

Scalable and resilient RESM arrays for geolocation of radar signals

Modern conflicts underscore the growing strategic importance of agile, pervasive electromagnetic awareness across the operational spectrum. Large Radar ESM (RESM) systems on high value platforms have proven easy to detect and destroy. By contrast, the presence of MicroESM sensors in the battlespace is near-invisible.

Ultra low-SWAPC and highly deployable across platforms, multiple MicroESM sensor systems can also be used in the same force, battlespace or operating theatre. Networked into a scalable and self-healing Multi-sensor Array, ESROE's solution provides real-time information superiority across all domains.

Multi-sensor system at a glance:

- Software-first, modular architecture
- Flexibly scale sensor array up or down
- Self healing, fully automatic network
- Fully remote operation
- Geolocate signals when in range of 2 sensors
- Platform-agnostic, passive, low-SWAPC sensors
- Highly affordable

Delivering identification, bearing and geolocation of radar emitters with performance approaching that of legacy systems, ESROE's Multi-sensor Array solution comprises two or more networked MicroESM sensors.

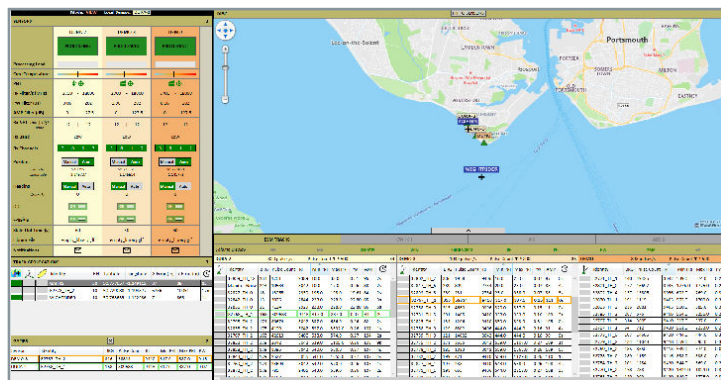
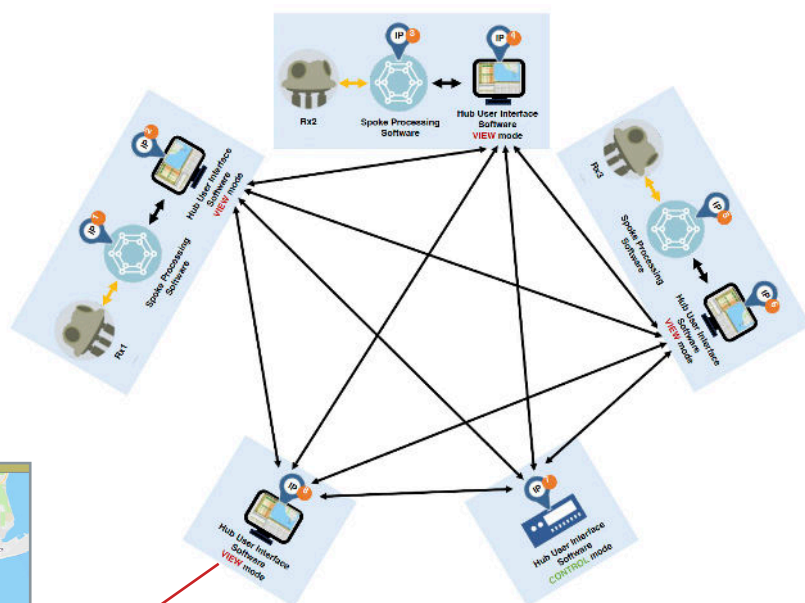
The number of sensors in the array can be flexibly scaled to meet mission demands. All whilst removing reliance on SQEPs (suitably qualified and experienced person) at each sensor location, as the Multi-sensor Array can be remotely operated by a single user.

This remote operation utilises a range of different communication bearers, also allowing the sensor systems to be mounted on autonomous and unmanned platforms to provide actionable ELINT from the tactical edge.

Software-first innovation for the future force

MicroESM sensors can be deployed in a variety of ways—soldier-borne, as payloads on UAVs or USVs, in combination, or semi-permanently installed along a coastline. Hundreds of sensors can be networked together and controlled by a small number of remote operators, enabling geolocation of signals of interest, even when they are moving.

Remote operators have full control of the entire array, while users in the field can view the tactical picture it generates. If a control station drops off the network, control is automatically transferred.



All MicroESM multi-sensor array nodes are connected to each other via bearer-agnostic TCP/IP sockets. In addition to the sensor nodes, any number of non-sensor CONTROL and VIEW user interfaces can be supported.

Functionality	Metrics	Description
Frequency Range	2 GHz to 18 GHz	Switches automatically between 2 - 12 and 12 - 18 GHz bands
Frequency Measurement	3.5 MHz (2 - 12 GHz) 2.5 MHz (12 - 18 GHz)	Measurement resolution Accuracy ≤ 2 MHz rms
Enhanced Frequency Measurement	0.85 MHz	Measurement resolution and accuracy possible for pulse density $< 100\,000$ pulses per second
Azimuth Coverage	360 degrees	
Bearing Measurement	7 degrees	Typical rms accuracy
System Sensitivity	-55 dBm -70 dBm	With bearing measurement For CW signals without bearing measurement
Dynamic Range	50 dB	
Minimum Pulse Width	40 ns (2 - 12 GHz) 50 ns (12 - 18 GHz)	
Time of Arrival	20 ns (2 - 12 GHz) 25 ns (12 - 18 GHz)	Measurement resolution Accuracy ≤ 20 ns rms
Environment Pulse Density	Up to 200,000 pulses per second*	Fast response time up to stated density, graceful degradation thereafter.
Emitter Library Capacity	200 emitter mode lines*	Capable of expansion
Reported Emitters	100 simultaneous emitters*	Capable of expansion
Operating Voltage Range	10 - 20V DC (12V nominal)	16-36V with alternative supply
Power Consumption	< 20 W < 10 W	Full operating mode (Main unit) Standard mode (Main unit)
Size	$< 18\text{cm} \times 18\text{cm} \times 10\text{cm}$	Length x depth x height
Weight	< 2 Kg	Main unit
Operating Temperature Range	-20 degrees C to +49 degrees C	
Environmental Certification	IP 68	Main unit - designed for long term operation at sea, it is also tested for vibration, shock and immersion (further details on request).
Data Logging	Continuous	Continuous logging of pulse data, which can be remotely extracted for analysis. Logging also includes emitter track data, library data generated by the system, and AIS data.

* These values are fundamentally dependent on computer performance and can be improved with a higher performance processor.

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