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## From the Editor



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Welcome to UnderCurrents, where we shine a light on the innovations reshaping undersea operations and subsea technology. At this time of year, we also pause to remember the ANZACs and the extraordinary service and sacrifice that underpins the freedoms we enjoy today. Their courage and resilience remain central to Australia and New Zealand's military heritage.

While the future of warfare will look very different from the beaches of Gallipoli, the core objective remains the same: protecting people and national interests in increasingly complex and contested environments. Today's conflicts are shaped less by clearly defined front lines and more by information dominance, persistence, and technological advantage — particularly in the maritime domain.

In this edition, UnderCurrents highlights the systems and technologies redefining modern warfighting and maritime security. Autonomous platforms, mission management tools, and advanced autonomy software are transforming how operations are conducted, offering new perspectives beneath the surface while reducing risk to personnel. These technologies provide a decisive advantage — enhancing situational awareness, responsiveness, and decision making.

We invite you to stay connected with UnderCurrents as we continue to track the ideas, technologies, and capabilities shaping the future of undersea operations.

If you have any questions or feedback, we'd love to hear from you at [sales@bzg.com.au](mailto:sales@bzg.com.au).

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# Foreword



In this edition of BZG Under Currents, we return to a subject that rarely stays quiet for long: mine warfare.

In my article, 'The Mine Warfare Cycle', I explore how sea mines have an unsettling habit of fading from attention between conflicts—only to re-emerge at moments of global tension and real strategic consequence. Current activity and periodic escalation in and around the Strait of Hormuz are a timely reminder of this reality. The mere threat of sea mining in this narrow chokepoint continues to have an outsized influence on global shipping, energy markets and economic stability. It reinforces a simple truth: sea mines remain one of the most potent asymmetric tools available for disrupting global economies.

That reality underlines why mine countermeasures capability is never a "nice to have". It is a standing requirement, even when the headlines move on.

Here in Australia, BlueZone Group continues to assist the Royal Australian Navy with equipment and support services that underpin mine warfare operations when they are required. This includes ensuring systems are ready, supported and operable in demanding conditions, and that skills and sustainment arrangements remain credible over time. Mine warfare is not something that can be surged from a standing start, it demands preparation, experience and trusted partnerships.

On a more personal note, my perspective is informed not only by history and analysis, but by operational experience during the Iran–Iraq Tanker War and the First Gulf War. That experience reinforced a simple truth: effective mine countermeasures are built on disciplined processes, trained people and reliable equipment, applied consistently in complex and unforgiving environments. Technology matters, but only when it is integrated into a system that works under pressure.

Looking ahead, mine warfare itself continues to evolve. The threats are changing, operating environments are becoming more complex, and the expectations placed on those conducting mine countermeasures are higher than ever. Maintaining effectiveness now requires the adoption of new equipment, improved integration and modern ways of operating, designed not only to counter the threat, but to better protect the people who must confront it at sea.

This understanding continues to shape how we work with the Australian Defence Force: practical, realistic and grounded in what is required to succeed. It also reinforces the strength and relevance of the long standing relationship between BZG and the ADF.

**NEIL HODGES**  
Managing Director  
BlueZone Group

# REMUS 620

## and the Power of Modular Underwater Autonomy

Maritime mine warfare continues to evolve, driving defence forces toward uncrewed, modular, and networked underwater systems that reduce risk to personnel while sustaining operational tempo in complex littoral environments. HII's REMUS 620, a second-generation, medium-class Unmanned Underwater Vehicle (UUV), is purpose-built for this shift: it combines multi-day endurance, open-architecture payload integration, and mission-level software options that support single-vehicle tasking as well as collaborative, multi-vehicle operations.

### A Medium-Class UUV Designed for Mine Warfare Outcomes

For mine countermeasures (MCM) and explosive ordnance disposal (EOD) support, the operational value of a UUV is measured by three things: how long it can stay on task, how effectively it can find and classify mine-like objects, and how seamlessly it integrates into the broader MCM kill chain (detect ▶ classify ▶ identify ▶ re-acquire ▶ neutralise). REMUS 620 is designed around these outcomes, offering up to 110 hours of endurance and a maximum range



**ONE PLATFORM, MANY MISSIONS**

of 275 nautical miles, providing the persistence needed to search large areas, sustain re-acquisition patterns, or conduct repeated sorties without exposing crewed platforms to mine risk. This endurance is enabled by modular, swappable rechargeable Li-Ion battery options with recharge in-vehicle listed at 12 hours, supporting operational flexibility and rapid turnaround during sustained task groups or deployed operations.

### High-Accuracy Navigation: The Foundation of Reliable Re-Acquisition

In mine warfare, navigation accuracy directly impacts probability of re-acquisition, especially when coordinating multiple vehicles and correlating contacts across sorties. REMUS 620's standard navigation suite includes an iXblue Phins C7 INS (accuracy 0.01% of distance travelled), paired with a Teledyne RDI 300 kHz phased-array DVL with 500 m bottom lock, plus GPS and support for LBL and DVL-aided dead reckoning. The result is a platform designed to deliver the consistent georeferencing needed for mine-like object contact reports, repeatable track lines, and accurate cueing of follow-on assets; key to shortening the "sensor-to-effect" timeline in MCM operations.

### Payload Flexibility and Open Architecture for Mission Modularity

REMUS 620 is built around a modular, open architecture that supports rapid reconfiguration between mission sets, incorporating customisable dry or wet primary payload modules, externally accessible secondary payload interfaces, and open standards to minimise integration effort and lifecycle cost. For defence operators, this matters because mine warfare rarely exists in isolation: hydrographic survey, ISR, and route survey tasks frequently occur adjacent to MCM operations. REMUS 620 is explicitly positioned to shift between missions including mine countermeasures, hydrographic surveys, intelligence collection, surveillance, and electronic warfare, supporting multi-mission force packages without needing separate bespoke vehicles for every task.

### Mine Warfare Sensors: Synthetic Aperture Sonar (SAS) at the Core

A standout capability for MCM is REMUS 620's integration options for Kraken Synthetic Aperture Sonar (SAS). Kraken SAS offers constant resolution of 3 cm × 3 cm (post-sortie processing, with an option for real-time), and swath widths up to 236 m with MINSAS 60, and up to 440 m with MINSAS 120; a powerful combination for wide-area search and high-confidence classification.

Importantly, REMUS 620 performance is shown with these payloads installed, indicating realistic endurance/range trade-offs under operational payload loads:

- **With MINSAS 60 (Dry Payload):** endurance up to 78 hours and range up to 205 nm (with 3× battery option).
- **With MINSAS 120 (Wet Payload):** endurance up to 50 hours and range up to 132 nm (with 2× battery option).

This is highly relevant for MCM planners, as it supports mission design decisions including number of vehicles required, sortie durations, and coverage rates while maintaining data quality for contact detection and classification.

### Data Handling and Onboard Processing to Support Modern Workflows

REMUS 620 includes 4-16 TB solid-state storage, with an externally removable option, and an NVIDIA Jetson AGX Xavier payload processor; a configuration aligned with the growing need to handle large high-resolution sonar datasets and enable advanced onboard processing. This architecture supports operational pathways such as faster post-mission exploitation and, where implemented, edge processing approaches that can reduce the time from collection to actionable outputs.

REMUS 620's payload ecosystem includes technologies that align strongly with the Australian market, including Kraken SAS payload options; capabilities that can be further strengthened when paired with mission management and autonomy frameworks such as the HII Odyssey™ suite and SeeByte SeeTrack/Neptune.



This combination positions REMUS 620 as a highly relevant capability for Australia's ongoing investment in uncrewed maritime systems, force protection, and MCM mission readiness.

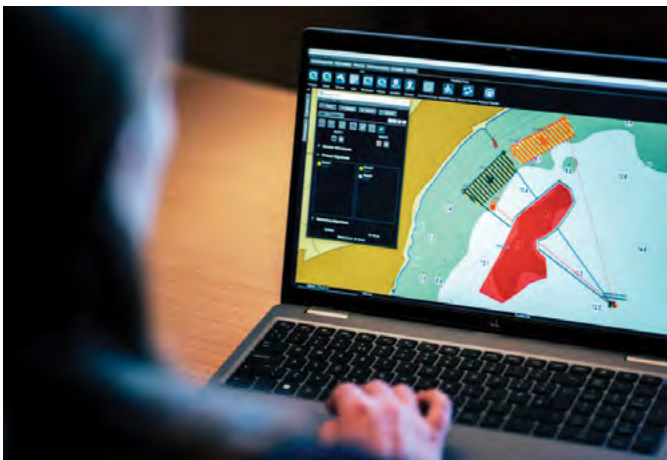


#### READ MORE

For more information on HII's REMUS 620, please contact the BlueZone Group sales team.

# Mission Autonomy in Mine Countermeasures: Coordinating the Uncrewed Fleet with Seebyte

In an era of contested seas and reduced tolerance for risk, mission level autonomy has become the backbone of effective defence operations.



Neptune Software (photo credit: Seebyte).

The rapid evolution of maritime mine warfare has driven navies to adopt increasingly autonomous approaches to mine countermeasures (MCM) and explosive ordnance disposal (EOD). As fleets move away from single platform operations toward coordinated teams of robotic and autonomous systems (RAS), the requirement for robust mission level autonomy software has become critical to reduce risk to personnel, accelerate mission timelines, and operate effectively in contested or communications degraded environments. SeeByte's Neptune software has emerged as a key enabler in this space, specifically tailored to complex defence environments. Already adopted by the US, UK, and Dutch Navies, Neptune represents a significant step forward in the orchestration of multi vehicle autonomous missions.

## Mission Level Autonomy Designed for Defence

Neptune is not a vehicle controller; rather, it operates at the mission level, coordinating squads of heterogeneous Remote and Autonomous Systems (RAS) to achieve complex operational objectives. The software assigns goal based plans and objectives according to the individual capabilities of each asset, ensuring that every platform is employed where it is most effective. By automating task allocation and coordination, Neptune augments human decision making and allows operators to focus on mission outcomes rather than vehicle micromanagement.

A defining feature of Neptune is its ability to run multiple tasks in parallel, dynamically reallocating responsibilities as conditions evolve. Vehicles can automatically take ownership of tasks, swap roles, or compensate for malfunctions, significantly improving mission resilience. This approach is particularly valuable in mine warfare scenarios, where environmental uncertainty and operational tempo demand rapid adaptation.

## Decentralised Control for Contested Environments

Mine warfare operations frequently take place in communications restricted or denied environments, where reliance on constant links to a central control station is neither realistic nor desirable. Neptune addresses this challenge through a decentralised autonomy architecture,

allowing vehicles to continue operating even when communications are degraded or intermittent.

On board artificial intelligence enables in mission adaptation, allowing Neptune to respond to changes in mission objectives, environmental conditions, or vehicle availability. RAS, operating under Neptune's control, collaborate and adjust their behaviour autonomously to ensure mission success, a critical capability for modern naval forces operating in complex littoral and expeditionary environments.

### **Proven Application in Mine Countermeasures and EOD**

Neptune has been specifically developed with MCM and EOD missions in mind and is already operationally proven in this domain. Its ability to coordinate multiple unmanned platforms makes it well suited to distributed mine hunting, classification, and re acquisition tasks. By integrating sensor data, mission planning, and adaptive tasking, Neptune enables a more efficient and safer approach to mine warfare, reducing the need for crewed vessels to operate in hazardous areas.

The software supports a wide range of sonar and sensor formats commonly used in mine warfare, including side scan sonar from EdgeTech, Klein (MIND Technology), as well as forward looking sonar such as Teledyne BlueView. This broad sensor compatibility ensures Neptune can be deployed across existing and future naval RAS fleets.

### **Integration with Third Party Vehicles and Systems**

A key strength of Neptune lies in its commercially controlled open architecture. Rather than locking users into proprietary ecosystems, Neptune is designed to integrate seamlessly with third party vehicles, sensors, autonomy behaviours, and signal processing functions. This is achieved through SeeByte's Software Development Kit (SDK), which allows defence organisations and industry partners to tailor Neptune to their specific operational needs. Neptune currently supports a variety of widely used unmanned platforms, including HII REMUS, ATLAS SeaCat, and MARTAC Mantas vehicles. This demonstrates its suitability for mixed fleet operations, where different classes of autonomous systems must work together under a single mission framework. Such interoperability is increasingly important for allied and coalition operations, where platform diversity is the norm rather than the exception.

### **Scalable Architecture from Edge to Mission Command**

From a systems perspective, Neptune is designed to operate across a range of hardware configurations, from embedded processors onboard vehicles to operator workstations. The software can run on lightweight embedded platforms such as Intel Atom or Raspberry Pi systems and can be scaled to more powerful configurations using NVIDIA Jetson hardware when AI/ML capabilities such as automatic target recognition (ATR) are required.

Neptune integrates with SeeByte's SeeTrack environment, providing a coherent ecosystem for mission management, situational awareness, and data exploitation. Support for standard geospatial formats, including S 57 and S 63 ENC, ESRI Shapefiles, and GeoTIFF, ensures compatibility with naval charting systems and existing command and control workflows.

### **Australian Representation through BlueZone Group**

For Australian defence, BlueZone Group serves as the local representative for SeeByte, providing access to Neptune and the broader SeeByte autonomy portfolio. Through this partnership, Australian naval and defence organisations can engage directly with a proven, internationally adopted mission level autonomy solution while benefiting from local expertise, support, and integration capability.

As Australia continues to invest in autonomous and uncrewed systems for maritime security, mine countermeasures, and force protection, Neptune offers a scalable and interoperable software backbone capable of integrating with both current and future RAS platforms. The combination of SeeByte's operationally proven autonomy software and BlueZone Group's Australian presence positions Neptune as a compelling solution for sovereign and allied defence applications.



#### **READ MORE**

SeeTrack: The Defence Ready Command and Control System for Maritime Autonomy

For more information on SeeByte's Neptune Software, please contact our sales team.

# Artemis IRIS

## Mission Ready Technology for Blackwater Diving Operations

In challenging underwater environments where visibility is almost non-existent, seeing clearly can be the difference between success and failure; and this is exactly where Blueprint Subsea's ArtemisIRIS excels.



This month BlueZone group had the pleasure of supporting a demonstration of Blueprint Subsea, part of the AION Group, ArtemisIRIS for the NSW Police Diving Unit. Taking place off Balmain, with known wreckages nearby, it set the perfect scene to display the benefits of the IRIS heads up display.

## What is IRIS?

ArtemisIRIS is a next-generation helmet-mounted sonar imaging system engineered for divers operating in extreme underwater conditions. IRIS delivers real-time, ultra-high-resolution sonar imagery directly to a high-definition binocular display, overcoming low visibility, murky and black water environments, ensuring diver situational awareness is maximised.

## Benefits of IRIS in Application

IRIS enhances diver safety and operational effectiveness by combining advanced sonar imaging with a diver-centric, mission-ready design. Its dual frequency sonar capability allows divers to seamlessly switch between wide area scanning and high-resolution close-range imaging, supporting confident navigation and rapid target identification even in zero visibility conditions. By delivering critical situational awareness directly within the diver's field of view, IRIS reduces uncertainty, lowers cognitive load, and minimises time spent searching; key factors in improving both safety and dive efficiency.

The system's ergonomic weight distribution and compatibility with leading helmet platforms, including Gentex Ops Core and Future Safety, ensure comfort and stability during extended missions, helping divers maintain focus and performance over longer bottom times. Engineered for reliability in demanding environments, IRIS features a robust PEEK and anodised aluminium construction rated to 100 metres and extreme operating temperatures, -10°C to +45°C, while a removable lithium-ion battery provides up to two hours of operation. An intuitive three button interface enables simple, low distraction control in high stress scenarios, supporting faster decision making and contributing directly to successful mission outcomes.

## Enhanced Capabilities for Police

Blueprint Subsea's Artemis range delivers significant benefits for Police Diving operations by improving safety, efficiency, and operational outcomes. The ArtemisHHS enables divers to rapidly survey large areas in zero

visibility or blackwater conditions, allowing teams to locate targets faster and reduce overall dive time, while the ArtemisIRIS provides high resolution, in-water inspection for detailed identification and confirmation. This capability is particularly valuable for hull inspections to detect concealed drugs, port and harbour clearance tasks for EOD operations, and body recovery missions in challenging environments. By giving divers the ability to "see" in blackwater and maintain awareness of their surroundings, the system also enhances diver safety, including increased protection when operating in areas where hazardous wildlife such as crocodiles or sharks may be present; a huge advantage in Australian waters.

## BlueZone Group in partnership with Blueprint Subsea

This demonstration would not have been possible without the expertise and support of Blueprint Subsea. We sincerely thank the Blueprint Subsea team for taking time out of their travels to be present, share their knowledge, and contribute their technical insight. The success of this demo also reflects the strong and trusted relationship between BlueZone Group and Blueprint Subsea, with BlueZone Group proudly representing Blueprint Subsea across Australia and New Zealand. This partnership enables us to deliver worldclass subsea solutions locally and provide our customers with direct access to leading global technology and expertise.



### READ MORE

Safer Summers: Innovation Beneath the Waves with ArtemisSAR and StarFish

Blueprint Subsea's Artemis HHS Takes the Spotlight on 7 News!



Beyond the Surface: ArtemisSAR Enhances Diver Safety in Hostile Waters

For more information on Blueprint Subsea products, please contact our sales team.

# Kraken MP SAS

Portable Synthetic Aperture Sonar for  
Modern Maritime Missions



Kraken SAS integrated onto REMUS (photo credit: Kraken Robotics).

## With Kraken's MP SAS and BlueZone Group's trusted in country support, Australian operators can now access a proven, portable SAS solution built for modern maritime missions.

As the demand for high fidelity seabed intelligence continues to grow across defence, offshore energy, environmental monitoring, and hydrographic survey sectors, operators are increasingly seeking compact, low logistics solutions that do not compromise on data quality. Kraken Robotics' MP SAS (Man Portable Synthetic Aperture Sonar) delivers exactly that: a lightweight, modular, and field proven sonar system that brings world class SAS capability to small class autonomous underwater vehicles (AUVs).

Built on Kraken's industry leading SAS technology, the MP SAS has been engineered specifically for platforms where size, weight, and power constraints have traditionally limited sonar performance. The system integrates seamlessly into UUVs with diameters as small as 7.5 inches, enabling advanced imaging and bathymetry on vehicles that previously relied on lower resolution sidescan systems. Despite its compact form factor, the MP SAS achieves ranges of up to 100 metres per side, delivering real time SAS resolution of 3 cm × 3 cm and post processed imagery as fine as 2 cm × 2 cm. This level of detail allows operators to detect, classify, and map seabed features with exceptional clarity.

Portability is at the heart of the MP SAS design. Its 60 cm lightweight transducers and modular payload section can be added or removed in the field without recalibration,

dramatically simplifying logistics and reducing turnaround time between missions. Rated to 300 metres, the system is ideal for coastal, harbour, and continental shelf operations, while maintaining the robustness required for demanding military and commercial environments. The MP SAS also supports real time full swath processing, enabling embedded automatic target recognition (ATR) and advanced autonomy features that reduce operator workload and increase mission efficiency.

Kraken's SAS technology is not experimental — it is a proven, operationally deployed capability trusted globally for mine countermeasures, port and harbour security, infrastructure integrity surveys, and broad area habitat mapping. With constant resolution across the entire swath and one of the industry's highest area coverage rates, the MP SAS enables operators to complete missions two to three times faster than traditional sidescan sonar systems.

In Australia, Kraken's advanced sonar solutions are backed by BlueZone Group, the trusted in country support partner for maritime robotics and underwater sensing technologies. With decades of experience supporting defence, research, and commercial customers, BlueZone provides local expertise, maintenance, integration support, and rapid response capability — ensuring Australian operators receive the full benefit of Kraken's cutting edge technology with reliable, domestic support.

Compact, capable, and combat proven, the Kraken MP SAS represents a new standard in portable synthetic aperture sonar. Whether deployed on legacy UUVs or integrated into next generation platforms, it delivers the high resolution seabed intelligence required for modern maritime operations — without the logistical burden traditionally associated with high end sonar systems.

High Resolution Synthetic Aperture Sonar providing higher-grade information that reduces the cost and time required to make critical decisions.



### READ MORE

For more information on Kraken Robotics MP-SAS, please contact our sales team.



# The Mine Warfare Cycle

# MINE WARFARE REMAINS PRESENT, DULL, DARK, AND DANGEROUS

By Neil Hodges

I began my career in Mine Warfare (MW) in the mid 1980s. At that time, I could not have predicted that I would remain engaged in MW for over four decades, but here we are!

One pattern has repeated with remarkable consistency: sea mines fade from attention during quiet periods, only to reemerge when the consequences of neglect are most expensive and measured not just in naval risk, but in delayed ships, higher fuel costs, and rising prices far from the sea.

Mine warfare is one of the clearest examples of asymmetric conflict at sea, where a cheap, simple weapon can threaten assets worth billions. Mines are relatively easy to make and deploy, but difficult to detect and remove. They do not need to sink ships to be effective. They merely need to create doubt.

This article is not intended as a critique of any one navy or nation. Instead, it is offered as a practical reminder, a lifecycle that many maritime states have experienced in different ways.

Understanding this cycle matters, because mistakes in Mine Warfare are rarely confined to the naval domain. They spill quickly into global trade, energy prices, insurance markets, and ultimately everyday cost of living.

## STEP 1

“Mines are yesterday’s problem”

Mine warfare is often judged by the absence of visible outcomes. When mine countermeasures work well, nothing dramatic happens. Ships pass safely. Ports remain open. Trade flows normally. From the outside, it can appear as though the capability is unnecessary, particularly to decision makers balancing tight budgets and competing priorities. This creates a dangerous illusion. When defence budgets tighten or priorities shift, mine warfare is frequently viewed as a low yield investment. It lacks the visibility of major surface combatants or aircraft. Its success cannot be easily showcased. Over time, this leads to reduced platforms, smaller specialist workforces, and thinning experience.

The first step in the cycle is rarely a deliberate decision to abandon mine warfare. More often, it is a gradual assumption that the problem belongs to the past or can be addressed later if needed.

## STEP 2

The reminder arrives

Then something happens. Often suddenly. When tension rises or conflict emerges, mines remain an attractive option precisely because of their asymmetry. They are inexpensive relative to the assets they threaten. They exploit chokepoints and constrained waters. And critically, they influence behaviour long before clearance begins.

Shipping slows. Routes change. Insurance premiums rise. Commercial caution sets in. Even the suspicion of mines can impose real economic cost. The effect is not limited to naval operations; it propagates rapidly through supply chains and energy markets. This is the moment when interest in mine warfare returns, often urgently.

## STEP 3 Rebuilding what cannot be surged

After a shock, investment flows back in. Navies re-learn what mine warfare professionals already know: the difficult part isn't laying mines, it's finding and clearing them in an environment that is noisy, complex, and uncertain. Mine countermeasures is not a single piece of equipment. It is a combination of sensors, trained people, procedures, and confidence in the results. All of these elements have to work together in noisy, uncertain environments and they take time to build.

Historically, this "rebuild" phase tends to emphasise platforms, dedicated minehunters and specialist crews, because that's how Mine Warfare was done for decades.

## STEP 4 The slow drift

Eventually, the immediate pressure eases. Attention shifts. Other priorities emerge. Platforms age. Specialist pipelines shrink again. The capability does not disappear, but it becomes fragile.

This is a particularly risky phase, because it can look acceptable on paper. There may still be trained personnel, working systems, and credible doctrine, just at reduced scale. The line between "sufficient" and "barely adequate" is often crossed quietly. The cycle then resets.

## STEP 5 Why this matters beyond navies

Mine warfare has always had consequences beyond the military sphere, but those consequences are sharper today.

Global trade relies on predictable maritime movement through narrow and heavily trafficked waterways. Disruption, or even perceived risk, quickly translates into higher transport costs, longer transit times, and increased volatility in energy and goods pricing.

These effects are felt far from the water, by consumers and industries with no direct connection to naval operations. Sea mines are particularly effective in this context because they target certainty. They do not need visibility or escalation to work. Their power lies in doubt.

## STEP 6 The cost of late response

When mine threats emerge in earnest, responses tend to be expensive. Crewed platforms are surged. Clearance operations are deliberate and time consuming. Risk is borne by high value ships and highly trained people confronting low cost weapons.

This imbalance has always been the uncomfortable truth of traditional mine countermeasures. It is also why late investment is so punishing. The financial cost is high, but the human risk is higher.

## STEP 7

### A genuine opportunity to break the cycle

There is, however, a meaningful shift underway. Remote and autonomous mine countermeasure systems are changing the economics and risk profile of mine warfare. They are not perfect, and they do not remove uncertainty entirely. But they are now good enough to start building real capability, capability that materially reduces the need to place people in mine danger areas.

The goal is simple: identify, classify and neutralise mines with as little risk to people as possible. When applied sensibly, this approach will become safer, more scalable, and more sustainable over time, even while acknowledging that remote and autonomous systems still rely on human judgement, oversight, and experience.

The use of remote and autonomous systems opens the door to different operational models, deploying capability from shore facilities, vessels of opportunity, or commercial platforms, rather than relying solely on small numbers of specialist ships. This flexibility matters if mine warfare is to be maintained as a standing capability, rather than rebuilt from scratch after each shock.

Importantly, this is not about replacing expertise. It is about using existing expertise more effectively, with better tools, earlier intervention, and lower risk to people, accepting that perfection is unattainable, but improvement is both possible and necessary.

### The lesson worth remembering

The mine warfare lifecycle is not theory. It is a pattern shaped by human nature, institutional incentives, and the challenge of investing in capabilities whose success is measured by the absence of crisis.

The lesson is not that mine warfare should dominate naval planning, but that it should not be allowed to hollow out quietly. The costs of neglect are always paid later, and they are rarely confined to defence budgets.

For organisations involved in maritime security, sustainment, and autonomous systems, the takeaway is simple: readiness is cheaper than recovery. Breaking the cycle requires steady attention, practical investment, and a clear understanding that sea denial remains a live and recurring feature of the global system.

Mines may be a quiet weapon, but their effects are anything but.



# RAPID, RELIABLE, READY: The Littoral Riverine Survey System in Defence Hydrography

When military operations hinge on understanding what lies beneath the waves, deployable hydrographic survey systems like the LRS become essential tools for safe, informed decision making.

Military hydrographic survey operations play a critical role in ensuring safe navigation, operational readiness, and informed decision making by delivering precise, reliable mapping of the seafloor and surrounding maritime environment. It typically involves mapping seabed depth and features, identifying hazards, characterising sediments, and understanding tides and currents. In a defence context, it enables forces to operate safely and effectively in contested or unfamiliar waters.

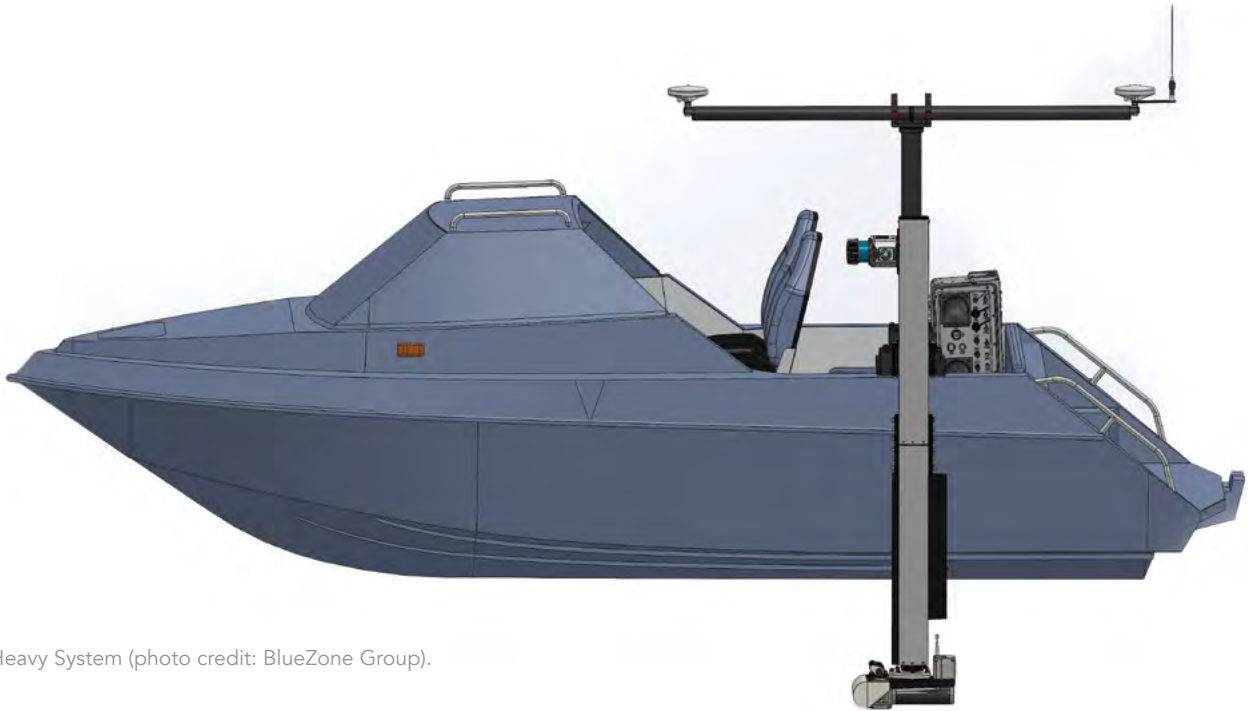
BlueZone Group currently manages the sustainment contract for the Littoral Riverine Survey (LRS) System, a fully deployable hydrographic survey capability designed for rapid use on virtually any available vessel. The system is delivered in both light and heavy configurations,

packaged as portable, commercially flyable kits, enabling rapid mobilisation and seamless operation wherever they are required.

The Light LRS kit offers a highly deployable, efficient survey solution built around CeeHydro's single beam echosounder and mounting hardware, ideal for rapid depth profiling and reliable seabed mapping thanks to its precise vertical measurements and simplicity of



LRS Light System (photo credit: BlueZone Group).



LRS Heavy System (photo credit: BlueZone Group).

mobilisation. Complementing this, the StarFish side scan sonar from Blueprint Subsea enhances the Light kit with exceptional shallow water imaging, providing high resolution CHIRP operation, up to 200m swath coverage, and a lightweight, single person deployable design from a RHIB or small tinny — perfect for fast environmental assessments and target identification.

The Heavy LRS kit, equipped with the Teledyne SeaBat T20 multibeam echosounder, delivers superior data quality through its fully integrated, frequency agile wide band arrays (190–420 kHz), high resolution bathymetry, and fast mobilisation, enabling detailed special-order level 1 surveys with clean, accurate seabed representation and reduced processing time.

Both configurations ensure the LRS system can be rapidly deployed on any vessel of opportunity while maintaining high quality survey outputs tailored to mission requirements.

BlueZone provides significant advantages as a sustainment partner, delivering consistent, long term value through comprehensive technical expertise and customer-focused support. With dedicated ongoing technical assistance, BlueZone ensures systems remain operational, reliable, and optimised throughout their lifecycle. Our focused

engineering team brings deep knowledge of each system, supported by a rich historical issue database and years of hands on experience, meaning end users benefit from fast diagnosis, informed troubleshooting, and effective solutions. The continuity of familiar engineers — who build rapport and trust with clients — creates a seamless support experience that enhances confidence and operational performance. BlueZone's sustainment model includes onsite technical assistance, functional testing, and direct engagement with operators to ensure equipment is performing as intended and any emerging issues are addressed promptly. As Engineer Jacob Smith notes, "As the subject matter experts on this equipment, we're in the best position to provide support to the SPO and the end users, and help them get the most out of this equipment." This expertise-driven approach ensures clients receive not only support, but true partnered sustainment that maximises capability, efficiency, and longevity.



#### READ MORE

Echo Sounders Sonars  
and Sub Bottom Profilers

For more information on Hydrographic Survey equipment and support, please contact the BlueZone Group sales team.

# Advancing ASW Readiness with SEABER's RECALL<sup>®</sup> Micro AUV

As naval undersea threats grow more sophisticated, the demand for smarter, safer, and more realistic operator training has never been greater.



As undersea warfare becomes increasingly complex, navies must rely on autonomous, rapidly deployable systems to ensure effective training and operational readiness. In response, SEABER has engineered a cost efficient solution designed specifically to enhance operator proficiency in undersea environments. SEABER RECALL® is a recoverable microAUV (Autonomous Underwater Vehicle) specifically developed for anti submarine warfare (ASW) training.

Often used in concert with larger, more sophisticated training targets such as the Saab AUV-62 Intermediate Anti-Submarine Warfare Training Target (IASWTT), the Seaber RECALL® augments ASW training activities without risking high value assets.

➤ A core strength of the RECALL® system lies in its ability to accurately reproduce submarine like noise, movement, and acoustic signatures, enabling operators to train against realistic underwater targets.

Its support for passive, active, and combined acoustic modes mirrors real world engagements, strengthening both detection and classification skills. Its ability to deliver high fidelity acoustic realism and programmable behaviours allows crews to rehearse scenarios that match real world submarine interactions far more closely than legacy systems can provide. This elevates the accuracy and safety of training outcomes.

Built on a high performance microAUV platform, RECALL® retains the manoeuvrability and responsiveness needed for complex training exercises. Despite its compact size, just 90 cm long, 12 cm in diameter, and 10 kg in weight, the system delivers exceptional capability, reaching speeds of up to 12 knots and operating safely at depths of up to 300 meters. This performance profile allows operators to rehearse engagements that accurately emulate submarine behaviour while maintaining controlled and safe training conditions.

Safety and cost efficiency are further supported by RECALL®'s fully recoverable architecture. Its SEACOMM UHF recovery module ensures reliable localisation and retrieval even in challenging sea states, reducing the risk of asset loss and enabling repeated training cycles without compromising operational safety or budgets.

One of RECALL®'s most significant advantages is its low operating cost. Traditional disposable or complex recoverable AUV targets are often expensive and limited in capability. RECALL®, by contrast, provides a fully recoverable, multiuse solution that dramatically reduces long term expenditure while enabling more frequent training rotations.

Ease of use plays a crucial role in training environments, and RECALL® is purpose built to empower both seasoned crews and newer operators. The system's intuitive human machine interface allows non experts to confidently programme and supervise missions, even under demanding conditions. This reduces cognitive load during training and encourages safe, consistent mission planning practices.

RECALL®'s compatibility with modern ASW sonars, torpedoes, and acoustic tracking systems ensures that operators train with technology reflective of current and future naval capabilities. This integration enables seamless transition from simulated training to real operational platforms, strengthening both safety and proficiency.



SEABER RECALL® (photo credit: SEABER)



### READ MORE

SEABER's Milestone in Underwater Exploration

For more information on SEABER RECALL®, please contact the our sales team.

# ArtemisSAR & StarFish

## Innovation Beneath the Waves for Safer Summers

The Advanced Sonar Systems Giving Surf Life Savers the tools to Protect Lives with Greater Speed, Safety and Confidence.

As we turn the page into Aussie summer, the rhythm of life begins to shift. Schools wind down, businesses ease off the pace, and communities take time to soak up the warm weather, long days, and beautiful beaches. Surf Life Savers across the country step up as our seaside heroes — patrolling the beaches, watching over the shore, and keeping swimmers safe while we enjoy the sun and surf.

Among the toughest responsibilities Surf Life Savers face are search and rescue missions. These can involve locating missing swimmers, recovering foreign objects, and, in tragic cases, lost lives. The question is: how do we ensure Surf Life Savers are equipped and protected while they protect us?

Enter Blueprint Subsea, a UK based company, who specialise in advanced underwater acoustic sensors. Among their diverse portfolio are two game-changing systems, the Artemis Search and Rescue (SAR) system and the StarFish side scan sonar.

➤ These cutting edge technologies have transformed the way Surf Life Savers conduct search and recovery missions, enhancing efficiency, accuracy, and safety along our coastlines.



The StarFish is a side scan sonar device designed for shallow survey work. This system can be towed, hull-mounted or integrated into an OEM system. Engineered for efficiency, the towed system enables rapid one person deployment. The tri-fin design provides a stable platform for improved image capture. With swath coverage of up to 200 metres, Surf Life Savers can scan entire beaches quickly with multiple passes. This efficiency gives them a crucial edge in time sensitive missions, reducing search times and increasing the likelihood of successful outcomes.

The ArtemisSAR system combines sonar, camera, and GPS technology with a handheld console for recording and reviewing data. This system is designed to locate targets in hazardous, turbid conditions. The ArtemisSAR system is a game changer for search and rescue operations in hazardous environments where traditional towed systems cannot reach — such as shallow reefs and rugged coastal rock faces. By eliminating the need for divers to manually search complex reef structures, ArtemisSAR not only enhances search efficiency but also significantly reduces risk. Surf Life Savers now only need to enter the water

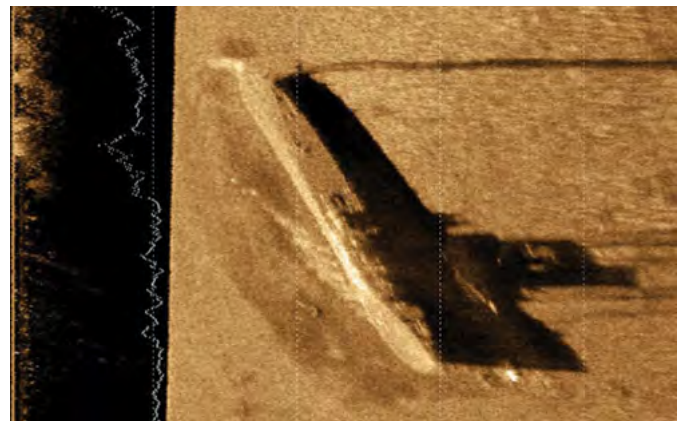
once a target has been identified, ensuring safer and more effective missions.

Blueprint Subsea is at the forefront of marine innovation, with systems like ArtemisSAR and StarFish redefining search and rescue operations along our coastlines. These technologies increase the safety of Surf Life Savers by keeping them out of the water for longer, while also reducing the physical strain and fatigue associated with manual diver searches. Capable of operating effectively even in turbid or murky conditions, they allow divers to assess the underwater environment before entering, enabling them to make safer and more informed decisions. By dramatically cutting down search times in time critical missions and offering rapid deployment, ArtemisSAR and StarFish provide Surf Life Savers with the tools they need to respond faster, more efficiently, and with greater confidence in challenging environments.

As communities embrace summer and the beaches fill with families, swimmers, and surfers, Surf Life Savers continue their vital role as guardians of the shore. With advanced tools like StarFish and ArtemisSAR, they are better equipped than ever to meet the challenges of search and rescue — ensuring that the Aussie summer remains a season of joy, safety, and celebration.



Artemis SAR (photo credit: Blueprint Subsea).



StarFish Sonar Image (photo credit: Blueprint Subsea)



### READ MORE

From Shipwrecks to Shorelines:  
The Multi-Disciplinary Power of  
StarFish Side Scan Sonar



### READ MORE

Beyond the Surface:  
ArtemisSAR Enhances Diver  
Safety in Hostile Waters

For more information on products by Blueprint Subsea, please contact the BlueZone Group sales team.

# SRS FUSION

## A Hybrid ROV Built for the Demands of Modern Marine Operations

In an era where underwater data is critical to infrastructure, defence, and environmental stewardship, the SRS FUSION ROV emerges as a versatile, high-performance solution designed to meet the evolving needs of marine professionals.

With a compact footprint, powerful propulsion, and advanced sensor integration, FUSION is redefining what's possible in subsea inspection and survey work.

Built for performance at just 25kg in air, the FUSION is lightweight and portable, yet it packs a punch with six brushless DC thrusters — four vectored for agile horizontal movement and two vertical for precise depth control. Capable of speeds over 4 knots forward, it's engineered for dynamic environments like ports, pipelines, and offshore platforms.

Its depth rating of 300 meters makes it suitable for a wide range of missions, from shallow water inspections to deeper infrastructure surveys. The tool-less design and neutral buoyancy in freshwater allow for rapid deployment and easy handling, even in confined or remote locations.

With its hybrid capability — functioning as both a tethered ROV and an untethered AUV—the FUSION adapts to mission needs, offering unmatched flexibility in the field. FUSION's 914whr lithium-ion battery delivers 3–4 hours of typical endurance, with fast charging options that get you back in the water quickly — 90% in just 2 hours. As a battery-powered system, the FUSION requires only a data and communications link to the surface, enabling the use of a low-drag, small-diameter tether.

What truly sets FUSION apart is its sensor suite. Equipped with HD 1080p imaging, multibeam forward-looking

SRS FUSION

**DIVE  
DEEPER,  
FASTER,  
SMARTER**

SRS FUSION (photo credit: BlueZone Group).

sonar, side scan sonar, and DVL navigation, it offers a comprehensive view of the underwater environment. Whether you're mapping seabeds, inspecting hulls, or monitoring environmental conditions, FUSION delivers real-time, high-resolution data with pinpoint accuracy. FUSION integrates seamlessly with the Reach Robotics grabber arm to support a wide array of mission profiles, further enhancing its versatility across diverse operational scenarios — from precision sampling and object retrieval to complex intervention tasks in challenging underwater environments.



SRS FUSION isn't just a robot—it's a reliable partner for underwater professionals who demand precision, endurance, and adaptability. Whether you're charting unknown waters or safeguarding critical infrastructure, FUSION is ready to dive in.

Its automation modes — including station hold, waypoint navigation, and return-to-home — make it a powerful tool for autonomous missions, while the rugged Android tablet interface ensures intuitive control for operators in the field.

The FUSION is already making waves across multiple sectors; its industry applications can include:

- **Defence & Security:** Supports underwater surveillance, mine detection, and rapid response in tactical operations.
- **Energy Sector:** Enables pipeline inspection, cable tracking, and asset integrity checks for offshore wind and oil platforms.
- **Maritime Infrastructure:** Used for inspecting bridge pilings, seawalls, and port facilities without the need for divers.
- **Environmental Monitoring:** Ideal for collecting data in sensitive habitats, thanks to its low-impact footprint and precision navigation.



#### READ MORE

on SRS FUSION and contact the BlueZone Group sales team.

# SeeTrack

## The Defence Ready Command and Control System for Maritime Autonomy

In an era where robotic systems define naval superiority, SeeTrack stands at the centre: Uniting AUVs, ROVs, and operators into one powerful defence ecosystem.

As autonomous technologies reshape the underwater battlespace, naval forces increasingly rely on robotic and autonomous systems (RAS) to conduct complex and often hazardous missions. Recognised as one of the most advanced command and control platforms for autonomous underwater vehicles (AUVs) and remotely operated vehicles (ROVs), SeeByte's SeeTrack software has become a global standard; deployed by more than 20 navies worldwide. Designed for defence, commercial subsea, and research environments, SeeTrack enables operators to plan, execute, and analyse missions with unmatched accuracy, efficiency, and situational awareness.

### **Mission Planning, Monitoring, and Analysis for High Stakes Operations**

At the core of SeeTrack is a comprehensive mission management environment that supports every stage of an underwater operation. Mission planners can coordinate single or multi vehicle deployments, configure task plans, and visualise environmental constraints; all from an intuitive interface. During execution, SeeTrack provides real time situational awareness, displaying vehicle health, sensor feeds, and operational progress.

For post mission analysis, SeeTrack integrates advanced data processing tools such as sonar waterfall review, sensor mosaics, and rapid target picking utilities. By fusing data from multiple onboard sensors, the system delivers high resolution insights critical for time sensitive defence tasks, including mine countermeasures and harbour security.

### **Multi Platform Compatibility for Modern Naval Fleets**

Modern underwater operations increasingly involve diverse fleets. To meet this demand, the SeeByte software suite is engineered as a system-and-vendor neutral, multi system platform, allowing AUKUS and partner navies to operate a broad range of world leading autonomous and uncrewed systems through a single software environment. Notable compatible systems include but are not limited to REMUS UUVs, Kraken Synthetic Aperture Sonar (SAS) systems (Katfish towed system and UUV payloads), Teledyne Reson sonar systems, Bayonet AUGVs, SRS Fusion ROVs, VideoRay ROVs, and plenty more.

This interoperability ensures that vehicles or payloads can be upgraded, swapped, or integrated without requiring operators to retrain; preserving capability while reducing lifecycle cost. It also enables seamless coordination during joint naval operations, where assets from multiple countries must operate side by side with consistent command and control standards.

### **Campaign Manager: Turning Mission Data into Actionable Intelligence**

In maritime security, the value of data increases over time. SeeTrack's Campaign Manager module extends mission execution into long term intelligence gathering by storing, organising, and indexing both current and historical operations. Users can search previous mission



SeeTrack Software in use (photo credit: Seebyte)

data, perform automated change detection, and generate detailed reports; helping navies track environmental changes, monitor seabed conditions, and build a persistent operational picture.

### Autonomy Extensions for Next Generation Threat Detection

SeeTrack's optional autonomy extensions give naval forces access to emerging technologies in underwater automation. These include:

- **Mission Level Autonomy**, allowing vehicles to adapt to conditions and optimise behaviours mid mission.
- **Automatic Target Recognition (ATR)**, a machine learning driven toolset that accelerates the detection and classification of mines and other seabed objects.

These capabilities reduce operator workload and significantly speed up the identification of potential threats; key in high tempo mine countermeasure operations.

### A Proven Platform for the Future of Underwater Robotics

From multinational naval exercises to high risk mine clearance operations, SeeTrack enables forces to deploy robotic assets with confidence and precision. Its vendor neutral architecture, advanced mission analysis tools, and forward leaning autonomy extensions position it as a future ready command and control platform for modern defence organisations.

SeeTrack continues to redefine what is possible in maritime autonomy; empowering navies to operate safer, faster, and more intelligently beneath the surface.



#### READ MORE

Check out our interview with Seebytes CTO, Scott Reed

For more information on SeeTrack Software by Seebyte, please contact the BlueZone Group sales team.



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