Contribution of MicroESM to the achievement of Information Superiority in the Modern Battlespace

A whitepaper by ESROE's Tom Beese and Jon Roe

Abstract: Current conflicts have highlighted the urgent need for agile, pervasive electronic intelligence to outpace evolving threats. MicroESM answers this call with a radically deployable solution that brings accurate radar detection capability to even the smallest platform. This paper explores how MicroESM unlocks new tactical possibilities, shifting the paradigm in electronic warfare and enabling commanders to dominate the electromagnetic environment.

ESROE

Identifying the Spectrum

The limitations of traditional RESM systems in modern battlespaces

The modern battlespace, as evidenced in the Ukraine, has brought radar back into sharp focus. Radar plays a key role in battlefield surveillance and in modern weapon systems, including anti-armour, artillery, and air defence. This, in turn, is driving the critical importance of rapidly suppressing these radar systems as a fundamental element within the concept of achieving information superiority.

Within Electronic Warfare, achieving detection, identification and location of radar systems is through the use of Electronic Support Measures (ESM) systems. Such systems have been developed over decades, but the challenge within NATO and the 5-eyes nations radar ESM (sometimes known as RESM) is that their cost, size, complexity and power consumption mean that they are generally only on a limited number of large, very high value platforms such as warships and surveillance aircraft. Even in the land battlespace large vehicles have been required to transport and operate such equipment and the cost of even these smaller platforms has limited the numbers available in operations.

Because of this value and scarcity, most existing RESM capability and the platforms carrying it, tend to be deployed in “stand off” positions to avoid exposure to significant threat. This limits how effective these systems can be. It also drives up the performance requirements on the RESM equipment, particularly in terms of receiver sensitivity needed to ensure that radar threats and radar signals of interest can be detected at long range. The result is that individual systems cost into the $M’s.

The size, complexity and power consumption of traditional RESM systems make them incompatible with unmanned vehicles dominating modern battlespaces

Redesigning RESM for tactical advantage whilst maintaining near-peer performance

MicroESM delivers a breakthrough on these limitations. Complementary with existing systems, MicroESM’s very low size (< 2Kg) and power consumption (<20W), combined with low cost ($100K’s) mean that it can be placed anywhere in the battlespace and on any platform, and while delivering most of the performance of existing mainstream systems.

MicroESM also moves beyond providing a bearing to a detected radar. Deployed for battlefield surveillance or suppression and targeting, and whether a single system on a UAV flying appropriate flight patterns, or one of many systems across different platforms - or man-packed - MicroESM can deliver radar target geolocation.

Redesigned with a very low SWAP, MicroESM can be UAV-mounted (see feet for size comparison)

High impact, high resilience MicroESM

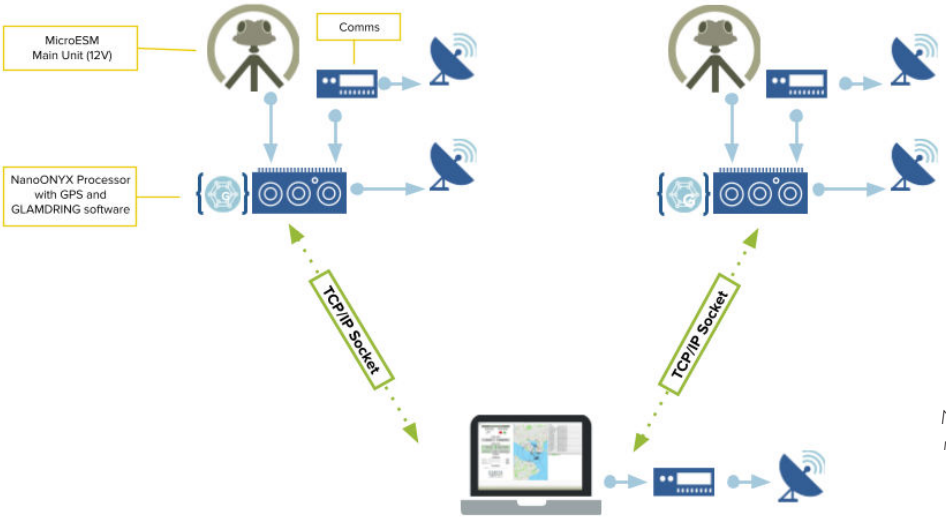
Unlike large systems on high value platforms, the presence of MicroESM in a battlespace is almost impossible to detect, due to its small size and very low power consumption, with resulting low heat signature. This ensures high impact and high resilience, capabilities further enhanced through a networked array of devices being able to autonomously heal any gap which is detected.

All of these features make MicroESM eminently suitable for operation by land forces in large numbers, whether soldier-borne, on locally operated UAS, or other manned or unmanned vehicles. Remote operation means that it can be used as an unattended ground sensor with a very low detection profile whilst providing intelligence on active radars. In these roles receiver sensitivity is less of an issue, because range to the target radar may well be relatively short.

MicroESM creates the possibility of a move away from dedicated signals units to the embedding of the capability within a much wider range of activities. This is true, not only for Army units, but also Navy and Air Force, where it can be deployed on lower value platforms. In particular, the ability to enable remote access means that many sensors can be controlled from a remote location by a small number of skilled operators, obviating the need for an increase in specialist signals personnel. Any deployment where a large number of such systems can be present creates the possibility for accurate geolocation of radar targets as well identification and direction finding.

The presence of MicroESM sensors in the battlespace provides near real time information on the presence of radar systems of interest which cannot be provided from longer range sensors. The battlespace can be covered by many hundreds or thousands of such sensors, networked together and controlled by a small number of operators, providing more comprehensive information than can be provided in a traditional NATO/5-eyes operation.

MicroESM is person-portable and fully autonomous, controlled from a remote location, obviating the need for an increase in specialist signal personnel



Networking MicroESM sensors provides accurate near real time geolocation of radar targets, as well as radar identification and direction finding

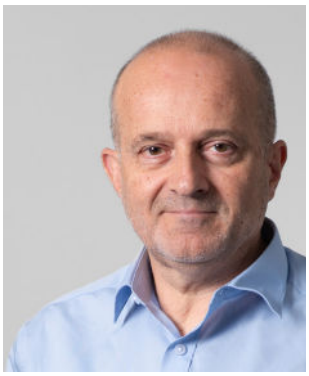
Conclusion

The war in Ukraine has starkly illustrated the central role of radar in modern warfare. Both sides have relied heavily on radar for detecting air and ground threats, guiding artillery, and enabling layered air defence. As a result, radar systems have become high-value targets, and the ability to detect, locate, and neutralize them—quickly and precisely—has proven decisive. The conflict has also shown the limitations of relying solely on large, vulnerable platforms for electronic sensing, reinforcing the need for low-profile, distributed alternatives that can operate at the tactical edge.

MicroESM delivers exactly the kind of distributed, low-signature capability that modern forces require. By enabling persistent, close-in detection of radar threats across all domains—land, air, and sea—it transforms the Electronic Support Measures landscape. Its agility, affordability, and deployability across a wide range of platforms make it a scalable force multiplier. In an era where electromagnetic awareness is key to survival and success, MicroESM is not just a technical innovation—it is a tactical necessity.

Tom Beese is a seasoned technology executive with decades of experience in the computing industry and an impressive track-record of bringing breakthrough technologies to market. His leadership is characterised by a focus on scaling high-growth, high-tech ventures and fostering advancements in cybersecurity and electronic warfare.

As Executive Chairman of ESROE, specialist in radar electronic support measures, Tom brings a wealth of strategic and operational expertise to the forefront of defense innovation, and is championing the use of ESROE's accessible MicroESM technology in the civilian market for the very first time.



Jon Roe has established an international reputation in the field of Electronic Support Measures, having spent 25 years as a scientist at the UK's Defence Science & Technology Laboratory (Dstl) researching new techniques for the automatic processing of radar signals. He was also instrumental in defining the specification of all of the Royal Navy's ESM systems from the mid 1980's to the early 2000's.

Today, he is CEO and founder of ESROE, a company that harnesses his deep domain knowledge to lead significant breakthroughs in MicroESM, which is transforming access to and the use of ESM in the land, sea and air battle spaces, as well as in coastal maritime surveillance and other civilian applications.