW ranges use multiple threat sites or airborne pods that typically generate only a single threat or a small, narrowly defined, and often outdated set of threats. Reprogramming threat sites and pods to introduce new or different threat characteristics requires a good deal of effort, and fidelity is often limited to a few characteristics such as frequency, PRI, and pulse width. CEESIM eliminates these deficiencies and provides unmatched fidelity, flexibility, and affordability in range test and training operations.

A typical CEESIM-based test/training range application, the Mobile Reprogrammable Emitter Simulator (MRES) can radiate threat signals at target aircraft or ships within a 100-mile radius. Target aircraft/ship movement is monitored by radar or other range time/space position indicator (TSPI) system and tracked by pedestal-mounted MRES antennas to achieve a high effective radiated power (ERP) in any direction within the 100-mile range. All threat and ECM signals are monitored and measured by an integrated signal measurement system (SMS), which allows realistic threat reactivity as well as after-action debriefing and analysis.

Available turnkey range systems include remote-control computers, data links, signal generation and modulation, tower/site construction, transmitters, antenna system, radomes, and pedestal/tower or mobile platform integration, as well as the highly accurate SMS.

Off-the-Shelf Turnkey Design

- A Reprogrammable Emitter Simulator (RES) is currently in operation at the US Naval Air Warfare Center, Patuxent River, MD
- A Mobile Reprogrammable Emitter Simulator (MRES), currently in production for the Naval Air Warfare Center, can be deployed wherever needed
- All types of aircraft and ships are currently using RES for test and training
- All RES functions are remotely controlled from a central facility over 20 miles from the RES site
- RES/MRES can generate 0.5-1.6 MPPS per channel, including pulse burst

Flexible External Control Interface

- All system functions can be remotely controlled using standard fiber-optics interfaces
- Distributed interactive simulation (DIS) and high-level architecture (HLA) interfaces are available
- Multiple radiating sites can be networked together and operated using coordinated IADS tactics

Advanced Performance Features

- Full reprogrammability of all emitter features in real time with full emitter fidelity
- Selection and radiation of new emitter set in less than 15 seconds allows RES and MRES to simulate one type of threat during first pass of an aircraft, then change to a completely different threat on the return pass
- Effective radiated power (ERP) of 90-109 dBm across the 2-18 GHz frequency range (with optional high-power 0.5-40GHz frequency coverage available)
- Integrated Threat Weapon System model provides realistic, validated threat engagements for training

Full Instrumentation

- Integrated receiver allows detailed validation of radiated RF signals
- Automatic time-tagged log of all events generated during a test/training mission enables post-event debriefing and analysis
- All system functions can be remotely controlled using standard external controls and easily interfaced with existing range and test control centers
- Video recording capability
- Aircraft/ship tracking system

For more information, please contact:

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