



# Transforming access to and the use of ESM in contested environments



Air



Land



Sea

# Reliable, non-cooperative target identification that is passive, pervasive and resilient

Electronic Support Measures (ESM) is a vital defense capability which has, until now, been reserved for major military platforms due to high SWAP, cost and operating requirements. ESROE's breakthroughs in ESM technology change this. Deployable anywhere, as a standalone micro sensor or a networked array across battlefields or along coastlines, ESROE has developed low SWAP,

autonomous, next-gen ESM for pervasive, advanced threat location and friendly forces protection. A spinout from the UK's Defence Science & Technology Laboratory, and at the forefront of ESM software, ESROE'S deep domain and software development expertise is now transforming the access to and use of this unique capability in the air, land and sea battle spaces.

**The world's first MicroESM system**  
ESROE's MicroESM provides comparable capabilities to traditional ESM systems but with significantly reduced size, weight and power (SWAP) requirements, making it a low-cost game-changer in the area of battlefield situational awareness. The key to these radical reductions in SWAP for an ESM capability lies in ESROE's processing software which is highly efficient at identifying radar pulses, making it compatible with small, low-power computing platforms that drastically reduce the overall requirements of the ESM system.

**Continuous identification of known & unknown radars**  
The most accurate radar classification algorithms on the market today, ESROE's processing software is uniquely able to interpret very uncertain information; intelligently reporting both known and unknown radar emitters to continuously improve it's situational awareness. To make the most of this advantage, ESROE's software can also be embedded in the Electronic Surveillance suites used in a range of military platforms, from armoured vehicles and UAVs, to large multi-role warships and surveillance aircraft.

**Scalable, networked deployment**  
The fully-automated ESM redesign means the capability can be scaled from individual special forces, to unmanned vehicles, and larger high value platforms - completely changing the way that ESM contributes to the safety of armed forces in hostile environments. Very small, with a low unit cost, MicroESM can be deployed in high volume too, making the solution highly versatile and resilient, as the units can be networked into an intelligent array along borders and battlefields.

Person-portable, ESROE's MicroESM is easily deployed on manned and unmanned systems to gain greater situational awareness of the ELINT environment and achieve a tactical edge on the electronic battlefield.



MicroESM acts as a force multiplier, across domains, to improve situational awareness of the total ELINT environment. Extending threat warning and covert surveillance capabilities to a wide range of vehicles, system operators can penetrate deep into enemy defences, getting closer than ever previously possible to locate targets of interest and measure the characteristics of even low power radars invisible to longer range intelligence gathering systems.

## Key benefits

- Passive receiver system mitigates detection
- Low SWAP supports varied missions/use cases
- Modular design enables integration with small manned and unmanned platforms
- Fully automated, providing continuous intelligent surveillance
- Minimal system training and no requirement for electronic warfare background
- Integrates with existing signal libraries
- Records unknown detected radars
- Quick and easy to set up and operate
- Choice of integrated power source or battery operation

## Cross-domain intelligence



Air

The ultimate solution to the range problem, MicroESM can be fitted to a UAV or drone, which can overcome sensor/target radar elevation limitations of land and/or surface based ESM. Aircraft applications of MicroESM can also provide the location of a radar signal, rather than just the direction to the signal. Whilst networking MicroESM with other air, land and sea based micro sensors provides enhanced geolocation and other significant EWOS benefits.

- UAV ESM payload can be used to provide location of a radar signal
- Low cost alternative to a traditional radar warning receiver (RWR) on transport aircraft
- Potential RWR for aggressor training aircraft
- Use 'collection mode' on covert surveillance missions, to avoid transmission to the ground.



Land

Augment ground based radar systems with multiple passive MicroESM sensors to build a more complete picture of the enemy's electronic order of battle. The more sensors deployed, the more resilient the system. ESROE sensors can be deployed to an individual or team, or networked across a battlefield, along a border, or a coastline, to extend surveillance capabilities way beyond what is currently possible with legacy solutions.

- Build a picture of enemy's order of battle
- Detect and locate hostile artillery and attack helicopters
- Protect ground forces by alerting to enemy units nearby
- Mount on lightly armoured or unarmoured vehicles to gather additional intelligence
- Soldier-worn sensors can be used on the move.



Sea

Achieve reliable non-cooperative target location across vast search areas to improve threat warnings, e.g. for anti-ship missile defences. Detect and identify ships that have gone dark, or deploy ESM on covert surveillance vessels to gather operational intelligence from the hardest to reach locations. MicroESM enables EW to become pervasive across oceans and along coastlines.

- Extend ESM to insertion craft and patrol boats and minesweepers
- Detect and locate anti-ship missiles, bomber aircraft or other warships
- Perform covert pre-mission surveillance of beachheads by adding sensors to USVs
- Use on UUVs to provide extra, low cost protection to surfacing vessels by detecting anti-submarine aircraft and fishing boats.

## Flexible deployment

Reducing the typical £1M investment in a minimum 50 Kg ESM sensor system, to an under £150K, < 2 Kg solution, MicroESM is transforming access to and the use of ESM in contested environments.

The all aluminium sensor design lends itself well to a transformatively wide range of military use cases, whilst the modularity of the system also means it is possible to integrate small sensor heads into more traditional platforms.

ESROE also offers standalone software applications which can be embedded in Electronic Surveillance suites, used in a range of military platforms.

## Technical Highlights

ESROE's MicroESM solutions are available in a variety of configurations to meet user requirements, but each model shares a core set of technical attributes:

- Frequency coverage: 2 GHz to 18 GHz
- Weight: < 2 Kg
- Operating voltage: 10-18v DC
- Power consumption: < 20 Watt
- Power source: BB2590 or LIPS 14 batteries
- Coverage: 360 degrees
- Operating range: Line of sight

## COTS packages

ESROE's standard MicroESM systems come complete with ruggedized tablet display, two ruggedized battery packs and charger, lightweight carbon fibre tripod and ruggedized cables. Other model specifications (see table below) provide even more flexibility of deployment.

To discuss your ESM requirements, get in touch via [esroe.com](http://esroe.com)

MicroESM Model	Tablet	Laptop	GLAMDRING integration	NanoONYX	Application / Use case
1t	✓				<ul style="list-style-type: none"> <li>• Man portable system</li> <li>• Temporary stationary unit</li> </ul>
1l		✓			
1vt	✓				MicroESM sensor mounted on vehicle with tablet connected via ethernet cable. <ul style="list-style-type: none"> <li>• Rapid incursion vessel</li> <li>• Vehicles that operate in low profile</li> </ul>
1l			✓		MicroESM uses platform's computing/ processing module on platform with internal display
1ni			✓	✓	Includes MicroESM processing software on NanoONYX <ul style="list-style-type: none"> <li>• Armoured vehicle with own display</li> </ul>
1nvt				✓	MicroESM processing software on a NanoONYX <ul style="list-style-type: none"> <li>• Patrol boat</li> <li>• Armoured vehicle without own display</li> </ul>