



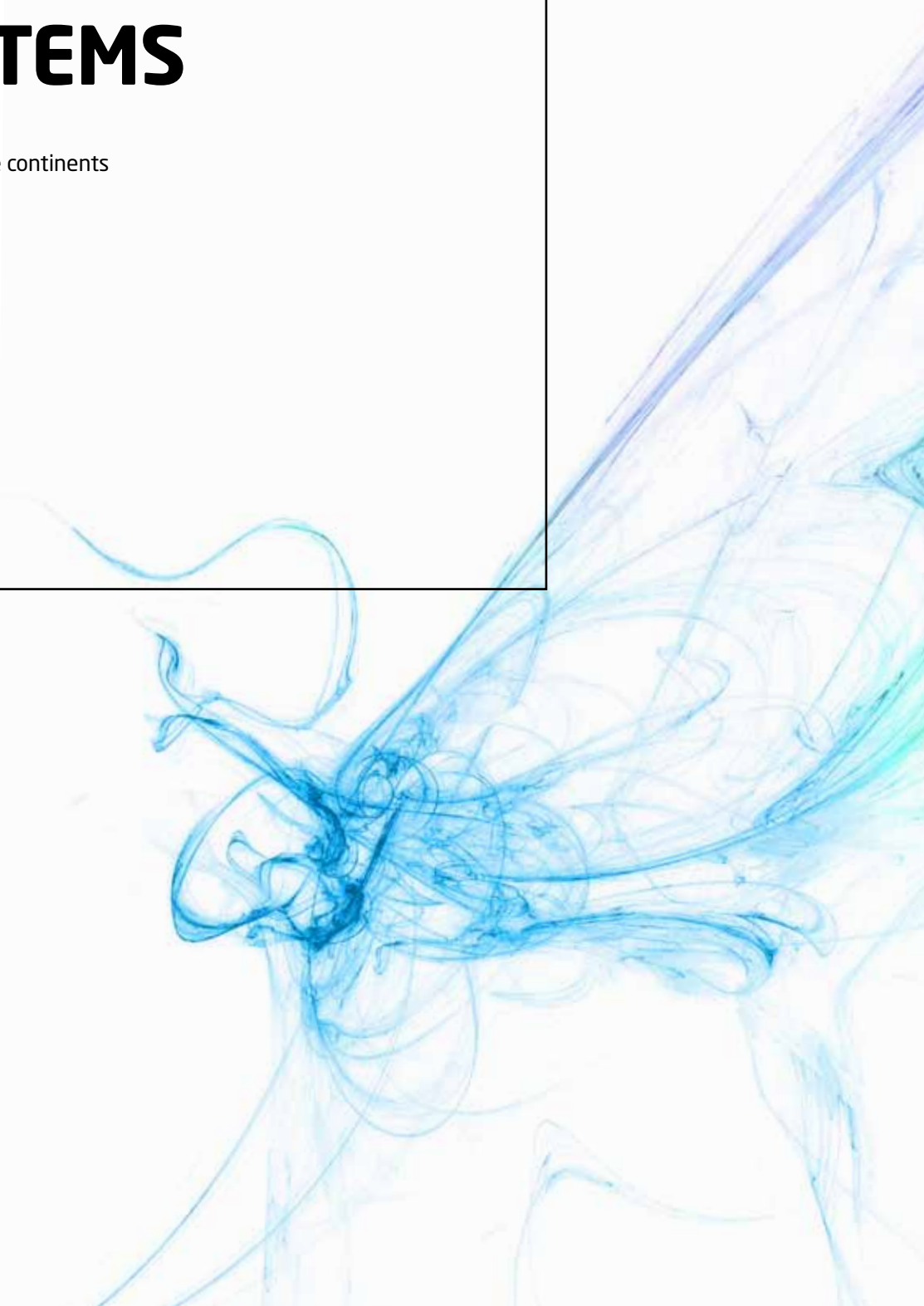
indra

DEFENSE AND SECURITY

RIGEL ES AND EA SYSTEMS

Defense and security in five continents

indracompany.com



RIGEL ES AND EA SYSTEMS



RIGEL ES System

The Naval Radar ES and EA systems provide high performance operation to successfully face new electromagnetic scenarios

Indra technology

Critical elements (as DRFM, RF receivers...) are designed and integrated by Indra. It allows to replace or update sub-systems minimizing the effect over the overall system. This sovereignty on the design provides Indra with the full capability for both elements replacing or updating. The obsolescence problem is eliminated from this point of view.

As fundamental concept of future evolution, Indra's systems are designed according to a modular architecture easily extendable from the same core process, which guarantees growth capability and flexibility. The System can be easily tailored to customer requirements because of its modular conception.

Therefore, the obsolescence problem is always controlled and solved, since we can review the specifications or replace the needed element without any impact on the overall system.

As a result of these main concepts stated before (design sovereignty, modularity, technology), Indra participates in most of the high level forums and study groups which are organized in our framework for systems definition.

RIGEL EA overview

The RIGEL Radar EA (Electronic Attack) system's family provides a platform with self-protection by means of jamming and deception countermeasure techniques against either single or multiple threats that are active on the whole 6-18 GHz frequency band (optional 0,5-18 GHz range, depending on selected configuration).

The different RIGEL EA configurations can be based on both mechanical or electronically pointing transmitter antennas (depends on selected configuration).

The RIGEL Radar EA system's family constitutes a unique instrument to successfully face the new electromagnetic scenarios, providing:

High performance Radar EA-System

- 360° azimuth coverage
- Different power configuration available
- Variable polarization
- Dedicated EA receivers for very low latency values
- Very fast response
- Maximum countermeasure power efficiency
- Transmitter power amplitude modulation capability
- Three-axes mechanical stabilization (mechanical pointing configuration)
- Radiation inhibition within bearing/frequency sectors

Advanced jamming/deception techniques

- Up to 11 types of jamming modulation, including audio swept capability for jamming techniques
- Advanced multi-bit DRFM based techniques
- Several jamming operation modes (automatic, supervised, manual, imposed)

Multi-threat countermeasuring capabilities

- Multi-threat capability
- Effective power management

Modularity and flexible integration

- Interoperability (via blanking) with on-board systems
- Possibility of two antennas configuration
- Easy installation (modular design)
- Flexible architecture (allowing further upgrades and future enhancements)
- Powerful BITE (initialization, operator initiated and continuous)
- Fully integrable with RIGEL ES System for optimum countermeasure deployment

Electronic attack function

The RIGEL Radar EA system has the capability to perform the following countermeasure techniques:

Noise jamming

- Spot jamming (SJAM)
- Barrage noise (BJAM) (with or without audio swept)
- Noise Cover Pulse (NCP)

Deception

- RGPO/VGPO
- RGPI/VGPI
- AGPO/AGPI
- High duty technique
- High density confusion
- Count down
- Cross polarization (depends on EA configuration)

Possible jamming modulations

- Non-coherent either continuous or cover pulse jamming
- Coherent burst cover pulse
- Synchronous jamming or bursted
- False targets
- Audio modulation (audio swept)
- Amplitude modulation pulse to pulse
- Amplitude modulation burst to burst
- Synchronous amplitude modulation
- Polarization modulated jamming

Optional extensions

Frequency band extensions

There are available different frequency band extensions, with the corresponding impact on system architecture:

- 0,5-2 GHz band
- 2 -18 GHz band

Electronically pointed antenna

This technology has been developed for naval platforms, and may be consulted for other platforms.

Tracker unit

It's a narrow band subsystem that provides high accurate elevation DF measurement allowing the tracking of the emitter, so that the radiation efficiency is optimized.

It provides dedicated receivers for enhanced sensitivity for signal processing and validation.

RIGEL ES overview

The RIGEL Radar-ES (Electronic Support) system's family constitutes a unique instrument to successfully face the new electromagnetic warfare scenarios.

The RIGEL Radar-ES system's family provides high sensitivity detection, analysis, classification and identification of radar signals, as well as high accurate DF measurement within a wide band instantaneous coverage, covering the whole 2-18 GHz frequency range (optional 0,5-40 GHz range, depending on the selected configuration).

The RIGEL Radar-ES system's family is based on Indra's in-house Digital Reception technology, which constitutes the cutting edge technology and represents the core of the Radar ESM systems, resulting in a set of unique characteristics.

The RIGEL Radar-ES system's family provides:

High performance ES-System

- Outstanding warning capability regarding pulsed and Continuous Wave (CW) signals, including Low Probability of Interception (LPI) Radars

- Wide band operation for superior tactical information, with Probability Of Interception (POI) of 100%, with accurate tracking of targets (depends on selected configuration)
- Very accurate DF measurements useful for accurate targeting operations (depends on selected configuration)
- Robustness to installation
- Advanced deinterleaving algorithms
- Advanced library matching algorithms for accurate identification

Field-proven digital reception

- Very high sensitivity for both pulsed and CW signals and equivalent detection range function
- Higher resolution and accuracy on both time and frequency domains, allowing significant improvements in radar parameter measurements
- Robustness in very dense or jamming scenarios due to the capability to handle several simultaneous CW signals without loosing performances
- Inherent pulse to pulse intra-pulse measurement capabilities
- Tools to record and process signal data, making possible a further Specific Emitter Identification (SEI) thanks to the samples collection for post-processing

Powerful recording capabilities

- Several data levels (events, pulse descriptors, detection descriptor, raw data (samples from the digitizers))
- Powerful analysis tools for detailed analysis of signals and ELINT capabilities
- Advanced training functionality (reproduction of a previously recorded scenario allowing the operator to practice with the whole functionality of the system)

Modularity and flexible integration

- Powerful BITE (initialization, operator initiated and continuous)
- Interoperability with on-board systems (blanking management)
- High integration capability with on-board and off-board systems (standardized interfaces)
- Fully integrable with Command, Control, and Communications (C3)/Combat Management System (CMS)
- Fully integrable with RIGEL EA System
- Easy Installation (modular design)
- Flexible architecture (allowing further upgrades and future enhancements)

Optional capabilities

Enhanced sensitivity mode

This mode provides to the system the capability to focus the operation in a particular sub-band, allowing to reach an extended detection sensitivity.

Enhanced Sensitivity Digital Interception Module (ESDIM)

This mode provides to the system the capability to focus the operation in a particular sub-band, allowing to reach an extended detection sensitivity.

Frequency band extension

System extends all its features and capabilities to the following bands (several configurations available):

- A/B band (50 – 500 MHz)
- C/D band (0.5 – 2 GHz)
- K band (18 – 40 GHz)

Detailed Intra-Pulse Analysis SW package

The system capability of raw data storage makes possible a later fine analysis for Intra-Pulse (IP) detailed measurement.

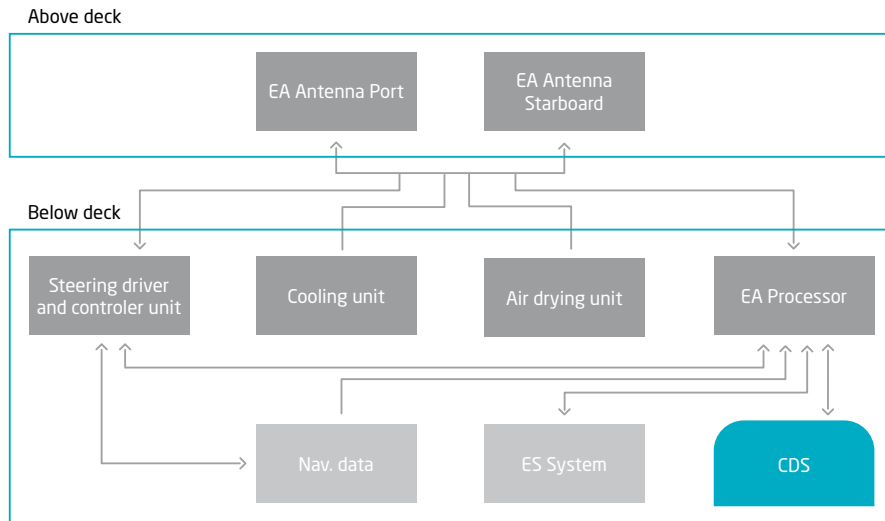
This option provides the operator with powerful graphic tools and algorithms to analyze the intrapulse modulation and the radar signature of a signal.

Analysis SW package

This SW upgrade is suitable for a deeper ELINT analysis for the intercepted emitters, with no real time restrictions, using cartographic representation of the information, storage in databases and power tool manual analysis of pulse descriptors collected by sensor.

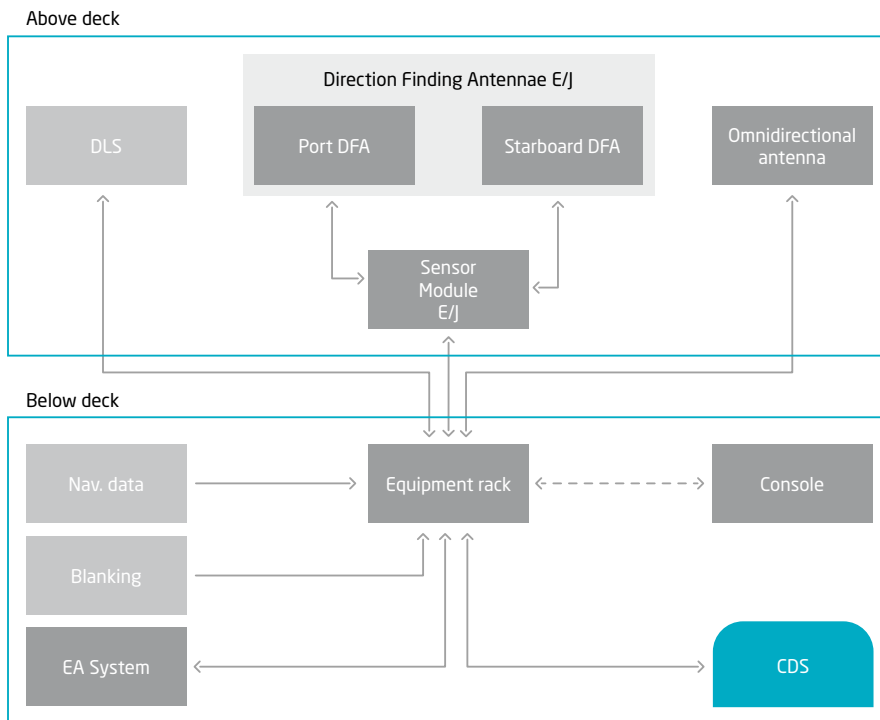
This capability has no impact on system's architecture.

RIGEL EA configuration



System is available in several configurations, so that it can be adapted to different platform installation constraints.

RIGEL ES configuration



System is available in several configurations, so that it can be adapted to different platform installation constraints.



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indra

Ctra. de Loeches, 9
28850 Torrejón de Ardoz
Madrid (Spain)
T +34 91 626 80 12
F +34 91 626 58 87
rigel@indra.es
indracompany.com

Indra, a member of
MR^{CM} Products
Monitoring, reconnaissance
and counter measures

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without prior notice.