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Naval Magazine

Seabed Operations

A multitude of actions must be taken

Multi-Domain Operations

Act across the five operational domains

Revolutionising Naval Training

Shaping the future of maritime training

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Built on operational experience

The maritime domain is becoming increasingly complex. Digitalisation, autonomy and evolving threats are changing how naval forces operate, while demands for situational awareness, interoperability and operational readiness continue to grow.

For more than 80 years, Saab has worked alongside naval customers to address these challenges. Rooted in experience from demanding maritime environments, its expertise spans underwater, surface and combat system capabilities, supporting operations from coastal waters to blue-water environments.

This experience has shaped a broad portfolio of naval and maritime capabilities designed to meet the evolving needs of modern naval forces. From underwater operations to integrated command and control, the focus remains on enabling effective operations in increasingly complex and contested environments.



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The strategic importance of the seabed

The report High Value of the North Sea, published by The Hague Centre for Strategic Studies, highlights the economic importance and vulnerabilities of critical undersea infrastructure. The incidents – particularly in the Baltic Sea – confirm growing concerns in this area. The aim of these sabotage operations is to undermine Western political and military support for partner countries and disrupt the energy independence of the Baltic states.

Sabotage of critical infrastructure – especially in areas that are strategic for energy security or focused on protecting supply lines beyond the Baltic Sea – are contingencies that will further escalate the hybrid conflict. Investments in deep-sea capabilities are now more necessary than ever to meet these threats today and tomorrow.

Up to 15% of global maritime trade passes through the Baltic Sea. The scenarios described represent a significant threat to national security and impede investment in offshore economic activities – for example, offshore wind farms, which are crucial to meeting the energy transition targets. This forces Western North Sea states to adopt a more alert, deterrent posture and to develop capabilities to defend against sabotage. That is no easy task: there are almost no environments in which more complex demands are placed on highly technical surveillance and security systems than the sea.

Underwater operations face numerous challenges, such as strong currents, temperature and pressure at depth, limited visibility and the peculiarities of underwater propagation. For a mission to succeed, therefore, powerful, robust and technically advanced solutions are required – ideally multifunctional systems that operate autonomously to minimise risk

to personnel and reduce costs. France, the United Kingdom, Germany, Norway and Sweden are just some of the countries that have revised their seabed-warfare strategies in recent years and are now investing in state-of-the-art equipment, including systems from Saab.

Multiple measures are required

When it comes to hostile attacks beneath the sea surface, no single measure will suffice. Seabed warfare spans many disciplines, and only by deploying them together will the desired effect be achieved: First, physical protection can be provided by improving the design of cables and pipelines, for example through the use of stronger materials, protective layers and/or coatings or compounds that reduce the risk of detection and damage from anchors and trawl nets. Second, continuous underwater monitoring is needed, with sensor and nodal systems that can also take mitigating action, supported by operational visibility from existing sensor suites, AIS and satellite imagery to detect suspicious movements by surface vessels. Suspicious underwater activity – such as divers or the use of trawl nets – can be picked up by sensors such as acoustic arrays and by GPS trackers that alert to unauthorised movements nearby. Third, the real-time sensor data from all these sources must be fused into a situational picture and linked with intelligence. Those data then need to be analysed and correlated to detect anomalies,

Successful missions require powerful, robust, and high-tech solutions.



irregularities and suspicious patterns of behaviour. Ideally, this would be supported by AI-driven real-time reporting systems that can immediately warn of potential threats. That, in turn, enables rapid communication and action in the event of sabotage or damage, for example by motherships that must be capable of responding. Fourth, underwater drones and counter-sabotage armaments should be deployed and further developed – for instance, electromagnetic jamming or sonar pulses to disable hostile drones, or automated interception drones to neutralise suspicious objects. Finally, a technological infrastructure of physical cables or virtual zones could be established in which unauthorised objects are detected and denied access. This list alone demonstrates the complexity and diversity of the challenge.

International regulation and cooperation

No single country can secure and protect the Baltic or the North Sea on its own. Western nations must therefore work together to safeguard cables and pipelines. They need to share information on high-risk areas and introduce regulations that prohibit anchoring in such zones, as well as keep shipping lanes free of cables – particularly along compulsory routes – to minimise the risk of damage. In addition, societies must strengthen their resilience against the disruptive consequences of such incidents. Clear lines of responsibility must also be established. At present, many different agencies at regional, national and international level are involved in protecting critical undersea infrastructure – including coastguards, navies, police, maritime law enforcement, and telecommunications organisations. This makes it more difficult to implement a coherent strategy. Stronger cooperation between nations, organisations and industry would be a major step forward in dividing up these complex tasks and ensuring coordinated action. In 2024, Norway and Germany launched a joint initiative to strengthen NATO's role in the protection of critical undersea infrastructure. Both countries proposed creating regional hubs for critical undersea infrastructure in various maritime zones within NATO's area of responsibility – such as the North Sea, the Baltic Sea, the Atlantic Ocean, and others. The idea is that each hub could then be managed by one or more allied nations. For instance, Norway has offered to establish a hub for critical undersea infrastructure in the High North, while Germany is ready and determined to assume responsibility for the Baltic Sea. In this way, Western nations can build a strong defensive line against attacks.

A matter of precision

Saab takes a comprehensive approach to critical undersea infrastructure, offering an extensive portfolio of sensors and both manned and unmanned platforms above and below the surface. Saab has supplied more than 900 vehicle systems worldwide – ranging from remotely operated vehicles (ROVs) for work, inspection and observation, to research ROVs, autonomous underwater vehicles (AUVs), and ROV



SAROV can be used both as an AUV for detection, classification and identification, and as a ROV for mine disposal.

accessories – and is one of the leading suppliers for both commercial and military applications. Through continuous innovation, the company has earned a reputation for handling complex tasks in some of the world's most demanding environments. In coastal areas, the Double Eagle family of systems, deployed by navies around the globe, is well suited to countering a wide variety of subsurface threats. The vehicles – Double Eagle Mk III, SAROV and MuMNS – can be launched from any type of vessel, from the shore, or from a dedicated platform, providing a safe, cost-effective and reliable solution for mine countermeasures (MCM) operations at depths of up to 500 metres. While the Double Eagle Mine Disposal System (MDS) is the leading solution for clearing unexploded mines, the versatile hybrid system Semi-Autonomous Remotely Operated Vehicle (SAROV) can be used both autonomously (as an AUV) for detection, classification and identification, and remotely (as an ROV) for mine disposal. Its robust design and modularity ensure outstanding performance and significant range and endurance. The Multi-Shot Mine Neutralisation System (MuMNS) represents a new generation of mine neutralisation and illumination. The ROV is highly efficient and manoeuvrable, offering a high degree of freedom, and is equipped with advanced sensors for precise mine identification. MuMNS speeds up operations and increases safety while reducing the cost of MCM missions. The system is designed to be operated by just two people, can easily be configured to

meet the specific requirements of any mission, and consists of a vehicle, generator, pilot station, winch and power supply. It can be controlled from the surface via an onboard console on a support vessel or from a vehicle on deck. The Doppler Velocity Log (DVL) and Inertial Measurement Unit (IMU) on board the Sea Wasp provide navigation capabilities that enable it to record and deliver specific payloads. The vehicle itself features Saab's unique iCON intelligent control system, ensuring exceptional manoeuvrability.

If an attack cannot be prevented, any damage must be repaired as quickly as possible. Critical undersea infrastructure also requires ongoing maintenance and repair. Sabertooth is a powerful and technologically advanced platform available in both single- and double-hull versions, combining Saab's military technology with commercial ROV/AUV capabilities. Thanks to its compact size, wireless operation and agility, the Sabertooth can move easily and safely in and around complex structures. This makes the vehicle ideal for offshore construction work and autonomous inspection, maintenance and repair (IMR) of subsea installations and tunnels. Sabertooth can operate independently from its docking unit, remaining there around the clock. When a 'garage' on the seabed is used, it can even function for up to six months without maintenance, eliminating the need for costly surface vessels. This hybrid AUV/ROV deep-sea vehicle, capable of "hovering," offers 360-degree manoeuvrability with six degrees of freedom, as well as interfaces to support a wide range of sensors and equipment.

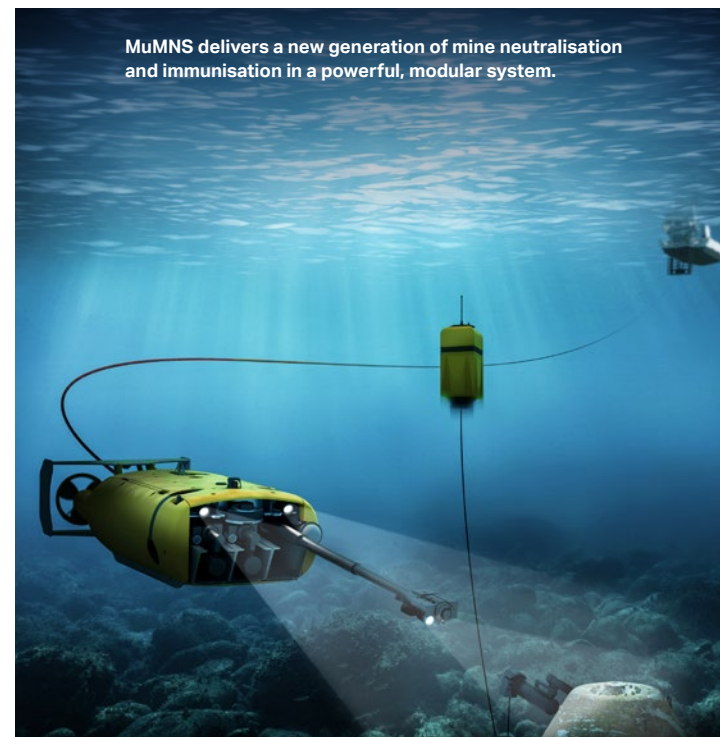
Rising urgency

In 2023, the European Union and NATO established a joint task force for resilience and the protection of critical infrastructure to further develop and coordinate capabilities in



With a high degree of operational autonomy, Sea Wasp takes vessels and operators out of harm's way, providing a safer underwater solution to ordnance disposal.

the Baltic Sea. In March 2025, a NATO seminar on Seabed Security was held in The Hague, highlighting the role of naval forces in protecting critical undersea infrastructure. This represents a clear commitment to ensuring maritime security and safeguarding essential infrastructure. It also underscores the urgency and importance of these issues at an international level. Time is running short, however, and it is absolutely vital that a harmonised and coordinated approach is implemented as soon as possible. Cooperation among allies – combining technical, operational and legal measures – can reduce vulnerabilities and significantly minimise the risks along the seabed of the Baltic and other high-risk regions. Detecting and countering threats to critical undersea infrastructure requires advanced operations and comprehensive defence and security capabilities. Such capabilities must ensure constant, efficient and dependable protection through the deployment of new technical systems, optimised procedures and strategic foresight. To ensure a mission's success, powerful, robust and high-tech solutions are essential. Strong collaboration with industry is also essential to protect communication, energy and internet infrastructure.



MuMNS delivers a new generation of mine neutralisation and immunisation in a powerful, modular system.

Enhanced surveillance and infrastructure monitoring

Protecting critical underwater infrastructure and maintaining maritime awareness demands persistent and adaptable capabilities. The AUV62-MR enables efficient underwater surveillance and reconnaissance, helping operators gain actionable insights while reducing operational risk.

As the security environment continues to evolve, the need to safeguard critical sea routes and underwater infrastructure is becoming increasingly important. From subsea cables and energy installations to ports and maritime approaches, operators require timely and reliable information to maintain situational awareness and respond effectively to emerging threats. Modern operations also place greater emphasis on reducing risk to personnel through stand-off capabilities and autonomous systems.

Developed to meet these challenges, Saab's AUV62-MR is an autonomous underwater vehicle designed for surveillance, seabed monitoring, and mine reconnaissance missions. Capable of conducting long-endurance operations across large areas, the system provides high-quality underwater data collection while operating with limited operator interaction when required. Its modular design, operational flexibility, and ability to be deployed from multiple platforms make it well suited for a wide range of naval and security applications. Built on Saab's proven AUV62 platform, the vehicle delivers a combination of reliability, availability, and future growth potential for modern underwater operations.



Emerging new technologies Multi-Domain Operations

The European security order has changed significantly in recent years, with conflict increasingly taking hybrid forms. Modern “hybrid warfare” combines military force with non-military tools such as cyberattacks, disinformation, economic pressure and covert operations. These activities are often difficult to detect and attribute, yet they can bring about wide-ranging political, economic and social effects in highly interconnected societies.

Rather than relying on open military confrontation, hybrid threats exploit multiple domains at once – including diplomacy, trade, cyberspace and domestic political environments. They may involve border provocations, propaganda campaigns, IT system disruptions, sabotage or limited military interventions. Typically, such activities unfold gradually and in ways that can appear minor in isolation, making them harder to recognise as part of a coordinated strategy. The overall aim is to create uncertainty, weaken trust in institutions, and increase polarization within and between states.

One consequence is that it is difficult to assign blame to a country or a particular organisation for an attack. Hybrid warfare has, of course, always been around to some extent but has increased significantly due to today’s more vulnerable, complex and uncertain world, which is more interdependent and interconnected through social media, for example. This implies that attacks on a single node can result in huge cascading effects. Hybrid warfare is of great concern for society as a whole, including the military community. To challenge and resist hybrid warfare, new methods must be developed in parallel with the traditional tools and concepts already in place.

Time as the most critical parameter

Together with hybrid warfare, a new generation of warfighting, such as distributed operations, is emerging to create and sustain a Common Operating Picture (COP) and to manage sophisticated networks. A variety of sensors and effectors distributed on different platforms can track and manage numerous hostile targets simultaneously, such as swarms of unmanned systems in all physical domains (underwater, on the surface and in the air). By extension, this complex environment also includes Information and Cyber Warfare in all of its various forms.

In order to survive, prevail and win in such an environment, rapid adaptation within a highly dynamic environment is necessary, including full control over the electromagnetic spectrum (EM). Because all of our modern sensors, communication systems and effectors are dependent on the EM spectrum, having full control over the electromagnetic spectrum can be regarded as the central tool for warfighting. For the warfighter, it is fundamental to be ahead of an opponent’s OODA loop (Observe, Orient, Decide and Act), so that “time” (meaning speed of decision-making and action) becomes the most critical parameter. Even the most perfect decision will result in failure if not made at the right time. We should therefore assume that all domains (includ-

ing cyber) are contested and that both civilian and military operations will be conducted across a full spectrum of conflicts and domains. New and multiple threats demand new ways of sensing, control, action, and coordination. This implies that resources in all domains must be coordinated in order to work together. A temporary advantage in one domain will enable effects in others.

Multi-Domain Operations are key

Multi-Domain Operations (MDO) are crucial in modern warfare, and require building an adequate and appropriate infrastructure and determining a suitable “modus operandi”. For example, we need to leverage networks for distributed sensing and real-time control of weapons. Traditional stove-piped capabilities must now work together, and it is necessary to reduce friction by bringing all these capabilities together. Doctrines must be flexible and adaptable; education and training must be revised and we need to take advantage of emerging new technologies. To merge big data from all current domains together and create something useful, we need a new way of thinking about Command and Control (C2).

The most obvious MDO concern is system integration networks on platforms that previously had no need to exchange multi domain data. Today, all systems, effectors and fire control systems must be integrated on one platform, and that information must be interchangeable with platforms of allies and partners. This is harder than it seems. Not only might hardware be incompatible, but the nomenclatures and formats for the same data may be expressed in very different ways.

Classification boundaries between warfare communities can vary and become a serious obstacle. Likewise, bureaucratic organisations with different command and control structures, decision levels and technical language can be a barrier for efficient MDO. Within recent years, information assurance has risen to become a paramount concern – do we trust the information that emerges from other networks or a different domain? We have two fairly new domains in MDO, space and cyberspace, which will create new possibilities for the warfighter, but also new risks, depending on the situation at hand on the battlefield.



Act across the five operational domains

The core of MDO in the maritime domain is a well-adapted Command-and-Control system together with communications. The major segments of the C2 system include the Combat Management System (CMS), a software-intensive system designed to operate in complex battlefield environments. The CMS manages information received from various subsystems and displays it, and efficiently detects, tracks, assesses and engages threats utilising the available effectors, such as weapons and countermeasures.

Future operating environments will produce high quantities of information that far exceed the ability of current C2 capabilities. Adversaries will strive to deny, obfuscate, imitate, and degrade the information that commanders require to make the right decision at the right time, and seek to prevent those decisions from being carried out. In the past, successful operations were achieved through a single unified command that delegated authority through a hierarchy of subordinates. Traditionally, a hierarchical C2 structure has been regarded as the optimal approach to C2. However, the future operational environment will limit the ability of such systems to achieve the goals for which they were designed. Recent conflicts have increasingly shown that centralised C2 structures are less resilient to attacks. Rapidly responding to changing conditions and the ability to command across the five operational domains in all operating environments and dimensions is imperative. In future scenarios, it will not be feasible to have a constant command oversight. Instead, senior commanders will have to conduct their functions by effectively communicating intent, priorities and restrictions, such that subordinate commanders are trusted to make decisions based on the information available to them.

Secure communications with effective C2 systems

Optimising a C2 system for MDO requires minimising the time for decision-making (the OODA loop). One way of doing this is to look into human factors and investigate how our brains struggle to process information. It is a fact that we see the world in 3D and we process information most effectively in three dimensions. However, most information relevant to command and control is delivered as 2D, via graphs, charts and other data delivery formats. We cannot alter the way our brains work, but we can change the way information is delivered to us. Dramatic advances in data visualisation – such as virtual reality – gives us the power to present information three-dimensionally. New advanced data analytics and autonomous capabilities, aided by Artificial Intelligence (AI), can also be effectively integrated into command networks. However, this is a dual edged sword. All new technological capabilities will impose both new opportunities as well as challenges.

For example, AI can process huge amounts of data and make predictions based on patterns in that data. This enables better and faster decision-making, reduces uncertainties, and can reveal an opponent's intentions and capabilities. Machine Learning (ML) is a subset in artificial intelligence concerned with the development and study of statistical algorithms that can learn from data and generalise unseen data and thus perform tasks without explicit instructions. ML will increasingly influence how political and military leaders perceive the strategic environment, weigh risks and options and judge their adversaries. However, relying on AI, decision-makers will also introduce a new source of uncertainties. If the AI systems are insecure, inadequately trained or applied to the wrong types of problem, they could inject bad information into the decision-making processes and lead to an inadvertent escalation with perhaps catastrophic consequences.



GlobalEye has a mix of modern active and passive sensors, providing long-range detection of objects in the air, at sea and over land.

C2 system effectiveness is based on safe and reliable communications. We can assume that all communications will be contested in future conflicts, presenting complex challenges for the whole communication architecture. Remote sensing, monitoring, quantum encryption and diagnostic technologies, plus the advent of new communication channels, like social media have given us new tools to disseminate information. Advances in high-bandwidth, low-latency data transmission (5G and soon 6G) mean that the information flood gates are about to open. Mobile ad-hoc networks can be rapidly implemented to provide secure communica-

tion when normal communication networks are compromised or there is a lack of communication infrastructure.

Holistic platforms for multi-domain operations

As mentioned earlier, AI is fundamental in protecting the integrity of the data, and in protecting and defending information and information systems by ensuring their availability, authentication and confidentiality. Likewise, cybersecurity must be practised to protect systems, networks and programs from digital attacks aimed at accessing, corrupting or destroying sensitive information. Implementing effective cybersecurity measures is particularly challenging today because the number of devices has exploded and attackers are becoming more innovative.

The key to staying ahead of the threat is to innovate, but both armed forces and industry are hampered in their ability to innovate quickly enough to stay ahead of an opponent's operational concepts and technological developments. Interconnectedness of commercial and military technologies must be utilised in a better way, and we need to embrace new technologies and use them where it suits us best.

It is fundamental to work together between industry, defence forces, acquisition agencies and research communities.

With many years of experience in developing cutting-edge and battle-tested C2 systems for all relevant domains, Saab has consistently emphasised human factors and the fusion of sensor data to present an unambiguous COP for the warfighter. This enables accurate targeting for weapons when required, even in highly complex and hostile environments. Saab has embraced all the new trends. Requirements and technologies for future C2 systems will gradually be able to offer our warfighters the necessary C2 tools to conduct effective multi-domain operations.

The complex environment in the Baltic Sea

Saab has developed larger holistic platforms where sensors, communication and Command and Control are fully integrated and can act as a node for MDO. A good example is the GlobalEye, an airborne platform which supports cross-domain exchange of information to both civilian and military authorities (coast guard, police, customs, joint military headquarters etc.) by using, for example a national security cloud computing service.



The 9LV Combat System delivers a comprehensive C4I solution for naval forces, supporting all types of mission.

The same situation can be described with the Visby corvette system operating on the surface and the new A26 submarine under the surface. Acting together, these three platforms in their different domains can improve overall situational awareness in a hostile and complex environment, but also create a temporary advantage in one domain to enable effects in others.

The Baltic Sea is a good example of where MDO will be of utmost importance in the years to come. The Baltic Sea is a cul-de-sac and a littoral sea. This implies that it is a very complex environment where it is easy to hide but also difficult to detect an adversary. The space to manoeuvre and act is limited, which means very short reaction times.

Finally, MDO will have to adapt and develop in order to cope with military tasks of the future and to survive. To succeed, both governments and industry must work together, and commercial and military technologies have to be interconnected. This will enable our warfighters to prevail and survive in an increasingly sophisticated combat situation.

9LV Naval Combat System

Striking performance for modern navies

As maritime operations become increasingly complex, naval forces require the ability to integrate information from multiple sensors, manage evolving threats and coordinate effects across different domains. Combat management systems play a central role in this process, bringing together data, decision-support tools and weapon systems to support commanders and crews in making informed decisions. Saab's 9LV Combat System is one example of how these capabilities are being applied across a range of naval platforms, supporting missions from coastal defence to open-ocean operations.

The 9LV Combat Management System (CMS) ensures unfailing readiness and delivers the striking performance necessary for empowering naval platforms and maritime missions.

- Anti-Access / Area Denial (AA/AD) operations
- Protection and escort
- Maritime patrol and response
- Border control and interdiction
- Peace support operations
- Anti-piracy
- Search and rescue
- Environmental control

A Combat Management System (CMS) is at the heart of a warship's fighting capability, bringing together sensor data, weapons and decision-support functions to support effective operations at sea. By providing a common operational picture, a CMS enables crews to maintain situational awareness, respond to threats and coordinate actions across the maritime domain.

As technologies and threats continue to evolve, naval forces require systems that can adapt over time. The 9LV CMS is designed with an open and flexible architecture, enabling the integration of new sensors, weapons and capabilities throughout a platform's lifecycle. Its architecture can extend across the ship's network infrastructure, allowing functions and services to be shared between subsystems and supporting more efficient use of onboard resources.

Today, 9LV is in service with more than 20 navies and deployed on over 200 warships worldwide. Through long-term partnerships and local support organisations in countries including Sweden, Finland, Norway, Germany, Canada and Australia, Saab works closely with customers to support operational requirements and future capability development.



Mission-based combat management

The 9LV CMS is designed to support a wide range of naval platforms and operational requirements. Its modular and scalable architecture enables configurations ranging from smaller combatants to frigates and destroyer-class vessels, while supporting the integration of a broad range of sensors, weapons and platform systems.

Depending on operational requirements, configurations can be tailored to support specific mission profiles such as anti-submarine warfare (ASW), anti-surface warfare (ASuW) or air defence. Larger configurations can accommodate multiple tactical data links, extensive automation and the simultaneous management of threats across the air, surface and subsurface domains.

The Naval Combat Management System connects naval ship sensors, weapons, data systems and other equipment, providing an integrated operating system.

The system architecture incorporates redundancy and physical separation of critical assets to support resilience and operational availability. It can also be integrated with command support systems, providing an extended C4I capability that supports decision-making and mission execution across complex operational environments.

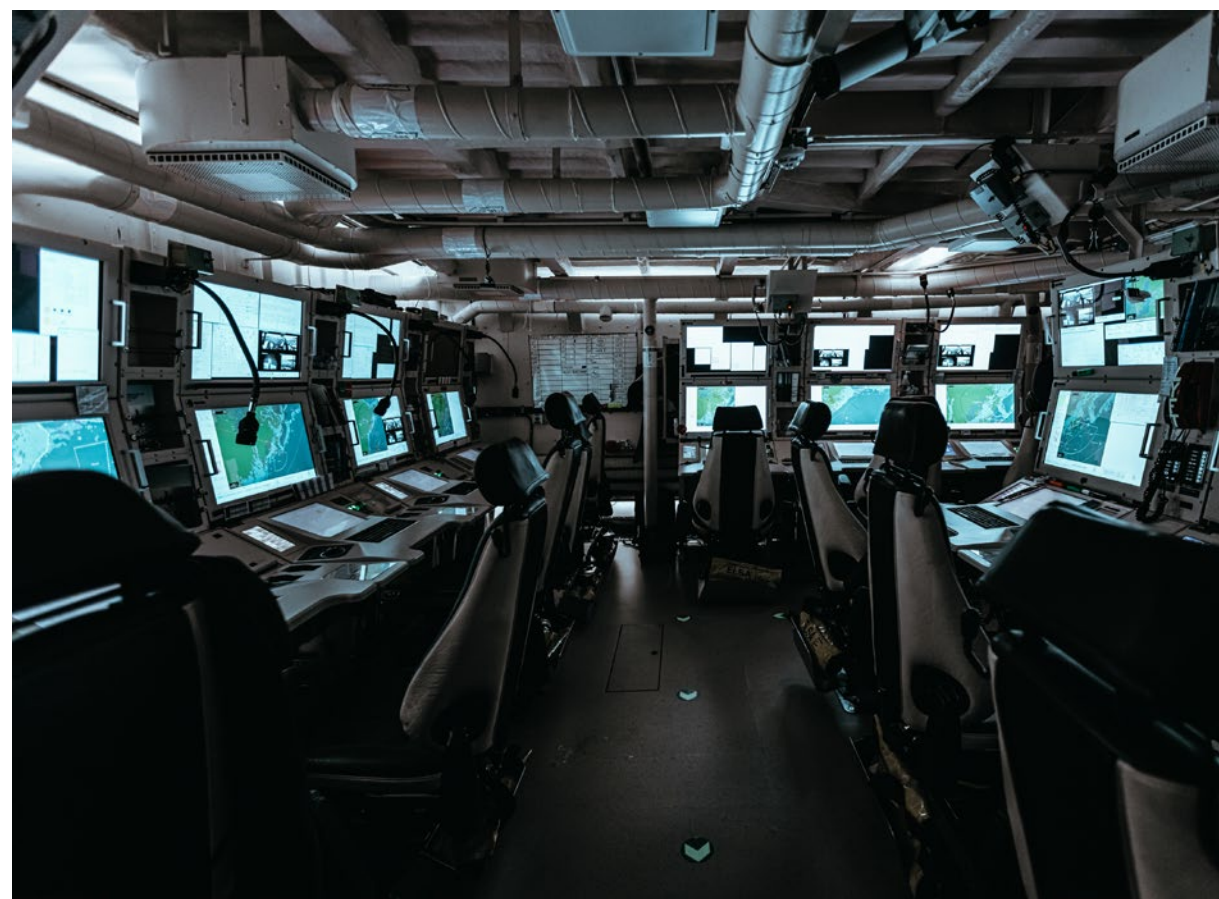
Patrol vessels

Patrol vessels operate across a wide range of missions, from maritime surveillance and border protection to force protection and security operations. Their combat management systems must provide the situational awareness, communications and command capabilities required to support these tasks while accommodating the space and crew limitations associated with smaller platforms.

A 9LV configuration for patrol vessels can be scaled to match the vessel's operational requirements, combining multifunctional operator workstations with distributed user interfaces across the platform. The system supports the integration of onboard sensors, weapons and communications, enabling the vessel to share information with other naval, joint and unmanned assets. Depending on mission requirements, configurations may include the integration of remotely operated small and medium-calibre guns for engagement of both surface and aerial threats.

Coastguard, auxiliaries & inshore units

Coastguard, auxiliary and inshore vessels perform a broad range of missions, including maritime security, surveillance, search and rescue, fisheries protection and critical infrastructure monitoring. These operations require situational awareness, communications and command capabilities that enable crews to coordinate effectively with other maritime and joint assets.



The 9LV Fire Control System provides rapid, reliable engagement against any target in any environment.

The 9LV CMS can be configured to meet the requirements of smaller platforms while providing a common operational framework with larger naval vessels. The system supports the integration of sensors, communications and remote weapon stations, enabling operators to monitor activity, assess potential threats and coordinate responses within the maritime environment.

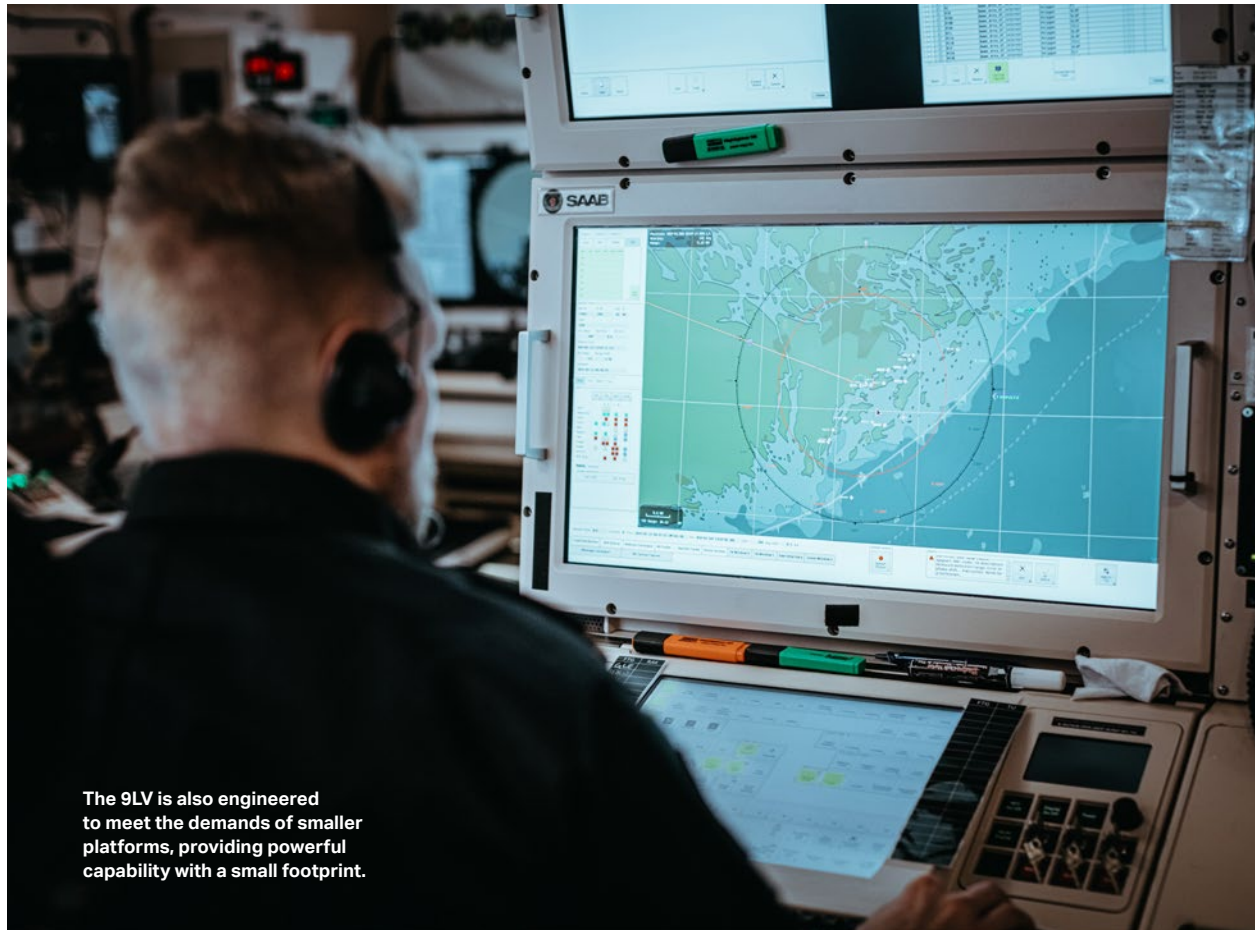
Its modular architecture can be adapted to the available space and operational requirements of each platform, while maintaining compatibility with the broader 9LV family of systems. Depending on mission needs, configurations can incorporate capabilities such as video surveillance, communications management and remote weapon control, supporting a wide range of maritime security and protection tasks. It is easy to integrate and cost-efficient throughout its lifecycle. At its core, 9LV CMS contains hardware that provides the functionality needed for maritime security missions, while it is also uniquely scalable due to full compatibility with all 9LV technology. Communication solutions, video surveillance and designation of threats to a remote weapon station are a few examples of mission requirements.

Integrated Fire Control capability

The 9LV Fire Control System (FCS) supports the detection, tracking and engagement of a wide range of maritime and aerial threats, from asymmetric surface targets to modern anti-ship missiles. It can be delivered as part of an integrated 9LV CMS or as a standalone solution for integration with third-party combat systems.

Based on a modular and open architecture, the system supports the integration of sensors, weapons and other onboard systems, enabling adaptation to different platform requirements and operational needs. The architecture also facilitates integration in both new-build programmes and modernisation projects.

Designed to support engagement operations in complex threat environments, the 9LV FCS enables the management of multiple simultaneous targets while operating within demanding response timelines. The system is deployed across a range of naval platforms, including patrol vessels, corvettes, frigates and larger surface combatants.



The 9LV is also engineered to meet the demands of smaller platforms, providing powerful capability with a small footprint.

As naval threat environments become increasingly complex, multi-role ships require the ability to detect, track and respond to multiple threats simultaneously. Through the integration of sensors, tactical data links, weapons and electronic warfare systems, the 9LV architecture supports a layered approach to air defence. The 9LV Weapon Control System enables the coordination of short-range and area-defence missile systems, together with guns and decoys, providing commanders with the flexibility to respond to evolving operational scenarios.

9LV FCS provides the defence of a vessel with the following features:

- Minimises time of engagement
- Optimises weapon and sensor usage against multiple threats
- Enables rapid designation, search and acquisition phases
- Reduces operator workload in critical conditions
- The available weapons such as a SAM or a gun

ACTING UNDETECTED
Three A26 submarines for Poland

In June 2026 Saab signed a contract with the Polish State Treasury Armaments Agency for the production and delivery of three A26 submarines. The A26 submarine is designed to meet the demanding operational requirements of the Baltic Sea. Engineered for stealth, it can operate with a minimal acoustic signature, enabling it to remain undetected while conducting a wide range of missions.

As part of the programme, Saab is committed to establishing maintenance, repair and overhaul (MRO) capabilities in Poland in close collaboration with Polish industry. This will support the long-term operation of the submarines while strengthening Poland's sovereign defence capabilities and strategic autonomy.



The mission network will facilitate rapid and secure information exchange, and integration across domains, supporting combined operations between all branches of the military.

Saab to lead NATO's new underwater battlespace project

The Saab-led MANGROVE consortium has been selected by NATO to lead the Allied Underwater Battlespace Mission Network project (AUWB-MN). The project formally commenced on 1 September 2025 and will deliver interoperability for Maritime Uncrewed Systems and conventional platforms across allied nations.

The project is designing a Reference Architecture and a Test and Reference Environment for a mission network that leverages both crewed and uncrewed systems, above, on and below the water.

The mission network will facilitate rapid and secure information exchange, and integration across domains, supporting combined operations between all branches of the military. The outcome is expected to become a new standard for NATO.

The AUWB-MN project is a significant step forward in the modernisation of our warfighting capabilities and the ability for NATO allies to operate effectively together in the underwater domain of the future. Saab and the MANGROVE consortium are expected to deliver a robust and effective mission network that will strengthen NATO's maritime defence.

The consortium was selected on 16 July, 2025 and the project is part of NATO's Digital Ocean and Antisubmarine Warfare Barrier Smart Defence Initiative. It is sponsored by twelve different nations led by the UK, together with Sweden, the US, Australia, Spain, Germany, Italy, Portugal, Canada, the Netherlands, Denmark and Norway. Together they have committed to adopt the standard developed through this project.

Saab's business area Naval is leading the multinational consortium, MANGROVE, comprising CETENA and IDS part of Fincantieri Group, FlySight, GraalTech, Miraya, Saab UK and BlueBear, S2IX and the University of Plymouth.



In critical situations, you need to be able to control all dimensions of the threat and quickly create optimal situational awareness and decision support. To do so, it is necessary to have the ability to exchange real-time information between all of your own forces involved. The core of GlobalEye and the basis of its ability to provide cross-domain exchange and connectivity is founded primarily on two things. The first is a powerful command and control system for multi-domain surveillance and real-time information. The second is a range of both active and passive sensors capable of handling all threats, in every domain – anything from electronic warfare threats to hypersonic missiles, stealth fighters and small, slow and low flying objects.

Airborne ultra-long range sensor system

The connectivity of GlobalEye across all the domains creates unique tactical, operational and strategic benefits, providing commanders with powerful decision support and enabling them to establish and share a trusted, consistent and real-time recognised situational picture. At an operational altitude of more than 35,000 feet, the airborne multi-domain solution can detect, identify and track very large amounts of different objects and signals at distances of up to 650 km. As an airborne ultra-long range sensor system, GlobalEye can warn and command other sensors in the network and, through this, extend the time for planning and implementation of countermeasures.

Protecting national and territorial integrity

GlobalEye is designed to carry out both civilian and military tasks, including joint operation scenarios. It goes without saying that it is more effective to gather all these capabilities in one and the same solution to meet security challenges in a world where threat scenarios are continuously changing and the line between military and civilian challenges and threats is no longer as clear.

Regardless of operating during peacetime, in crisis or maybe even at full conflict – having Saab's Airborne Early Warning & Control (AEW&C) solution GlobalEye is key to success since it provides a great advantage to any nation protecting its national and territorial integrity. GlobalEye can work alone or be easily integrated with other national assets.

As a command centre, the true strength of GlobalEye becomes evident when all multi-domain-produced information is uploaded, combined and fused. The massive amount of data managed by GlobalEye needs to be processed quickly and efficiently to enable instant identification of patterns and deviations that may affect the course of events. AI-functionality and machine learning allow for powerful real-time data analysis and constitute a strong complement to the intelligence that is built into the command-and-control system.

Collaboration is key

GlobalEye is adapted to the specific needs of every customer, with individual requirements considered during the design and project planning phases. Saab's engineers and technicians work closely with each customer's team to provide full transparency at all stages of the manufacturing process. This collaborative approach helps reduce any potential future issues with GlobalEye, as service teams on both sides are familiar with the inner workings of the product, reducing any downtime.

Furthermore, collaboration between Saab and its customers ensures all agreed features are implemented in accordance with the customer's confidentiality requirements. The customer is able to check and sign off work at all stages, decreasing the need for re-work at a later stage. This helps speed up the production process, allowing GlobalEye to be completed, delivered and in the air within a very attractive timeframe.

As well as collaborating with customers, Saab's internal teams – from sales and design to manufacturing and training – work effectively together to ensure a seamless production process. Furthermore, they work closely with trusted third-party suppliers to get what's needed, when it's needed, avoiding additional time being added to project timelines.

GlobalEye – a strategic national asset

Today's threats are often multi-domain, which usually require coordinated efforts from several different arms, sometimes even with units from other countries, or in a mix of civilian and military resources.

The Sirius Compact can be integrated onto drones, vehicles, and smaller boats such as Saab's Combat Boat 90 or an Unmanned Surface Vessel.

Portable passive sensors

The silent ears of the battlefield

The growing use of electronic warfare and the huge investments in technology have produced ever more conflicts in which adversaries employ the same types of weapons. The ability to obtain information quickly at an early stage will play a key role in the outcome of combat operations.

Detecting and analysing enemy radar and communication signals is one of the most important tasks on the modern battlefield. The high-tech equipment required for this makes it possible to create a high level of situational awareness across all domains – the foundation for military decision-making. Rapid technological change poses a major challenge here: ever more signals are being generated while the latest technologies are used to hide, obscure or manipulate them. The fact remains: those who can collect and analyse the greatest possible volume of data most rapidly will be one step ahead of the enemy.

With decades of experience developing and producing complex passive-sensor systems for ships, vehicles, and aircraft, Saab brings deep technical expertise to the field. Mathew Willmot, Sales Director for Sirius Compact, explains, "A major challenge in obtaining data is your own visibility. Anyone using radars also reveals their own position. One solution is passive sensors: these allow you to observe the enemy's signals without being detected yourself. That is increasingly relevant because it greatly reduces your vulnerability."

Lightweight with 360° coverage

Saab is one of the market leaders in Signals Intelligence (SIGINT) and Electronic Support Measures (ESM). The company demonstrates this with the Sirius Compact: a modular and scalable, lightweight passive Electronic Warfare (EW) sensor. The sensor answers the growing challenges of modern combat operations. Sirius Compact can be used standalone, as part of a sensor network or to complement existing sensors.

It is user-friendly and can be deployed by an operator virtually anywhere, with range adjustable to the situation. The sensor therefore delivers essential situational awareness immediately. "This type of portable system, which does not require extensive specialist training, answers the need for mobile, flexible 'real-time' intelligence collection and thus opens new possibilities for tactical electronic warfare," Willmot explains.

Only those who can quietly collect as much data as possible, classify and analyse it in a very short time will be ahead of the enemy.

Characteristics and performance

Sirius Compact is available in several configurations. The smallest variant is 35 cm high, has a diameter of 15 cm and weighs no more than three kilograms. The system therefore fits in any rucksack. It also features an integrated IMU/GNSS sensor to provide positional data and draws less than 60 W of power. Power is supplied by batteries. Mounted on a tripod, Sirius Compact can be deployed virtually anywhere, but it can also be integrated into drones, vehicles or smaller boats such as Saab's Combat Boat 90 (CB90) or an Unmanned Surface Vessel (USV).

A defining characteristic is its 360° azimuth coverage, which enables immediate detection of radar and datalink emissions across the 1-18 GHz frequency band from any direction. The sensor's platform and datalink independence are also significant, allowing integration into existing networks and platforms. A single sensor already improves situational awareness; with three sensors, accurate geolocation by triangulation becomes possible with bearing accuracy of less than 2° rms (root mean square).

Finally, Sirius Compact is controlled by the TRS Lite software (Tasking & Reporting System) via a tablet. A single operator can manage up to five sensors, which in turn can be grouped and controlled as bundles. This latter capability is available in the more advanced TRS 9EW. "With these software systems, users can automatically generate reports, assign tasks to other sensors or even register new signals, thereby expanding their own 'Threat Library'," Willmot says.

Identification and analysis

Detecting signals is the first step in obtaining situational awareness. In a second step, the identified signals must be analysed and classified. Saab does not store sensitive data on the sensor but forwards signals immediately. When the sensor is used on a drone it can also be operated without a network connection.

The perfect complement to any network

Portable passive sensors are suitable for a wide range of applications. They complement more complex systems and primarily act as an early-warning capability, for example for ground-based air defence. Owing to its size, the sensor can be mounted almost anywhere, even on civilian infrastructure. Sirius Compact is part of the Sirius family. The common DNA of all products in this family delivers high precision and combines decades of R&D expertise in a new, compact model.

Saab has carried out numerous tests and demonstrations that demonstrate the impressive performance of the compact sensors. For example, an aircraft taking off 200 kilometres away can be detected as soon as it appears above the radio horizon with very accurate direction finding (DF). During the entire detection and analysis process that aircraft receives no signal from the sensor and therefore has no indication that it has been detected. Sirius Compact also proved reliable when deployed on a fast-maneuvring combat boat in challenging weather conditions.

The performance and usability of the TRS Lite software have also been independently tested by military organisations. After a short introduction, infantry operators were able to set up the sensor in just a few minutes and were impressed by its operational capability and ease of use. "The product naturally benefits from our expertise in signals intelligence. The challenge is not only to make high-technology devices as small and mobile as possible, but also to ensure that performance is not compromised," Willmot observes.

Willmot concludes: "Mobile systems are more than just a technological achievement; they are indispensable on the modern battlefield. The complex demands and threats faced by combat units require efficient and precise early-warning systems. Passive sensors provide – as the 'ears' of the battlefield – a detailed picture of enemy activity. These sensors, such as Sirius Compact, add a new dimension to planning and decision-making and can play a key role in the cat-and-mouse game of electronic warfare."

The increasingly complex requirements and threats require efficient and precise early warning systems.

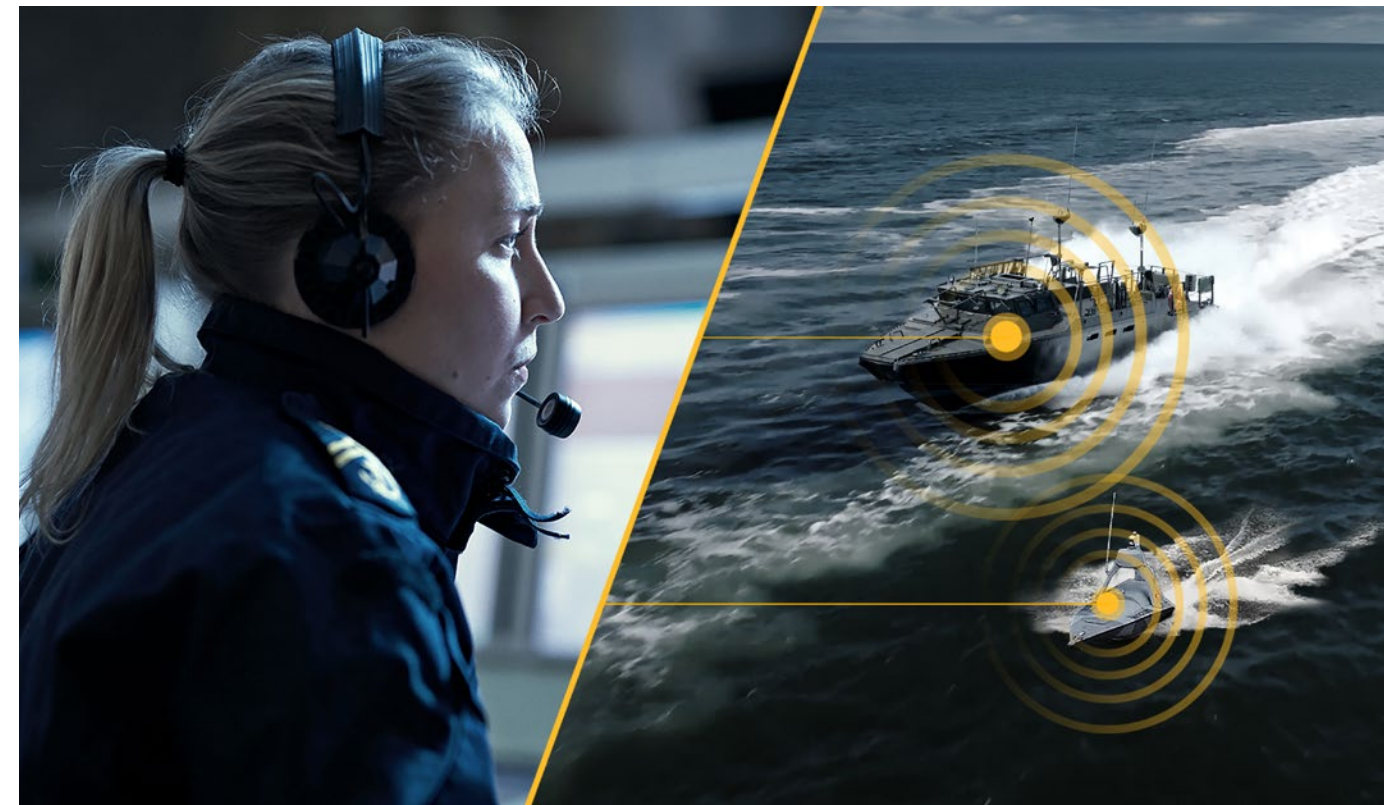
Saab Lightweight Torpedo

The Baltic Sea is one of the most demanding marine environments on the planet. Just 70 metres deep on average, its brackish waters are crowded with rocks, islands, and small caves that make naval operations arduous and extremely challenging.



To meet these challenges, Saab developed the Lightweight Torpedo (SLWT), which is designated Torped 47 by the Swedish Armed Forces. Designed for deployment from submarines and surface vessels, and prepared for future helicopter integration, the system strengthens anti-submarine warfare capabilities while providing increased operational flexibility. Developed specifically for the Baltic Sea region, Torped 47 is optimised for shallow waters, complex seabed conditions and challenging acoustic environments where reliable target detection, identification and engagement are critical.

The torpedo combines advanced homing, navigation and communication capabilities with a modern propulsion system, enabling efficient operation across a range of speeds and tactical scenarios. Its wire-guided functionality allows operators to maintain control throughout the engagement, retask the weapon if required and ensure precise target prosecution. Designed to counter modern submarine threats and evolving countermeasure technologies, Torped 47 delivers a future-ready underwater warfare solution for modern navies.



Unleash the power of autonomy Autonomous Ocean Core

Autonomous Ocean Core is a vessel-agnostic, open-architecture control system designed to enable autonomous operations across a wide range of maritime platforms, enhancing mission effectiveness and operational success at sea.



The Autonomous Ocean Core control system equips small and medium-sized naval platforms with advanced autonomy for both military and civilian missions. Operators can easily enable un-crewed operation by inputting the vessel's parameters into the motion control function.

The system offers advanced obstacle and traffic detection, which not only increases the autonomy of the ship, but also ensures safety during operations in busy or dangerous waters. In addition, the control system manages vital ship systems such as pumps, rudders and lighting, and automates the response to emergency situations. For example, if water enters the hull, this is automatically detected and the pumps are activated, while fuel levels and fire safety are continuously monitored.

The control system of the Autonomous Ocean Core uses three different sources for location determination, which makes it possible to operate without GPS. This enables the vessels to operate in areas where GPS signals are disrupted. The system continuously calculates the optimal route and checks whether the vessel is following the planned course.

In addition, the system uses a fleet management function that allows multiple vessels to be managed and monitored simultaneously. The open and modular architecture of the

Autonomous Ocean Core offers the flexibility to easily integrate new technologies and sub-systems, so that the system can continue to respond to technological developments in the future.

Autonomous Ocean Core on CB90

The CB90 has proven to be reliable in recent decades. The fast attack boat no longer holds any secrets for Saab's designers, it is also an easy-to-understand ship, with systems that are not too complex. In addition, the vessel offers sufficient space for placing weapons, sensor systems and being able to take drones. This means that Saab also sees the CB90 as an ideal platform to realise its plans for unmanned systems. Under the name Enforcer 3, Saab has a test and development platform for unmanned systems, based on the CB90. Saab expects that naval and amphibious operations in the future will be carried out by cooperating manned and unmanned vessels. The Enforcer 3 can be deployed both manned and unmanned.

Exploiting the benefits of unmanned systems

More and more tasks can be performed both manned and unmanned. Especially routine tasks or missions that are potentially dangerous, such as operations in bad weather conditions or in a conflict zone, are ideally suited for unmanned vessels. They can then minimise the risks for the crew. The Enforcer enables flexible integration of crewed and autonomous units operating together in coordinated

swarms. These interconnected units provide a more complete tactical overview while reducing manpower requirements. During tests, Saab equipped the unmanned vessels with jammers to attract attention, allowing crewed units to remain undetected. This adaptable approach offers a safe, effective and scalable solution for a wide range of maritime operational challenges.

Modular with open architecture

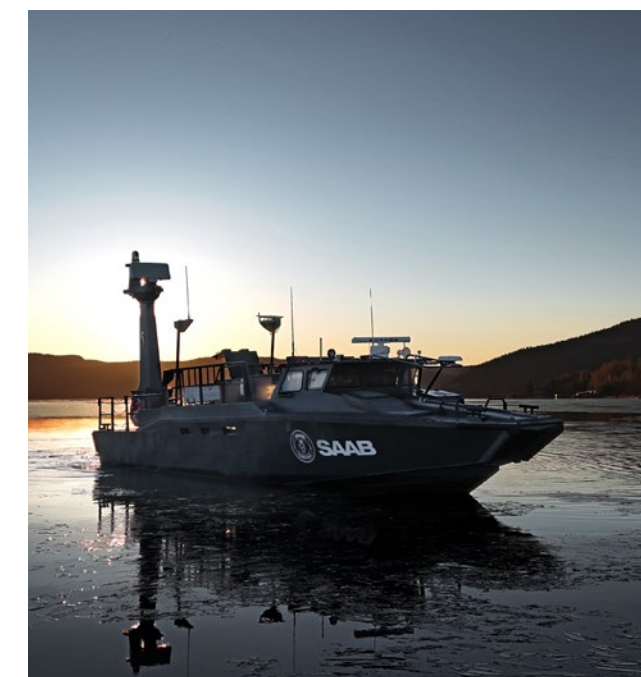
One of the Enforcer's greatest advantages is its versatility, which comes from the open architecture of the Autonomous Ocean Core. This system is designed with flexibility in mind, allowing not only Saab itself but also third-party manufacturers to easily develop and integrate new systems. This approach promotes the ship's adaptability, allowing it to quickly respond to technological developments.

Saab also offers a wide range of systems to further expand the Enforcer's capabilities. For example, the Sea Giraffe 1X radar was added to one of the Enforcer 2 models, and an electro-optical infrared camera was installed in the mast. The plug-and-play design ensured a smooth integration process. In addition to these features, other options are also available, such as the Sirius Compact, a passive sensor for detecting radars, and the Trackfire Remote Weapon System.

Unmanned monitoring of maritime areas

The missions for which the Enforcer has been developed are diverse and cover a wide range of operational tasks. One of the most promising applications is carrying out long-term intelligence and reconnaissance missions beyond the horizon. The Enforcer can be used to detect so-called dark vessels, ships that have switched off their AIS signals. In addition, the unmanned ship is ideal for monitoring critical infrastructure, such as wind farms, where continuous surveillance is required.

Thanks to its autonomous capabilities, the Enforcer can independently navigate to such locations, accurately map the situation and then immediately move on to the next mission, without human intervention. This makes the vessel particularly suitable for long-term operations at great distances. The Enforcer 3, like the CB90, can reach high speeds, which enables fast response times when necessary.



The Autonomous Ocean Core is the future heart of unmanned operations for the Enforcer 3 and other vessels.



Revolutionising Naval Training

Modern naval forces face increasingly complex and diverse threats, ranging from drone swarms to asymmetric attacks at sea. To maintain operational readiness, realistic and adaptable training solutions are essential. Building on decades of development in live training systems, Saab has extended its proven GAMER technology into the maritime domain, enabling highly realistic, scalable, and interoperable training environments for naval operations.



For more than 30 years, Saab has been developing its training system continuously to meet new challenge, always with a focus on those factors that are crucial for truly effective training: realism, scalability, deployability, standardisation and interoperability. The GAMER system which is currently used by more than 35 nations in Europe and North America, including numerous NATO member states, relies on a combination of laser-based simulators, sophisticated ballistic modelling and geometric coupling technology to modelling highly realistic combat scenarios. It provides a safe training environment without using live ammunition, enabling naval forces to simulate complex engagements effectively. However, transitioning the system from land to sea involves evaluating how it will adapt to the unique maritime environment, such as salt-water exposure and potential maintenance needs. A dedicated community of GAMER nations – the 'Interoperability User Community' (IUC) – with its current 16 actively participating nations is also working on common requirements and standards that are incorporated into the development of new technologies in order to continuously develop co-operation within the alliance.

Accessibility

One of the key benefits of the Maritime Live Training system is its ability to conduct exercises close to port, eliminating the need for long-distance travel or airspace clearances to train forces and develop new tactics. By utilising laser systems, which require far fewer safety restrictions than live ammunition, naval forces can train conveniently near harbours, significantly increasing the frequency and accessibility of exercises. GAMER – for land as well as sea – features a range of interoperable software tools to support the entire training lifecycle: from planning and preparation to execution, control and evaluation. Components of the system include firing systems, target systems, communications infrastructure and Exercise Control systems (EXCON), all integrated to ensure seamless and realistic training experiences. Moreover, by strengthening interoperability and shared logistics, the system directly supports the Cooperative Support Initiative (COSI) – a multinational naval logistics and support framework that strengthens collaboration among NATO and partner navies.

Laser technology for realistic combat scenarios

The heart of Saab's Maritime Live Training is the innovative use of laser technology. While many live training systems use a single-path laser to simulate the firing of ammunition, Saab relies on the BT46 two-way laser technology which precisely models the speed, flight time and flight path of the ammunition and is currently the most accurate and realistic laser-based simulator system in the world. Each laser shot carries encoded data, including information about the ammunition type, calibre and impact characteristics, following the NATO-standard U-LEIS protocol. This detailed informa-

tion ensures accurate simulations that mirror real-world combat conditions. The system integrates seamlessly with the ship's fire control systems, providing operators with identical feedback to what they would receive from real ammunition, making the training process extraordinarily realistic.

Multiple threat simulation

The Maritime Live Training system is particularly beneficial for preparing naval forces to face newer threats and challenges, such as drone swarms. By equipping both weapons and drones with laser detectors, naval forces can simulate drone attacks and assess the performance of their combat systems. This allows crews to refine anti-drone tactics, identify the best ammunition types and determine optimal engagement ranges. Moreover, the system is capable of simulating a wide range of threats, from small surface vessels to aerial drones as small as 50 centimetres in wingspan. With clever programming, a single drone can simulate multiple threats, enabling navies to conduct complex scenarios without needing to deploy a large number of physical assets. Saab's system extends beyond ship-based weapons, creating a complete training environment. Boarding teams, for example, can be equipped with personal laser detectors and small arms transmitters, with their locations tracked via GPS. This real-time tracking allows exercise controllers to monitor every participant's position during operations like boarding suspicious vessels, adding another layer of realism. For larger vessels, such as frigates, laser detectors can be strategically placed to protect vulnerable areas like the bridge, engine room or ammunition storage compartments. This simulates realistic vulnerability models, training crews to target enemy weak points while safeguarding their own.

A global solution for modern training needs

Building on the success of its land-based technology, Saab is finally bringing its advanced systems to the maritime sector. The U.S. Marine Corps has already adopted Saab's training technology, awarding a \$37 million contract modification to expand their Marine Corps Training Instrumentation Systems (MCTIS). These will enhance the realism of training exercises for Marines, helping improve their battlefield performance and survivability. In addition, every GAMER system comes with the option of a comprehensive support package, to ensure that armed forces can concentrate on the essentials during these exercises. From the provision of spare parts, to the implementation of repairs and the management of resources, the entire exercise can be coordinated and controlled by Saab experts.

In the near future, Saab is planning to incorporate artificial intelligence and data analytic tools to enhance after-action reviews. Saab's new Maritime Live Training solution provides an invaluable tool to develop both tactical expertise and doctrinal approaches required for modern maritime warfare.

TactiCall ICS

Integrated Multi-Level Communication Solution

Multinational force operations are increasing, and with them the complexity of the chain of command. Sometimes it is a matter of optimising internal procedures in the area of communication in such a way that external as well as internal and red as well as black networks can be integrated into an easy-to-use and technically secure communication platform. This supports vessels in their complex management tasks. Missions today require efficient coordination and cooperation between the individual actors, a wide range of communication channels and the interaction of different classification levels.



Saab's TactiCall Integrated Communications System ICS is the result of more than 30 years of experience in designing naval communication solutions. It is an operationally proven communications system in service today on board 20 different vessel classes in the navies of nine different countries.

TactiCall ICS is a fully software-based integrated communication solution that interconnects all communication technologies, regardless of radio band, frequency or hardware. It enables fast and centralised control of both internal and external communications through a single, intuitive user interface. Operators can efficiently access multiple communication channels across various classification levels, enhancing mission effectiveness.

Based on a modular, COTS/MOTS building-block design, TactiCall ICS can be tailored to fit any vessel type, from small boats to frigates, submarines, and larger ships like destroyers. The system supports seamless voice and data communications and easily integrates with both legacy and third-party systems, ensuring future flexibility while protecting prior investments.

Certified for multi-level security

TactiCall ICS is designed for naval operations and is certified to EAL5+, supporting secure communications up to NATO Secret. It enables command teams aboard ships and submarines to manage internal and external communications across multiple security domains, such as unclassified, restricted, NATO Secret, and national Secret, using a single, intuitive operator terminal. Crew members can simultaneously monitor and communicate on both secure and non-secure channels, streamlining situational awareness and decision-making across all levels of the maritime chain of command.

Centralised management system

TactiCall management system is a modular user- and role-based interface allowing users to easily maintain and control all communication equipment. Furthermore, TactiCall Management provides Emission Control Management in order to invoke different silence levels, and provides optional frequency and antenna management as well as military SATCOM. TactiCall Management system provides Communication Plans with an overview of the equipment included in each chain. It also provides an overall overview status for the communication and allows an operator to test the setup prior to use, ensuring an effective mission configuration.

Framework agreement with Danish Armed Forces

In 2025, Saab has signed a 12-year framework agreement for the delivery, operation and support of four systems to the Danish Armed Forces. The framework agreement includes delivery, operation and support of the Danish Armed Forces' integrated communication system ICS and voice communication system (VCS), C-FLEX multi-function consoles, Mine Counter Measures (MCM) systems and the acquisition of upgraded maritime communication equipment.

The ICS and VCS facilitates the chain of command by giving naval teams access to a variety of communication channels of different security levels from the same user terminal. With communication systems, users can listen to a mix of both secure and unclassified communication and simultaneously be able to talk in both.



The upgraded maritime communication equipment will provide the Royal Danish Navy with enhanced connectivity and interoperability, facilitating seamless communication and data sharing across its fleet. This will enable faster response times and improved coordination during critical missions.

Operational on more than 40 classes of ship

To date, more than 40 classes of ship worldwide are equipped with TactiCall ICS. The Norwegian Defence Material Agency (NDMA) has selected TactiCall ICS to replace the existing communication system for both internal and external use on board, including multi-level secure communication – unclassified, restricted NATO secret and national secret communication channels. TactiCall will be integrated on the following ship classes: Mine Counter-measure Vessels (MCM), the Skjold-class Corvettes and the Coast Guard Vessel (CGV) Svalbard.

Close collaboration with customers

Close collaboration with customers in a spiral development process where the system is improved through small and continuous evolutionary steps to meet the equally evolving needs and requirements of customers. The navies need to conduct an increased variety of missions – using multi-role ships. But at the same time, the number of crew members is actually reduced in some navies. This emphasises the importance of a system that can be integrated and operated

in a wide range of vessels, which in turn has positive implications for the training of the relevant staff and also for costs. The Danish mid-life update program is a testament to the ongoing commitment to enhancing naval capabilities. Additionally, Saab's good cooperation with the German Navy on the F123 program further underscores the global reach and reliability.

Complex communication networks are an integral part of today's globally operating, multinational task forces. A robust, mission-proven and highly survivable communications system can reduce the complexity of chains of command. Intuitive and modern user interfaces enable rapid and efficient action in all missions and operational environments. With the seamless integration of devices from a wide range of users and providers, nothing fundamentally changes in the hardware environment with the use of TactiCall. This simplification not only has a positive effect on operations, but also on operating costs.

NAVAL ESM & ELINT

High confidence situational awareness

Naval decision makers commanding surface vessels require a high level of confidence in their situational awareness with respect to the Electronic Order of Battle. This awareness is absolutely crucial for achieving mission objectives and, ultimately, for the survival of the vessel.

The SME family consists of a range of compact, high-performance tactical Electronic Support Measures ESM and Electronic Intelligence ELINT systems designed to meet today's complex electronic warfare.

The system provides automatic interception, analysis, and classification in dense signal environments. A high-fidelity ELINT capability operates in parallel, delivering interpulse, intrapulse, and time-domain analysis in detail. The systems also feature extensive recording capabilities and support both static (national) and dynamic (local) libraries to enable the classification of radar emitters with platform association.



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SAAB

Protect data, secure missions uncompromising information control

Control of sensitive information is the key to mission success. Increasing numbers of systems exchange vast quantities of data, raising the risk that classified material may end up in the wrong hands. A modern security architecture must therefore operate across domains and must not be hardware-dependent.

When countries, institutions or armed forces exchange information, information control plays an extremely important role. In the past this could be achieved using data diodes within a less complex information architecture. These ensured that data flowed in only one direction – from a less-secure system or network to a highly secure one, or vice versa.

Today the situation is different: because six, seven or more distinct security levels are typically required within ever more complex information architectures, high-tech security filters are needed to guarantee the integrity and confidentiality of classified information. “Cross Domain Solutions (CDS) ensure that information can be filtered in different directions. This allows a large number of systems to communicate without sensitive information leaking,” explains Swen Ventker, Director Sales and Business Development for communications systems at Saab. The company has been installing its CDS, TactiCall, for communications and information security on naval vessels since the early 1990s. Remarkably, the core software – originally developed as an integral part of the hardware – is now also available as a standalone product called TactiGuard XD and can be used on any hardware.

Efficient certification and scalability

Several companies offer sound information-security systems. However, CDS products are often tightly coupled to the hardware used. Once that hardware reaches end-of-life, the entire system must be replaced, involving high costs and often prolonged unavailability. Any structural change to a vehicle, for example, typically triggers a new accreditation. A software solution, by contrast, can be installed on a commercial off-the-shelf computer (COTS) or a customer-specific computer when that device is replaced. In that case you only need to purchase a new device and reinstall the software – a faster and more cost-effective approach. Moreover, a system such as TactiGuard XD offers further advantages: where space for new hardware is limited it can be used on existing equipment. This is an important consideration in combat vehicles, where space for additional computers is often scarce.

TactiGuard XD can be customised to meet a customer’s specific requirements and is available worldwide thanks to the International Traffic in Arms Regulations (ITAR). “Our system is certified in Norway under the Common Criteria (CC) licence, but we can also provide national licences if required. Although the CC licence does not expire, periodic re-certification takes place. Cross domain solutions ensure that information is filtered in different directions. This way our software continues to meet the highest standards and allows us to address the challenges of military operations,” says Swen Ventker. Many systems on the market are only nationally certified. That can be problematic in a NATO context when data must be exchanged between different armed forces.

Highest security level

The more flexible cross-domain solutions are, the better. Security must always be the highest priority. TactiGuard XD enables the creation of a bespoke Interface Control Document. This document uses a ‘Parameter Guard’ to translate all data into the required syntax. That ensures protected, filtered data transfer through multiple security mechanisms and provides a high level of resistance to cyber attacks. “Our protocols define in detail who may send which data, when, and in what form and length. All information is checked for format, syntax and semantics. Only those who know the exact, pre-defined structure can disrupt the system.” The entire process occurs near-real time, in a fraction of a second. Artificial intelligence is not used because it does not provide the required level of security.

Information security more important than ever

Experience from Ukraine again demonstrates how crucial rapid and reliable information exchange is to protecting lives. On the battlefield in particular the secure transfer of classified information, such as location data, is essential. Mobile phones that transmit or can be tracked must be replaced by robust systems that improve decision quality and provide strategic and tactical advantage. Military communications require solutions that can be deployed simply and flexibly at any time and scaled up at low cost. After all, information control is essential in a world where surveillance and cyber-crime are commonplace.

Electronic Warfare Outsmarting threats for a safer world

In the world of warfare, where every second counts, gaining the upper hand in information is the key to victory. Saab, with over five decades of expertise in electronic warfare, stands at the forefront of this innovation. Saab's electronic warfare solutions include protection for naval vessels and submarines, as well as signals intelligence systems for passive interception and analysis of radar and communication signals, providing situational awareness for naval platforms.

Amidst the vast expanse of the sea, a new tool is emerging to give naval forces the edge they need: the Naval Laser Warning System (NLWS). The state-of-the-art NLWS is poised to contribute significantly to the frigate's situational awareness and self-protection capabilities. With rapid threat warning and threat classification, it enables the combat management system to employ effective countermeasures against the laser threats, contributing to our shared mission of keeping people and society safe.

In a fraction of a second

In mere milliseconds, the NLWS swiftly detects radar or laser signals, serving both to locate adversaries and protect our own forces and platforms. The system can identify various types of lasers – including beam lasers, designation lasers, rangefinders and powerful blinding lasers, comparing them with its extensive signature database. Additionally, new signals can seamlessly integrate into this database upon request.

While the mechanics of laser warning systems are intricate, their operation is straightforward: when a laser beam targets a platform, the system rapidly recognises the threat, providing critical data about the emitter almost instantaneously. Not only does it determine the type and origin of the signal, but it also calculates the direction from which it originates. Currently boasting an accuracy of 7.5 degrees, with ongoing efforts to achieve a remarkable 1-degree prediction, the system is continuously evolving. With the ability to process up to eight laser signals simultaneously, the NLWS is remarkably robust, experiencing only one known failure despite years of operation.

Naval Laser Warning Systems for Spanish Navy

Selected for the Spanish Navy's F110-class frigates, Saab's Naval Laser Warning System provides real-time situational awareness of laser-based threats and strengthens platform self-protection capabilities. The system delivers full hemispherical coverage and can be fully integrated with the ship's combat management and electronic warfare systems, enhancing survivability in increasingly complex threat environments.

Deception and defensive measures

The integration of NLWS with other interfaces enables automatic deception and countermeasures once an enemy signal is detected. For instance, the system can emit a massive cloud of smoke to obscure the view of the platform from guided missiles. Remarkably, most guided weapons self-destruct when unable to identify a target. Therefore, this deceptive manoeuvre not only evades the attack but also renders the attacker's weapons harmless.

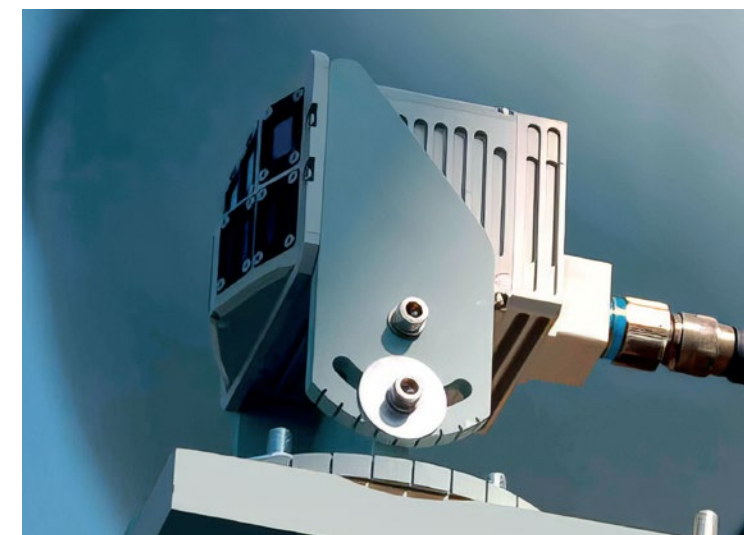
Enhancing situational awareness

Laser warning systems provide a critical advantage in situational awareness. Equipped with 16 sensors, the system offers comprehensive coverage. Even on a combat ship spanning 140 metres, only eight to ten sensors are required to achieve 360-degree observation. The compactness of the system is truly remarkable, fitting into just two suitcases. This portability allows for easy transport, installation and live demonstrations, making it exceptionally user-friendly, especially for military personnel unfamiliar with the system. Furthermore, this simplicity extends to training, as users can grasp all key functions within three days without any prerequisite knowledge. Moreover, the feedback from customers continuously informs the system's development, ensuring its effectiveness and adaptability in diverse operational scenarios.

Insights from other domains

As the threat landscape evolves, so too must the technology that counters it. Saab draws on its cross-domain expertise to enhance the performance of the Naval Laser Warning System. With each advancement, the system becomes even more indispensable to naval operations. Looking ahead, Saab envisions greater speed and efficiency in signal detection, ensuring that naval forces stay one step ahead of their adversaries. In an era where danger can emerge from any direction, a reliable 360-degree warning system is not just an asset – it is a necessity.

Saab also places strong emphasis on customer feedback and the unique operational challenges they face. A system is only as effective as its ability to meet the user's needs. In the vast expanse of the sea, where threats may arise from the shadows, the Naval Laser Warning System stands as a beacon of safety, guiding naval forces through the fog of war.





Sea Giraffe 1X makes maritime platforms more capable and better prepared to execute missions in the world's littorals.

Sea Giraffe Multi-Sensor Solution

A naval warship is a powerful asset. However, without the right means to detect, classify and counter today's advanced threats, even the most capable surface combatant will be vulnerable. Saab's Sea Giraffe Multi-Sensor Solution provides powerful radar performance in a compact format and is suitable for both larger combatants and smaller vessels.

The solution can be configured as a rotating combination of Sea Giraffe 4A and Sea Giraffe 1X, or as a fixed-face solution comprising Sea Giraffe 4A Fixed Face (FF) and Sea Giraffe 1X. This combination provides simultaneous medium-to-long-range air surveillance together with short-range air and surface surveillance, enabling naval forces to detect threats regardless of size, speed, shape or sophistication.

Addressing hypersonic threats

In the modern naval combat environment, forces may face threats travelling at several times the speed of sound. Traditional radar systems often lack the update rate required to detect and track these hypersonic missiles early enough to allow operators sufficient reaction time.

The Sea Giraffe Multi-Sensor Solution addresses this challenge through Saab's Hypersonic Detection Mode. Based on next-generation track-while-scan technology, it combines extremely fast track formation with a high update rate. This makes it possible to track large numbers of targets, including low-observable and manoeuvring threats, in all types of conditions.

Prepared for current and future threats

Supersonic and hypersonic missiles, stealth targets, small drones and increasingly sophisticated attack systems continue to challenge naval forces worldwide. The Sea Giraffe Multi-Sensor Solution combines medium-to-long-range surveillance with short-range air and surface coverage in a single integrated solution. Use of different frequency bands provides optimised performance in challenging weather conditions and contested electromagnetic environments.

Developed in one of the world's most demanding maritime environments, the Sea Giraffe radar family is designed to support naval forces with the situational awareness and survivability that is required across the full spectrum of operations.

Light-weight efficiency

Based on more than 60 years of radar development, Sea Giraffe 1X is a lightweight 3D AESA radar operating in the X-band. It delivers rapid and reliable detection of both air and surface targets, including sea-skimming missiles, UAVs and small surface vessels.

Covering the entire search volume every second, Sea Giraffe 1X provides accurate 3D target data and automatic tracking functionality, enabling operators to respond quickly to emerging threats. With a total system weight of less than 150 kg and very low power consumption, it is ideally suited for smaller vessels, highly manoeuvrable forces and as a complementary radar on larger ships.

Sea Giraffe 1X for Swedish Navy

Selected by the Swedish Navy, Sea Giraffe 1X helps protect coastal and littoral areas with advanced capabilities for the detection, tracking and classification of air and surface threats. The software-defined 3D AESA radar delivers simultaneous surveillance across multiple domains, including the detection of drones and other low-observable targets. Designed for continuous evolution, Sea Giraffe 1X can be updated to address emerging threats and is suitable for a wide range of naval platforms, from smaller vessels to larger surface combatants and autonomous systems.

With a higher level of awareness in multiple domains including small targets, have more time to manage any threats in any waters.

The multi-functional advantage

Designed to combine long-range air surveillance and defence with full horizon coverage of surface targets, Sea Giraffe 4A is the ultimate sensor for mission success and survivability across the full spectrum of conflict in any naval environment.

The commanding officer will access very high situational awareness through simultaneous air and surface surveillance together with uncompromised self-defence capabilities. This radar offers exceptional range, performance and multi-functionality in a single compact solution.

The Sea Giraffe 4A scans the total 360-degree search volume up to 70 degrees at 60 rpm and provides an unparalleled 3D target update rate, along with high altitude coverage and accuracy. The radar provides simultaneous all-weather coverage against air and surface targets from low, slow and small targets (UAVs), to fast-moving missiles and fighters, RAM target and jammer strobes, at all altitudes and in severe clutter. The surface channel offers a high probability of detecting very small targets in close proximity to the surface, for example rigid inflatable boats. The surface channel is also equipped with a high-resolution surface surveillance capability specifically designed to detect gun fire splashes in order to provide data for gun fire corrections (for example support pre- and in-action calibration).

The Sea Giraffe 4A Fixed Face is designed for continuous upgrades to meet tomorrow's requirements and future threats. The high reliability provided by Sea Giraffe 4A will greatly reduce the required investment in on-board and depot spares. The user-friendly design leads to reduced operator and maintenance training, which will significantly contribute to reducing the total cost of ownership.

Maintaining situational awareness

The Sea Giraffe AMB is an efficient medium-range radar designed to deliver outstanding performance in both littoral regions and blue-water environments. Powerful yet compact and lightweight, it provides naval commanders with the capabilities required to maintain continuous and accurate air and surface situational awareness, maximising response time when managing threats in any operational area.

The system supports standard or customised data link integration and offers superior overall performance compared with other naval 3D radars in the same class. Operating in the C-band, Sea Giraffe AMB provides 360° monitoring, a high update rate and a 1-second target revisit time. Its advanced Electronic Counter-Countermeasure (ECCM) capabilities, including ultra-low antenna side-lobes, ensure reliable operation in complex electromagnetic environments.

Sea Giraffe capabilities

- Simultaneous air and surface surveillance
- Multi-role capabilities
- C-UAS through ELSS classification
- Sense and Warn
- Excellent small target detection
- Fast reaction time for all targets
- Extensive Electronic Counter-Countermeasures
- Small physical footprint and light weight

To facilitate operator interaction, the Sea Giraffe AMB provides fully automatic operation for both air and surface targets, supported by a range of clutter maps and Doppler processing capabilities to eliminate land and weather-related interference. The system can classify and track fixed-wing aircraft, helicopters (both moving and hovering), small UAVs, jammers and ballistic targets. Its surface channel provides a high probability of detecting very small targets close to the surface, including rigid inflatable boats and periscopes.

The radar has been proven in all kinds of environments, including regions with extensive ducting conditions to master the littorals. It is the result of Saab's expertise and long experience in the field. Saab has supplied over 30 countries across the world with radars, and continues to push performance boundaries.

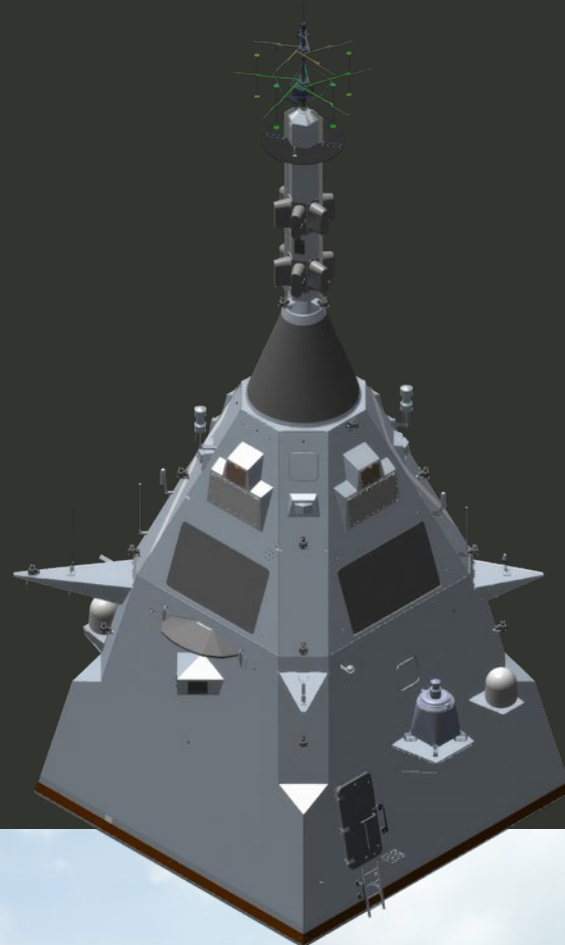
SLIM – Saab Lightweight Integrated Mast

The Saab Lightweight Integrated Mast (SLIM) concept entails holistic responsibility for sensor performance and integration, top-deck design, structural tolerances, interfaces, and installation. It is a multi-capability top-deck mast for the naval domain that accommodates housing for all major radars, sensors and antennas.

Saab has been designing and building composite masts for decades. Now, we have developed the technology into fully equipped, tested and verified masts suited for the prime contractor's shipyard. Derived from the stealth Visby-class corvette's fully carbon fibre hull construction, we have successfully introduced SLIM into the market for surface combatants.

Using a composite mast and superstructure delivers around 50% weight reduction compared to using steel. This results in a lowered centre of gravity and improved vessel stability, increased load capacity, lower fuel consumption, and reduced maintenance costs. At the same time, the composite mast provides a substantially reduced radar signature for the vessel.

Saab has signed a contract with the Defence Science & Technology Agency to supply six composite superstructures for the Republic of Singapore Navy's Multi-Role Combat Vessels.



STRIKING PERFORMANCE

Strengthening Germany's naval capabilities

In July 2026 Saab signed a contract with the German naval defence company TKMS and received an order to deliver and integrate combat systems, composite structures and sensors into four of the German navy's new MEKO A-200 DEU class frigates. The order involves equipping the frigates with composite superstructures, 9LV Combat Systems including the Fire Control System and Combat Management System, sensors such as the long-range surveillance radar Sea Giraffe 4A Fixed Face, the lightweight multi-mission surveillance radar Sea Giraffe 1X, as well as passive sensors.

The frigates will be produced in Germany with TKMS as the main contractor. The contract also includes an option for integrating and equipping additional frigates.



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