

Multi-Functional Radar Simulator (MFRS)

DESCRIPTION

MFRS is a multi-channel closed loop laboratory simulator capable of simulating a wide variety of multiple radars simultaneously. MFRS generates radar emissions for ECM systems under test (SUTs) and consumes jamming responses from the SUTs, combining them with radar returns and environmental effects to form a complete environment for the radar under test.

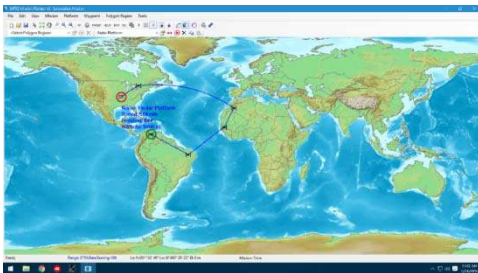


Unlike typical open loop threat signal density emitters, as a closed loop system, the MFRS can be used to measure the effectiveness of the jamming systems on a threat radar, by using a realistic threat receiver and signal processing. To provide environmental signal density, RF signals from other open loop stimulators can be combined with RF signals in the MFRS system.

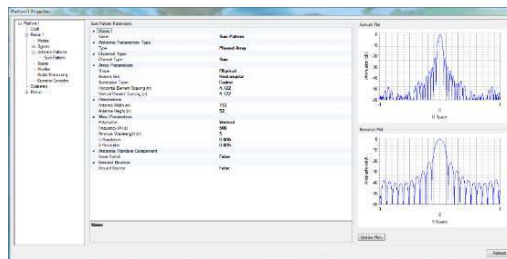
16 CHANNEL SYSTEM

MFRS can support up to 16 analog targets with an additional four digital targets and 16 channels of radar emissions simultaneously. Software tools are provided to define target environment, radar functionality, and other characteristics such as clutter, atmospheric/rain attenuation, and terrain blockage. Radar modes, waveform modulations, PRI sequences, antenna patterns and scans are created with supplied GUIs. Many radar features can be imported as user defined tables.

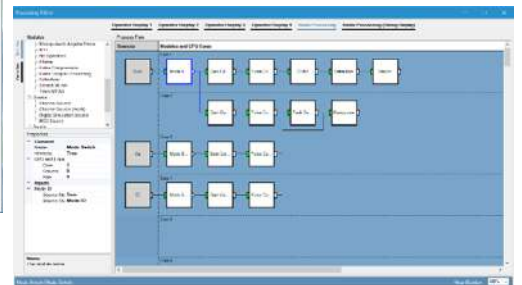
Radar processing functionality is generated using a block diagram editor (BDE) where radar modules can be wired together to form processing chains. A library of common radar modules is provided. The user may develop additional modules and add them to the library.



MAP GUI



**PHASED ARRAY GUI
EXAMPLE**

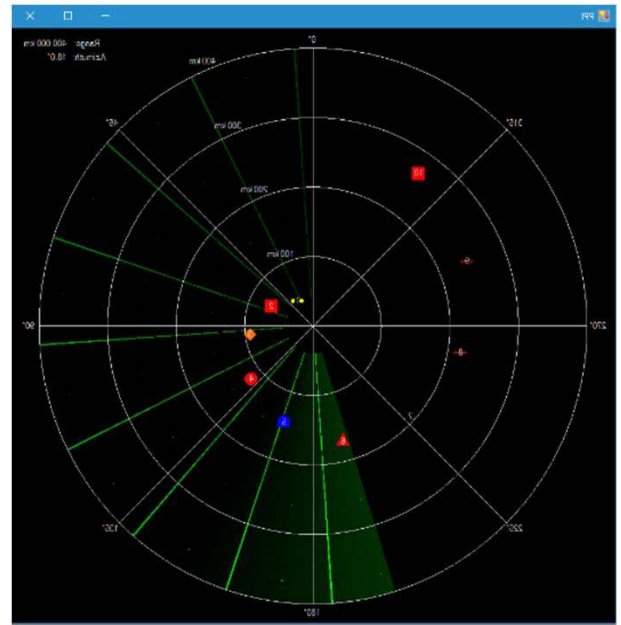


**RADAR PROCESSING BDE
EXAMPLE**

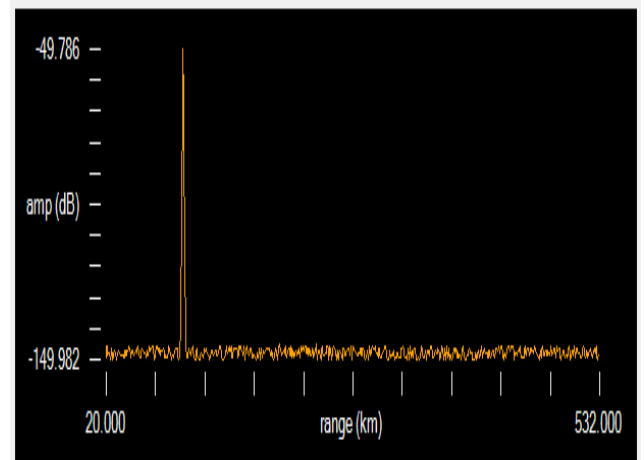
GENERAL CAPABILITIES

Radar

- Up to two simultaneous user defined radars
 - Search, Acquisition, Track, Multi-function Radars
- Radar consoles – up to 4
- Frequency range 0.50 – 18 GHz, 24-40 GHz
- Frequency agility – 600 MHz (pulse to pulse)
- Number of radar receive channels – up to 8
- PRI Characteristics
 - 100 nsec – 10 sec.
 - Constant, Staggered, Jittered, Drift
- PW Characteristics
 - 10 nsec – CW
 - Pulsed CW, FM (linear, non-linear), PSK, FSK, User defined
 - Modulation Bandwidth- up to 100 MHz
- Frequency behavior
 - Channelized
 - Hopped
- Antennas
 - Phased array
 - Aperture defined
 - Functional (Sinx/x, Gaussian, Cardiod)
 - User defined
- Antenna Scan (Electronic and Mechanical)
 - Circular Rotation
 - Sector
 - Raster
 - Conical
 - Spiral
 - User defined
- Radar Processing modules
 - Filter/decimate
 - STC
 - MGC, AGC
 - SLC, SLB
 - Pulse compression, matched filtering
 - Pulse Doppler processing
 - MTI
 - MFAR, CFAR (1D, 2D) Thresholding
 - Range, Doppler Ambiguity Resolution
 - Detection Clustering
 - Mono-pulse processing
 - Trackers – alpha-beta, Kalman



PPI SCOPE



A-SCOPE

Environment Simulation

- Targets – Air, sea, ground
- Target dynamics
 - Waypoint motion
 - Segmented motion
 - Ballistic
 - User initiated maneuvers
- Target properties
 - 6DOF model
 - JEM, Hub, Rotor modulation
 - RCS as a function of aspect angle
- Clutter
 - Map (user defined)
 - Statistical