Next-gen RESM for distributed coastal surveillance

Radar Electronic Support Measures (RESM) have long been central to maritime domain awareness, enabling the passive detection, tracking and identification of vessels through the interception of their navigation and surveillance radars. Traditionally, however, RESM systems have been confined to large, high-value platforms such as warships and surveillance aircraft due to the significant cost, size, power and operator burden of legacy systems. ESROE's software-first approach breaks this paradigm with an ultra low-SWAPC, remotely operable MicroESM solution, capable of identifying signals of interest even in RF dense shipping lanes.

Sensors System at a glance:

- 2 – 18 GHz frequency range
- Simultaneously reports 100+ emitters
- 7° rms bearing accuracy
- Full 360° azimuth coverage from 4 antennas
- Fully automatic operation
- < 20w consumption in full operating mode
- Sensor weight < 2 Kg

The coastal surveillance variant of MicroESM is engineered for reliable 24/7 continuous operation at fixed or semi-permanent sites. It comprises the ruggedised MicroESM main unit, paired with a dedicated computing platform pre-installed with ESROE's processing software. The enhanced computing resource provides higher processing performance and expanded storage, enabling uninterrupted data capture and long-term data logging around the clock.

For remote operation, the system employs secure wireless connectivity, allowing operators to monitor and control the MicroESM unit from any location. The remote deploymnet also features a defined API that delivers track-level output, ensuring seamless integration with wider command, control, and data fusion systems.

Continuous pulse logging facility
Radar intercept information can be streamed in real-time for live signal of interest tracking of 100+ emitters simultaneously. Alternatively, all measured radar pulse data can be continuously saved for remote analysis.

Accurate vessel finding capability
Direction finding of detected signals is achieved using the four antennas on a remote single sensor, refined for accuracy by the software. Whilst geolocation capability is achieved with as few as two networked sensors.

Automated radar identification
Automatic reporting and identification of radar signals can be displayed on a map in the ESROE software, or output to other systems as required

Intelligent radar libraries
Radar libraries can be loaded to the solution from internal or external storage, and any unknown radar emitters detected by the solution can be automatically saved as new library entries.

Fully remote operation
Continous operational use is achieved with an external 12V power supply and a wireless TCP/IP socket transfers track data back to a computer running the MicroESM UI and control software. Alternatively, use the API to deliver track-level output to other mission systems.

Functionality	Metrics	Description
Frequency Range	2.0 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, gracefulde gradation thereafter.
Emitter Library Capacity	200 emitter mode lines	Capable of expansion
Reported Emitters	100 simultaneous emitters	Capable of expansion
Operating Voltage Range	10 - 18V DC (12V nominal)	
Power Consumption	< 20W < 10W	Full operating mode (Main unit) Standard mode (Main unit)
Size	180mm x 180mm x 96mm	Length x depth x height
Weight	< 2 Kg 0.62 Kg	Main unit 9 Ah battery pack
Operating Temperature Range	-20 degrees C to +48 degrees C	
Environmental Certification	IP 68	Main unit
Data Logging	Continuous	API track-level output or TCP/IP socket transfer of track data. Logging also includes emitter track data, library data generated by the system, and AIS data.

For further information:

Email: microesm@esroe.com
Call: +44 (0)1329 237285
Visit: www.esroe.com