WIDEBAND ELECTRONIC WARFARE TEST AND EVALUATION SYSTEM

The CSIR's wideband electronic warfare (EW) hardware-in-the-loop system (ENIGMA) is used in operational test and evaluation to effect the modern electromagnetic environment and systems that sense the environment, such as operational radar systems.

The system's novel architecture is specifically designed to address challenges of the modern radar environment, surpassing traditional simulators in simulation realism (ability to present complex platforms in a realistic environment), software-defined electronic countermeasures and cost effectiveness.

Applications

Main applications are:

- The lab-based ENIGMA capable of presenting multiple threats in 3D space to a radar signal processor because of the unique digital antenna beamforming units; or
- The EW range application where a wideband response is critical, in addition to realistic targets and countermeasures.

It is also possible to deploy ENIGMA in an airborne application.

Features

The wideband EW ENIGMA system can detect and respond to wideband radar pulses. With expertise built over many decades, the CSIR can offer wideband performance with a superior spurious-free dynamic range, while simultaneously presenting high fidelity targets to the system under test.

High bandwidth Digital Radio Frequency Memory systems form the backbone of the ENIGMA system and, through the novel use of a software-defined architecture, ENIGMA offers the ability to create novel electronic countermeasure techniques, in addition to the extended library available in the ENIGMA system.

The system can present a **realistic target** to the radar under test using complex targets, this target is then able to respond to the radar using advanced programmable techniques, generating **realistic false targets**, and the target and false targets are presented in a **realistic environment** where radar clutter is presented to the radar.

ECM techniques include an advanced multi-train pulse repetition interval tracker and predictor to realise synchronised range and/or Velocity Gate Pull in techniques for up to four simultaneous radar systems. Techniques are coherent and Doppler-corrected.

The system is modular and easy to deploy in the field.

Specifications

Frequency range: 1 – 18 GHz typical, options up to 40GHz
Instantaneous bandwidth: 1.2 GHz typical, options up to 2 GHz
Dynamic range: 50 dB
In-band frequency ripple: ±3 dB
Number of complex target scattering points per channel: 48
ECM techniques: CW Repeater, RGVPO/I, VGPO/I, Synchronised R/VGPO/I, Single-capture Continuous Repeat, False Targets, Intra-PRI Targets, Pulse Train Repeater, Range Bin Masking, Velocity Bin Masking, Synthesised Targets, Spot Noise and Barrage Noise.

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