

# Radar Environment Simulator (RES)

*Modular Design Customizable for Multiple Radar & Seeker Applications*

- **Modular, configurable & scalable testing platform**
- **100s of realistic independent targets per scenario**
- **Up to 16 simultaneous channels**
- **Each channel can be programmed as a target, jammer or ECM signature**
- **Extensive ECM techniques and validated threat library**
- **SAR scene generation capability**



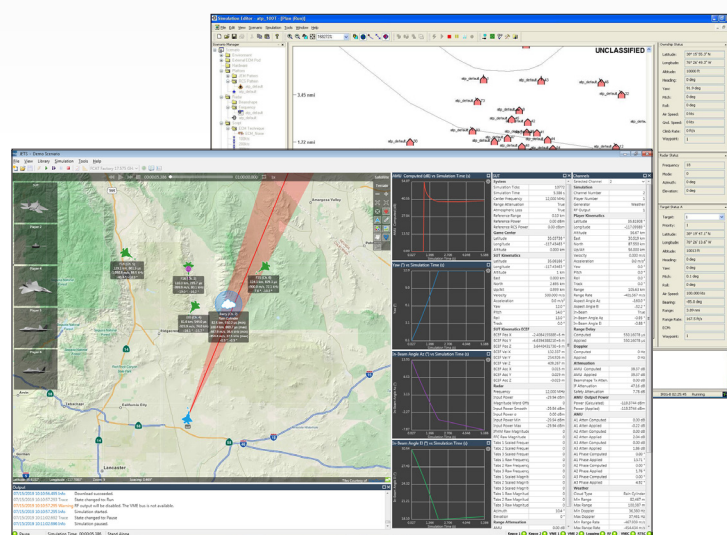
Mercury Systems is the world's largest supplier of DRFM-based and DSP/Synthesizer-based RES systems. These RF Direct Inject simulators have been developed to be generic to support multiple types of radar systems. The Radar Environment Simulator (RES) systems are used for applications ranging from anechoic chamber and open air range (OAR) to laboratory-based radar production testing and comprehensive radar performance evaluation.

To date, Mercury Systems has produced RES systems to test over 50+ different radars and seekers. The RES designs utilize advanced ASIC, FPGA, DSP and DDS technologies for high fidelity signal capture, modulation and regeneration. Coupled with powerful GPGPU processors and OpenVPX standard architecture, the RES systems are very cost-effective and flexible solutions for most radar testing applications.

Mercury Systems manufactures many varieties of RES products based on several different signal processing technologies. This allows Mercury Systems to tailor the best available technology to each customer's requirement

## Applications

- Air-to-Air & Air-to-Ground radar performance evaluation
- Radar performance evaluation
- ECM vulnerability assessment
- Radar production testing
- ECCM training/tactics development
- Advanced missile seeker/fuse testing
- Air defense personnel training



Example RES GUI Screens

*Mercury Systems is a leading commercial provider of secure sensor and safety-critical processing subsystems. Optimized for customer and mission success, Mercury's solutions power a wide variety of critical defense and intelligence programs.*



ACQUIRE



DIGITIZE



PROCESS



STORAGE



EXPLOIT



DISSEMINATE

- Receiver/processor development

## Features

- Up to 500 targets per scenario
- Up to 16 simultaneous channels
- Each channel can be a target, ECM, jamming clutter or chaff simulation
- Wide variety of ECM techniques and target modulation, including a validated threat library
- Wide instantaneous dynamic range
- Outputs: Digital, IF and RF – baseband to 100GHz
- Closed loop operations with radar
- Real-time external or local host control
- Modular/configurable design
- Standard OpenVPX architecture
- Windows-based Graphical User Interface (GUI)
- Real-time, runtime displays of SUT, targets, ECM, etc.
- Plan, range/bearing and HUD displays available
- High-speed scenario update rate
- High reliability
- Comprehensive BIT and calibration software
- Optional free space interfaces for range and anechoic chamber support
- Optional data link, IFF and video support
- Optional SAR Scene generation capability
- Supports monopulse, multi-channel, multi-beam radars
- Supports mechanical and electronically steered antennas
- Data logging for post-test correlation

## Specifications

### Scenario

Targets in scenario	Up to 500
Targets in beam	Up to 16
Jammers in scenario	Up to 12
Jammers in beam	Up to 4
Chaff in scenario	Up to 12
Chaff in beam	Up to 4
Weather in scenario	Up to 4 cells
Weather in beam	Up to 2

Ground/ship clutter	Downloadable 360° clutter definition
Airborne clutter	Dynamic MLC, SLC and ALR

### Signal Fidelity

Frequency range	SUT dependent-VHF to W-Band
Antenna types	Mechanical, electronic, combination
Waveform types	OW, pulse, phase-coded, FM (linear and non-linear)
Pulse width	50 ns to CW
PRI	<10 Hz to > 5 MHz
Spurious	<65 dBc typical Up to <-60 dBc worst case
Dynamic range	>120 db
Amplitude resolution	0.25 dB
RF ON/OFF isolation	100 dB
Doppler range	>+5 MHz
Doppler resolution	<0.1 Hz
Range	50 m to 1500 km
Range resolution	<0.3 m

### Target Fidelity

Mean RCS value	0.001 to 1,000 0o0 m2
3-D RCS patterns	±180° EL, ±90° AZ ±30 dB at 0.25 dB resolution
Scintillation	Swerling cases 0-4 + user-defined
Geometry modeling	6 (DOF)
Jamming assets	Combination coherent and non-coherent and chaff
Target modulations	User-definable modulations for JEM, Blade, etc.; Aspect Angle Dependent

### Interface Options

External computer control
Interfaces to additional radars
Jammer in the loop interfaces
IFF simulation (Mark XII, all modes)
IRIG A/B/G for synchronization
Free space transmission
Man/pilot in the loop
Video PPI and data link support
Data logging of SUT/target data

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