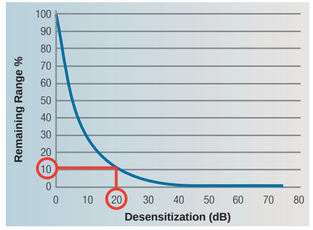
INTEGRATED COSITE EQUIPMENT (ICE)

Pole/Zero is the premier provider of solutions for communications challenges arising from RF interference. Our products enable military platforms to simultaneously operate multiple radios on the same platform without degradation in performance, range or compromises in CON-OPS. Our Integrated Cosite Equipment (ICE) line of products are incorporated between your radios and antennas to enable simultaneous operation of all your communications, radar, SIGINT/COMINT and other RF systems.

The Cosite Interference Challenge

Today's military transceivers operate over broad frequency bands with features such as embedded cryptography, frequency hopping, networking, and upgradeable waveforms. When transceivers are operated in close proximity to other RF emitters, these "other" RF emissions constitute interference to the receiver. Receive performance degrades rapidly due to a phenomenon termed "cosite interference". Vulnerability to cosite interference degrades the receiver's sensitivity to low-level, desired signals. Additionally, cosite RF emitters, although often operating at a frequency offset from the receiver, may degrade a receiver's range by creating spurious emissions (harmonics, intermodulation products, broadband noise, etc.). The challenge for the system designer is to resolve these various interference mechanisms to maintain performance and range.

Radio Range Reduction Due to Interference



Note that a 20 dB desensitization of your receiver results in the loss of 90% of your range! Regain the operating range of your system by incorporating ICE on your platform.

Pole/Zero offers an ICE product for every Cosite situation.

ICE1000 ICE2000 ICE3000 ICE4000 ICE5000

Use Pole/Zero Integrated Cosite Equipment (ICE) to resolve interference in your communication/data links. Protect your receivers and purify your transmitters in order to recover the range required for your missions. Determining the right ICE model for your application is easy and straightforward with the additional Pole/Zero capability to conduct a cosite analysis to achieve an optimal communication system.

Pole/Zero is an industry leader in high dynamic range RF communications solutions with over 30 years of experience.

Microwave Products Group
a DOVER company

Enabling Communication and Signal Control

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INTERFERENCE MITIGATION SOLUTIONS

Protect **your receiver and** ***Purify*** **your transmitter for** ***Increased Communication Range***

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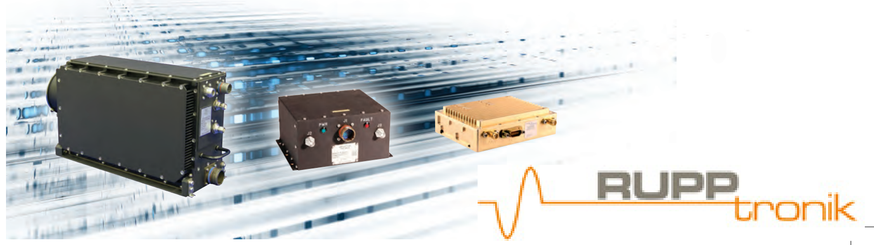

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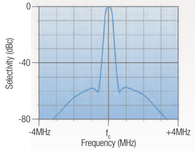
INTEGRATED COSITE EQUIPMENT (ICE)

- Today's crowded communication bands and closely located transceivers are often needed for simultaneous operations (SIMOP) and require RF systems designers/integrators to pay increasing attention to managing their equipment's generation and rejection of undesired signals and noise. Receiver desensitization greatly diminishes communications range.
- For the challenge of enhancing a modern transceiver's performance in a cosite environment, Pole/Zero offers our Integrated Cosite Equipment (ICE). ICE integrates high dynamic range amplification and frequency agile filtering to provide the transceiver the required cosite interference mitigation.
- ICE systems are designed to MIL-STD-810 and MIL-STD-461, interfacing directly with each transceiver to support modern single channel SATCOM and fast frequency hopping waveforms (e.g. SATURN).
- Key Features of ICE:
  - Reduced transmit broadband noise levels
  - Suppressed harmonics, intermodulation and spurious emissions
  - Significantly enhanced receiver dynamic range
    - Improved noise figure, and high signal handling and intermodulation
    - Reduced reciprocal mixing and cross-modulation
  - Mitigation of receiver desensitization at close frequency spacing

ICE3009

ICE5000 Applications

- Frequency Coverage: 30 to 406 MHz
- ARC-210/ARC-231 Interfaces
- Tune Time 50 µs typical
- TX RF Output Power Over 100 W
- Highly Selective



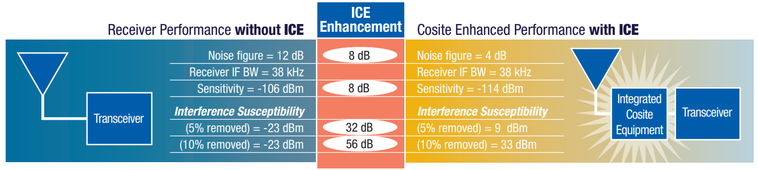
Typical Command & Control Platform (Multi radio systems)

ICE1000 Applications

- Frequency Coverage: 30 to 512 MHz
- Tune Time: 25 µs typical
- In-Band RF Power: 1 W (input) typical
- 1.0 x 3.8 x 2.8 (in.)

Comms Radio Relay (Retrans)

An Example of Receiver Performance Improvement with ICE



Highly Configurable Catalog Designs!

ICE3009 Configuration Selection Guide

The ICE3009 design provides a flexible ICE platform that can be configured for your specific application. Your requirements can be achieved by tailoring the design through choices such as multiple frequency bands, multiple interface options, output power levels and various additional features such as Guard monitoring.

Tailor your ICE3009 to meet platform needs:

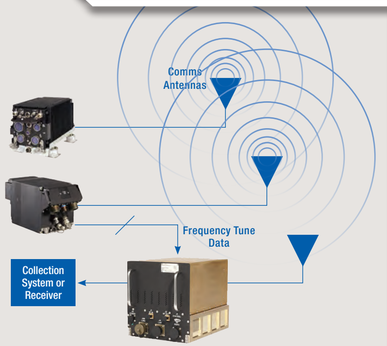
1 Choose one to three:
- VHFL: 30 to 88 MHz
- VHFH: 108 to 174 MHz
- UHF: 225 to 400 MHz

2 Choose a radio/tuning interface:
- ARC-210
- PRC-117
- ARC-231
- TRA 2030

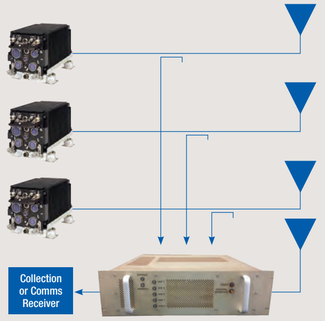
3 Select RF output:
- 20 W (AM), 50 W (FM) for Tri-Band (VHFL, VHFH, and UHF)
- 25 W (AM), 50 W (FM) for Dual Band VHFH and UHF
- 40 W (AM), 100 W (FM) for Single Band UHF

4 Identify other requirements:
- Input RF power (0 to +43 dBm)
- Incorporation of a Guard channel
- Modified frequency range

MULTICHANNEL INTERFERENCE CANCELERS



Broadband Surveillance Application



Near-channel Mitigation Application

Multichannel Referenceless Canceler

The ICE2004 is an 8-channel, 30-512 MHz RF interference canceler system that achieves 40 dB of strong signal attenuation without the need for reference signals from local transmitters. The ICE2004 enables the reception of low-level RF signals in the presence of up to 8 strong interferers as a result of its inherent low loss path for all non-canceled signals. The ICE2004 provides fast canceler acquisition and is compatible with SINCGARS and HAVE QUICK hopping waveforms. The ICE2004 can auto-tune to on-board or off-board signals and also supports direct radio tuning.

Multichannel Interference Canceler

Pole/Zero's MULTICHANNEL INTERFERENCE CANCELER (MIC) is a five channel VHF/UHF canceler system which significantly reduces the levels of strong interfering RF signals from co-located emitters to allow proper communications or collections receiver operation. The canceler detects frequency changes automatically – even with frequency hopping signals.

HIGH POWER FILTERS AND RF DISTRIBUTION

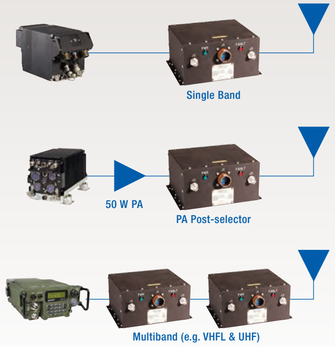
MEGA-POLE®

- Frequency Coverage: 30 to 400 MHz (separate bands)
- Tuning Time: < 25 µs typical
- In-Band RF Input Power: 50 W average, 100 W peak
- 6.0 x 7.6 x 3.6 (in.)

ERF-5W™

- Frequency Coverage: 30 to 520 MHz
- Tuning Time: 25 µs typical, 50 µs max.
- In-Band RF Input Power: 5 W average
- Single: 4.7 x 6.8 x 1.0 (in.)
- Dual: 4.7 x 6.8 x 1.9 (in.)

MEGA-POLE® Applications



Airborne and Ground Mobile

ERF-5W™ & RF Distribution Applications

COSITE ANALYSIS

Pole/Zero offers a Cosite Analysis and Integration service to assist in determining the level of cosite mitigation required for a specific communication application. The goal of the analysis is to work closely with the integrator to ensure maximum communications range and channel availability given the size, weight, power, and cost (SWaP-C) constraints.

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