

RAVEN Surface Ship Electronic Countermeasures System

ERP:

 **79** dBm

JAM TO SIGNAL RATIO:

High Power threats typically +30 dB

Low Probability of Intercept (LPI) typically +75 dB



AZIMUTH COVERAGE:



ELEVATION COVERAGE:

-30° to +60° Elevation

The Lockheed Martin Canada RAVEN System solution provides modern, effective on-board RF Electronic Countermeasures (ECM) through a wide range of jamming techniques. Deception, noise and self-synchronizing angle deception using cross-polarization combine to deny the exploitation of the electromagnetic spectrum by hostile forces. RAVEN provides 360° Anti-Ship Missile Defence (ASMD) self-protection for all naval platforms and is highly scalable. RAVEN consists of a set of steerable mid/high band antennas (6 to 18 GHz) with an option for low and/or very high band frequency coverage.

RAVEN builds upon the RAMSES (Reprogrammable Advanced Multimode Shipboard Electronic Countermeasures System) capabilities in service today with the Royal Canadian Navy through the introduction of modern technologies providing an open architecture that enables the RAVEN design to evolve more quickly to modern threats.

Unlike traditional radar jammers, RAVEN uses sophisticated RF and PRI prediction technology that is capable of producing both down-range and up-range false targets to a multitude of modern radar systems using complex PRI and RF agility patterns. RAVEN incorporates proven, leading edge, receiver technology to produce advanced deception and obscurity countermeasure waveforms against a variety of radar systems and radar-guided missile seekers.

RAVEN implements System on Chip (SoC) technology for the application of special mode techniques, soft-kill assessment, and antenna stabilization and control. The SoC design is highly modular and easily adaptable to various antenna assemblies and ship stabilization interfaces.



Predictive DRFM-based ECM Receiver



Prediction-Based ECM



Coherent / Non-coherent ECM



Self-Synchronizing Angle Deception

TECHNIQUES GENERATOR

RAVEN is capable of performing both coherent and non-coherent radar countermeasures. The non-coherent channel is capable of AM and FM techniques with an instantaneous bandwidth of 1 GHz. The noise channel is constructed around a direct digital synthesizer for extremely fast and accurate signal generation of transponder style techniques. Noise techniques can be set on with 1 MHz resolution and sweep bandwidths selected with 1 MHz resolution. The coherent jamming channel is implemented using a Digital RF Memory (DRFM). The DRFM is constructed around a 10-bit quantization ADC and DAC for low spurious responses. The DRFM memory depth is 1ms which allows use with wide pulse widths (i.e. pulse compression radars). The DRFM has an instantaneous bandwidth of 2 GHz and the centre frequency can be set on with 1 MHz resolution.

FEATURES AND BENEFITS



Up-range deception in addition to current down-range deception



Selective / Surgical Countermeasures



Digital capture and re-creation with no signal degradation



Proven, fielded Coherent (DRFM) / Non-coherent (Noise) ECM



Deception / Obscuration



Unlimited programmable technique combinations



Integration with other mechanically steered antennas



System-On-Chip Technology and Scalable Architecture



Small footprint and light weight enabling the potential deployment of the system to a smaller platform such as a USV

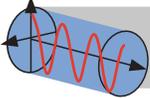
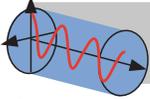
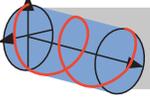
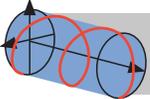
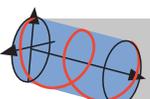
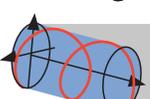


Low cost of ownership with no ITAR

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POLARIZATION

RAVEN is designed to detect, intercept and respond to signals with the following polarizations:

-  **Linear** (coverage between Vertical and Horizontal)
-  **Slant 45**
-  **Circular** (right-hand)
-  **Circular** (left-hand)
-  **Elliptical** (right-hand)
-  **Elliptical** (left-hand)

THREATS

RAVEN is able to intercept and generate signals to counter the following threat types:

-  **Missile Seekers**
-  **Surveillance and targeting Radars**
-  **Acquisition Radars**

MULTIPLE THREATS



RAVEN provides the capability to JAM up to eight time-shared threats simultaneously within the coverage volume.

TECHNIQUE TYPES:

COHERENT
Multiple false targets-main and side lobe
RGPO, RGPI
Spot, Barrage, Swept, Barrage / spot noise
APRM
RBM
CRBM
Sub-pulse masking
Constant gain or power
Inverse gain
AM and Swept AM

NON-COHERENT
Multiple false targets-main and side lobe
RGPO, RGPI
APRM
Spot, Barrage, Swept, Barrage / spot noise
Constant gain or power
Inverse gain
AM and Swept AM
ANGULAR DECEPTION
Cross Polarization using Configurable Positional Waveforms (scripted, adaptive, etc.)



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