DEFENSE



LARS WINBERG
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"My naval career began in Karlskrona, Sweden, where I served aboard a Hugin-class Fast Attack Missile Vessel, gaining hands-on experience with advanced radar and missile launch systems. This foundational exposure to high-tech combat systems led to a professional naval path that included service across multiple vessel types, including mine layers, broadening my understanding of surface warfare and naval defense operations.

The core of my expertise lies in submarine operations, developed through extensive service on Näcken-class diesel-electric submarines. There, I specialized in underwater acoustic systems—critical for stealth and surveillance—while maintaining broad technical proficiency across key submarine platforms. This experience has shaped me into a versatile defense specialist with deep capabilities in both surface and subsurface naval domains."

GRAS

An Axiometrix Solutions Brand

Acoustic Intelligence powered by GRAS Sound & Vibration

CHALLENGE:
Acoustic detection on the Battlefield requires ruggedized and purpose developed microphones

ACTION:
Technical and functional analysis, tested against MILSTD

SOLUTION:
Custom built microphones for specific defense purposes

BENEFITS:
Acoustic detection that works under the harshest conditions



Operating in combat zones presents unique acoustic detection challenges

Modern warfare increasingly depends on automated, sensor-driven technologies to gain a strategic edge in complex environments. As visual and electromagnetic systems face limitations due to terrain, weather, or adversary countermeasures, acoustic intelligence has emerged as a crucial capability for threat detection and situational awareness.

At GRAS Sound & Vibration, we specialize in delivering high-precision, ruggedized microphone solutions that enable defense customers to detect, localize, and classify acoustic events—even under the harshest conditions. Our experience in designing industry-leading measurement microphones extends into the battlefield, where precision, reliability and durability are mission-critical.



What GRAS Delivers to the Defense Sector

Ruggedized Acoustic Solutions Built for battlefield environments.

GRAS microphones are engineered to withstand:

- ✓ Wide temperature ranges, high humidity, and rapid thermal cycling
- ✓ Mechanical shock and vibration, in line with MIL-STD-810
- ✓ Dust, water ingress (IP-rated enclosures), and high acoustic pressure levels

Our ruggedized microphones retain their performance and sensitivity—even after long-term deployment in the field—delivering consistent data in every mission scenario.

The Defense Challenge

GRAS meets these challenges head-on by engineering microphone solutions that combine measurement-grade acoustic fidelity with military-grade durability.

The following case, shows how we have standardized the process to ensure that we meet every expectation and demand in every defense project.

The microphone is the core!

Together with the customer, we analyse the technical specifications for the microphone in question. When it comes to acoustic detection, it is important that the technical specifications for the microphone satisfy the needs in the complex environment of the battlefield. Impulse noise can easily do harm to lower quality microphones which can cause them to malfunction for seconds. This is where our technical expertise comes to play – and we have learned that this is highly valued by our defense customers.



Tested against Military Standards

We ensure our microphones are fully compatible with defense requirements:

- MIL-STD-810 for environmental endurance
- MIL-STD-461 for electromagnetic interference
- ITAR/EAR awareness and support, enabling secure international cooperation

GRAS provides comprehensive documentation, traceability, and validation to support procurement, audits, and long-term support contracts.

Environmental analysis

You know it better than we do – the battlefield is an extremely complex environment to operate within. Impulse noise from ballistic weapons, buildings, the landscape and also factors like humidity, temperature, air pressure and weather ads to the complexity. Throughout decades of collaboration with defense customers, we have proven that we can develop microphones that can conquer even the toughest conditions and provide the basis for acoustic detection.

High-Fidelity Sound Detection in Complex Environments

With more than 30 years of experience in precision acoustics, GRAS delivers:

- Ultra-low self-noise microphones to detect low-SPL targets such as drones or distant gunfire
- Wide dynamic range solutions to capture everything from whispers to blasts (up to 194 dB)
- Customizable microphone assemblies for integration into soldier systems, UAVs, ground vehicles, and sensor arrays





The daily use of the system

Equally important to the technical specifications and the ability to withstand the challenges within the battlefield is a deep understanding of the daily use of the armed forces. When we develop microphones for defense purposes, we thoroughly analyse the use case to explore every possible cause that can lead to malfunction. Our analysis ensures that we go through the form factor of the mounting of the microphone, physical protection from dust, water and so on.

In GRAS Sound & Vibration we are confident that our capabilities, our multi decade expertise and our ability to customize microphones in shape, size, technical performance and so on is the key to the life-long collaboration we have with leading defense manufacturers – and we are confident that this will be a benefit for your projects too.

Integration with Tactical Platforms

GRAS solutions are compatible with:

- ✓ Low-power embedded systems
- ✓ Tactical edge computing platforms
- ✓ EMI-shielded, cyber-resilient networks

Our team supports integration from concept through deployment, with mechanical, electrical, and data interface customization as needed.



Why GRAS?

Defense customers choose GRAS because we offer:

- **Proven technology:** Trusted in the most demanding measurement environments worldwide
- **Custom engineering:** Tailored mechanical and electrical solutions for mission-specific needs
- **Lifecycle commitment:** Product longevity, obsolescence planning, and full documentation
- **Field survivability:** MIL-validated, ready-to-deploy sensors that work in the battlefield environment

Conclusion: Tactical Sensing Starts with GRAS

In today's defense environment, a microphone is not just a transducer—it's a tactical sensor. GRAS Sound & Vibration delivers the precision, durability, and confidence needed to detect threats acoustically and make sound-based intelligence a core part of defense strategy.

Whether on a UAV, in a vehicle, or on a soldier, GRAS is the partner of choice for reliable acoustic performance on the edge of battle.

ABOUT GRAS SOUND & VIBRATION

GRAS is a worldwide leader in the sound and vibration industry. We develop and manufacture state-of-the-art measurement microphones to industries where acoustic measuring accuracy and repeatability is of the utmost importance in R&D, QA and production. This includes applications and solutions for customers within the fields of aerospace, automotive, audiology, and consumer electronics. GRAS microphones are designed to live up to the high quality, durability and accuracy that our customers have come to expect and trust.
GRAS Sound & Vibration is represented through subsidiaries and distributors in more than 40 countries and is part of Axiometrix Solutions, a leading test solutions provider comprised of globally recognized measurement brands.

GRAS Sound & Vibration
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