EU & NATO
Magazine

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Strengthening global defence cooperation

Content

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Integrated defence for a new security era

NATO's security landscape has fundamentally changed. Europe is facing a persistent, multi-domain challenge. Success in this environment demands more than isolated capabilities in the five operational domains – land, sea, air, cyber and space. It requires an integrated defence architecture where sensors, decision-makers and effectors work as one.

For NATO, this is not only a question of strategy, but of technology partnership. The Alliance needs industry partners that can deliver interoperable, combat-proven solutions across domains and that understand NATO standards, NATO doctrine and NATO's tempo. Saab is embodying this role with perfection: enabling allied nations to counter the drone flood, strengthen ground combat capabilities and achieve multi-domain operations – with platforms such as GlobalEye providing airborne early warning and cross-domain integration at its very core.

Multi-domain superiority
The concept of Multi-Domain Operations (MDO) requires activities in one domain to create effects in others: actions in the electromagnetic spectrum enabling ground manoeuvre, maritime surveillance informing air operations, or cyber intelligence shaping space-based ISR tasking. To achieve this, NATO needs platforms that combine data from numerous sources, process it in real time, and distribute an accurate, trusted Common Operating Picture (COP).

Saab's GlobalEye airborne early warning and control solution is designed as precisely such a node. Recent decisions by Sweden and France to procure GlobalEye aircraft underscore how central such capabilities have become to national and allied defence. In littoral, congested environments like the Baltic Sea – where air, naval and ground activities are tightly interwoven and response times are short – GlobalEye acts as the hub that enables coordinated situational awareness: sharing early warning data with air defence units, providing targeting information to surface forces, and cueing other sensors and platforms across the operational area.

Land forces still decide the outcome
Despite the rapid proliferation of drones and long-range fires, ground forces remain decisive. It is soldiers who must ultimately seize, hold and defend territory – from Arctic environments on NATO's northern flank to dense urban terrain along the Alliance's eastern frontier. Here, Saab's ground combat portfolio plays a central role in enabling NATO land forces. Saab's decades of experience in Nordic conditions, combined with recent operational feedback, is fed directly into product development and training concepts. Training and simulation systems complement this hardware.

Countering the drone flood – and the cost curve
Ukraine has demonstrated just how rapidly unmanned systems can become decisive. Commercial quadcopters, loitering munitions and military-grade UAVs now shape the battlefield, from tactically valuable reconnaissance to precision strikes. For NATO, this has turned Counter-Unmanned Aerial Systems (C-UAS) into a strategic priority. Saab addresses this challenge by offering a layered C-UAS approach built around three pillars: advanced sensors, intelligent command and control, and scalable effectors.

Unmanned systems as NATO force multipliers
Unmanned systems will not replace manned platforms, but they will be indispensable force multipliers for NATO. Rotary-wing unmanned aerial systems provide tactical advantages that fixed-wing platforms cannot match: vertical take-off and landing, operation from small decks and austere sites, and the ability to hover over a point of interest. Within this segment, Saab – through its involvement in the UMS Skeldar VTOL system – supports NATO navies and land forces with solutions designed around Alliance interoperability.

Shaping Europe's security together
Yet technology alone is not enough. To "strengthen ties between stakeholders and shape the future of security and defence in Europe", NATO, nations, industry and research communities must work in close partnership – from concept development and experimentation to acquisition, training and lifecycle support. Saab's long-standing cooperation with allied and partner nations, its focus on interoperability and its experience from complex operational environments position the company as a key contributor to that collective effort.

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 (including 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 communication 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

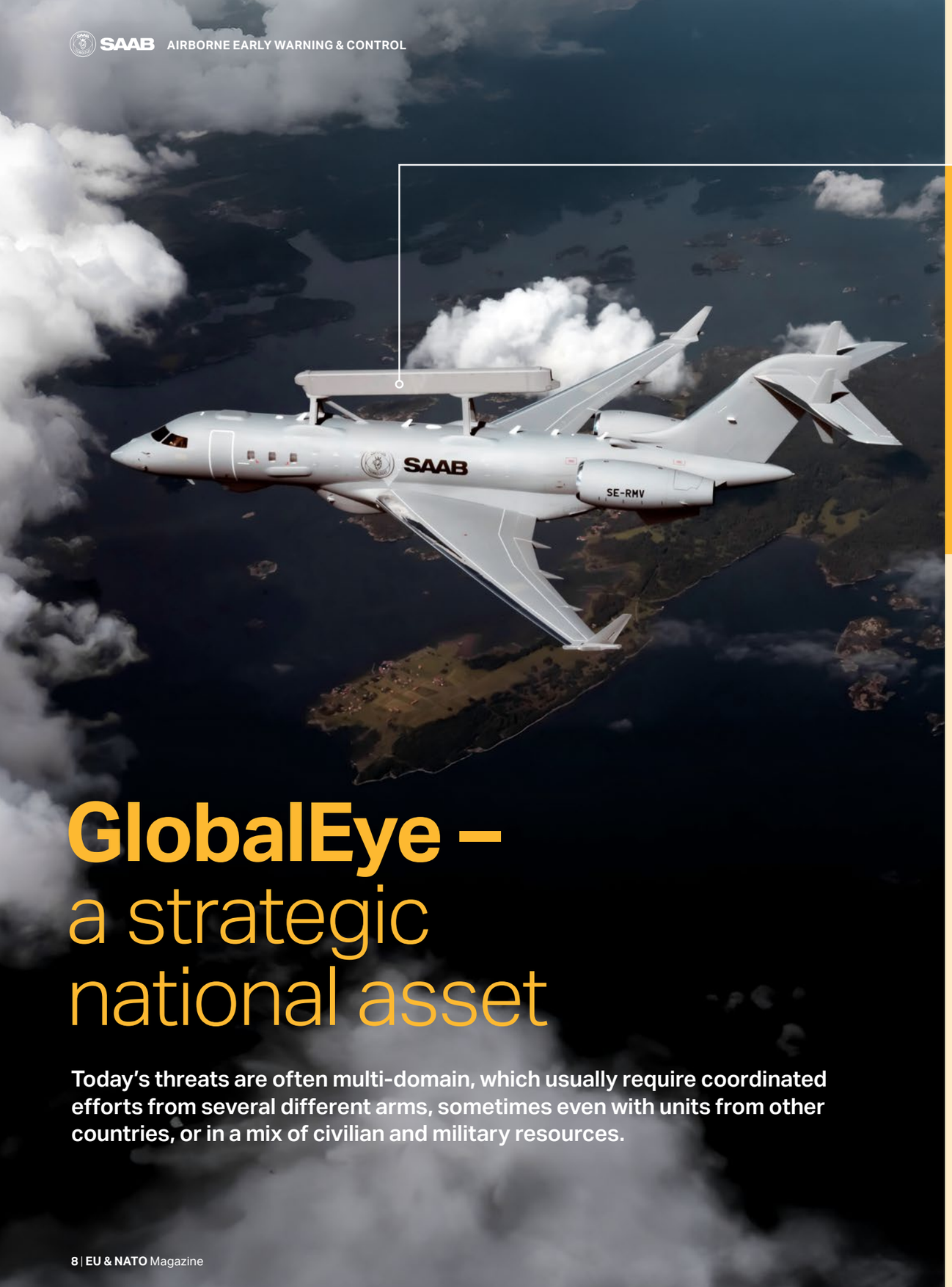
Saab has developed larger holistic platforms where sensors, communication and Command and Control are fully integrated and can act as a node for MDO. A good example is the GlobalEye, an airborne platform which supports cross-domain exchange of information to both civilian and military authorities (coast 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.



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.

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.

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.

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 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.

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.

Deployable Maintenance Facility anytime and anywhere

Being deployed often means operating under rather primitive conditions, especially in the early stages of a mission. However, this need not be the case. The mobile support solution DAM Deployable Maintenance Facility can largely mitigate these conditions.

DAM can be rapidly deployed without the need for construction machinery or cranes. However, its applications go far beyond that. Thanks to its modularity, robustness and integrated protection, DAM is a versatile solution also suitable for land operations. Examples include its use for the storage and maintenance of vehicles, helicopters and larger drones, as a command post, in disaster relief operations, for personnel accommodation, as a field hospital or for NBC decontamination. DAM seamlessly integrates into the modern compound environment.

Within DAM, Saab has incorporated the requirements and experiences of international armed forces. It also includes stealth capabilities through Saab Barracuda's integrated multispectral camouflage. This camouflage provides effective protection against modern reconnaissance and combat sensors, thereby reducing the risk of detection. In addition, Barracuda offers protection against solar radiation, achieving a temperature reduction of up to 10 degrees, which results in cost savings and a more comfortable working environment.

Shield in the skies

Unmanned helicopter systems protect both military and civilians

Early detection of threats is now more important than ever. Increasing border conflicts and challenging geopolitical developments require ever more protective mechanisms, while resources remain scarce. Unmanned helicopter systems can offer an appropriate response to these new challenges – they combine surveillance, inspection and threat detection, not just in a military context but also in a civilian one. It is important that they meet the growing demand for modular unmanned aerial systems that can be used for multiple missions.

Advanced sensor technology – from electro-optics and infrared to radar and signal reconnaissance – and a high degree of adaptability make the Skeldar V-200 an all-round talent. The aesthetically designed helicopter system was developed as part of a joint venture between Saab and UMS Aero Group AG, a Swiss supplier of tactical UAVs. Under the name UMS SKELDAR, Saab develops and markets globally unique solutions for civil protection, security, defence and maritime applications. The focus is always on people – their capabilities should be enhanced without increasing the risks they face.

High endurance, load capacity and adaptability

With its high endurance and load capacity, the Skeldar V-200 unmanned helicopter system can cover large areas and detect threats in real time. The system is suitable for inspecting power grids and gas pipelines, as well as for security patrols and reconnaissance flights. In the event of natural disasters, damaged areas can be quickly inspected and rescue operations supported. With the new integration of the F1MAG high-speed payload solution from UMag Solutions, a leading provider of advanced magnetic sensor technologies, Skeldar V-200 also offers a unique capability for submarine detection and the detection of sea mines in open waters. The state-of-the-art F1MAG magnetic field detector features automatic anomaly detection and a stated horizontal detection range of at least 200 metres, representing a whole new level of detection accuracy, operational flexibility and readiness for navies and maritime security organisations.

Ready for mission in just 15 minutes

Arms smuggling, illegal migration, sabotage and threats to critical infrastructure require the ability to monitor and respond in real time in difficult environments – and often without warning. The medium-weight helicopter system provides a real-time situational picture, thereby increasing operational capability. With a startup time of less than 15 minutes, the system is quickly ready for use and, thanks to its vertical take-off and landing capability, can be launched from ships, mobile platforms or land-based facilities. Skeldar V-200 consists of two helicopters controlled from a ground station, where a remote pilot and a sensor operator work together. The pilot sets the routes and monitors the system, while the sensor operator controls the sensors and navigates the helicopter itself. Even in severe weather conditions, the system can perform precision landings independently. And despite all these capabilities, Skeldar V-200 is extremely resource-efficient in operation. Individual adaptations to specific needs or operating environments are also possible.

Added value

When every investment in safety must be well thought out and have an immediate impact, unmanned helicopter systems such as Skeldar V-200 definitely tangibly strengthen operational capabilities. The robust, modular design allows for both military and civilian use. This creates cost efficiency and simplifies training and coordination: an essential component of resilient holistic defence.

Giraffe 1X
Precise detection in complex environments

Modern air defence demands sensors capable of detecting, classifying and tracking targets across the full threat spectrum – from large aircraft to small drones, from high-altitude missiles to low-flying cruise missiles. Giraffe 1X meets these requirements through world-leading radar technology optimised for challenging operational environments.

Built on gallium-nitride-based Active Electronically Scanned Array (AESA) technology, the system detects targets with radar cross-sections below 0.01 square metres at instrumented ranges of approximately 75 km, providing early warning against small drones that evade traditional air defence radars. Advanced signal processing with dedicated drone tracking algorithms distinguishes genuine threats from clutter and birds, enabling rapid classification even in electromagnetically complex environments. This precision reduces false alarms while ensuring real threats receive immediate attention. The radar provides complete 360° coverage with its entire search volume updated every second, ensuring no target escapes detection.

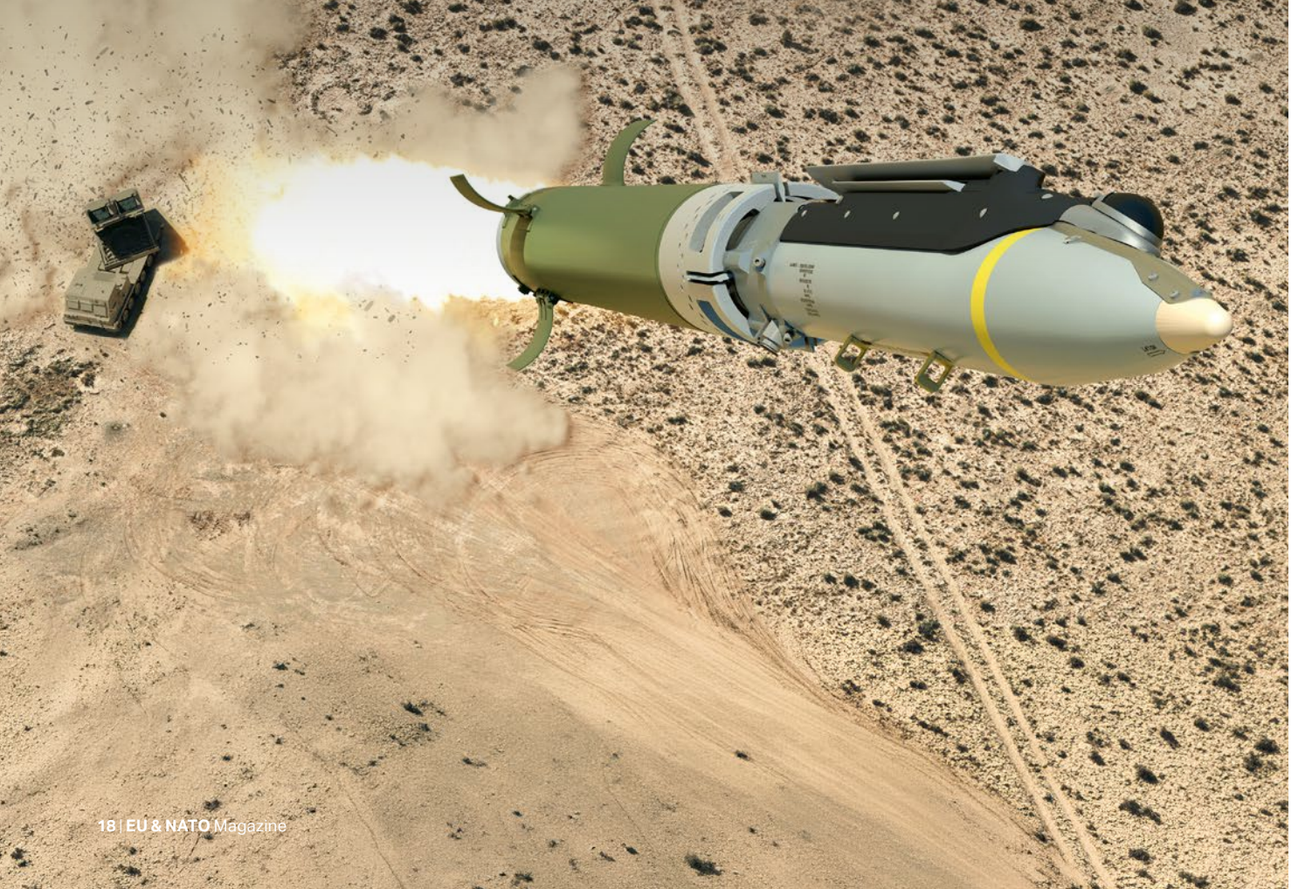
Exceptional mobility defines Giraffe 1X. The topside unit weighs just 100 kg, with the complete system under 150 kg, making it easily transportable. Rapid deployment – operational within minutes – allows the system to support expeditionary operations and frequent repositioning to avoid counter-battery fire. Remote or local operation provides tactical flexibility, while configuration options span mobile, fixed and rapidly deployable installations.

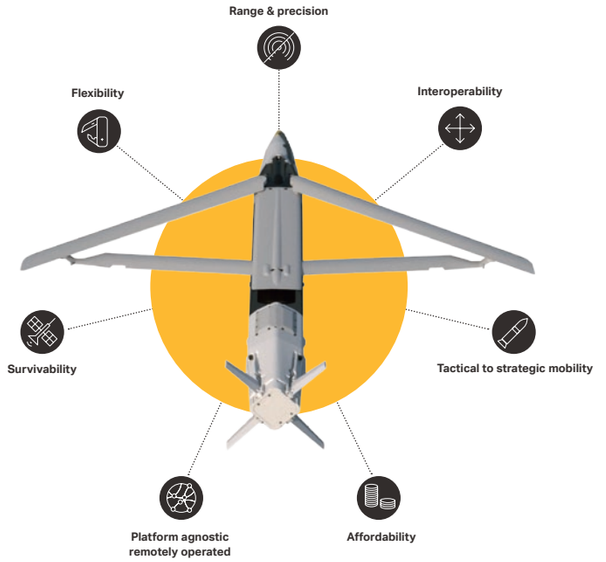
Integration with command-and-control systems and effectors completes the air-defence kill chain. When paired with systems like the RBS 70 NG – a man-portable air-defence system (MANPADS) with laser beam-riding guidance – Giraffe 1X provides the detection and tracking backbone for rapid engagement of aerial threats at short to medium range, delivering a complete Mobile Short-Range Air Defence (MSHORAD) solution. Simultaneous Counter-Rocket, Artillery and Mortar (C-RAM) “sense & warn” functionality adds another protection layer for forward-operating bases and critical infrastructure.

The radar’s modular design permits configuration for specific mission requirements, from stand-alone operation to integration within comprehensive ground-based air-defence systems. Combat-proven performance and continuous development ensure Giraffe 1X remains at the forefront of sensor technology, providing forces with the detection capability essential for surviving and prevailing in threat-dense environments.

Long-Range Missiles for the Artillery

The Ground-Launched Small Diameter Bomb (GLSDB), a new artillery weapon, is a long-range system that significantly increases the striking power of land forces. With an impressive range of 150 km, it engages targets with very high precision.





Boeing and Saab have partnered to enable the launch of the Small Diameter Bomb (SDB I) – an air-delivered, precision-guided munition – from the ground. The SDB I, also designated GBU-39/B, entered service with the US Air Force in 2006 and has proven its effectiveness in conflicts such as those in Iraq and Afghanistan.

Saab and Boeing have now fitted this glide bomb with a rocket motor and integrated it into a mission-planning system, enabling ground launch. Development has continued since its introduction in 2023, producing a rocket with outstanding accuracy and a long range. This gives commanders an effective means to neutralise all types of enemy units deep within their area of responsibility – a capability essential for mission success.

The warhead of the GBU-39/B is roughly 1.5 times the size of a 155 mm artillery shell. The weapon features standard fuze options, including impact detonation, airburst (HOB) and delayed detonation. Its penetration capability is also noteworthy, leaving targets vulnerable even under steel-reinforced concrete.

360° target engagement

After launch, the GLSDB climbs to altitudes of up to 15,000 metres. At apogee the GBU-39/B separates from the rocket motor. Wings and control surfaces then deploy and the GBU-39/B glides towards its target using GPS navigation and an inertial navigation system (INS). Each GLSDB is programmed individually and can attack its target from any angle along varied approach paths – for example, from the rear or almost vertically from above. This represents a critical difference from conventional rocket artillery, which follows a ballistic trajectory. With the GLSDB, targets can no longer hide behind steep terrain features – the lee of a hill, or the shadows cast by large buildings.

Another capability is that an operator can program multiple rockets simultaneously to strike a single target or several targets at once from multiple directions, making defensive countermeasures extremely difficult. The GLSDB gives operational commanders a weapon with a cost-to-range ratio unmatched by any other system on the market and with uniquely powerful performance.

Blend into the environment

Long-range precision munitions like the GLSDB allow strikes up to 150 km away with high accuracy, keeping troops out of harm's way. However, the rise of drones has made launcher survivability critical, as launch positions can be detected and targeted within minutes.

The GLSDB is launcher-agnostic: it can be integrated with and launched from a wide range of existing launch systems. Saab's solution is a low-signature launcher hidden in a standard 20' ISO shipping container. Internally, it houses two launch pods with up to 12 missiles, capable of 360° engagement. The system can "shoot and scoot" within minutes, then revert to a normal container and relocate. Its inconspicuous design also enables scalable decoys, further enhancing survivability.

The launcher is fully remotely operated, allowing prepositioned, concealed strike capability without personnel on site – reducing risk and manpower requirements while increasing operational endurance. Cost-effective and highly mobile, the system integrates easily with existing transport infrastructure, offering a flexible, survivable and affordable alternative to traditional launch platforms.

Ground Combat Systems

Decisive firepower for dismounted forces

Ground combat remains decisive in modern conflict. Well-equipped infantry with versatile weapon systems determine outcomes when operations extend beyond initial phases, particularly in urban environments and complex terrain where technological advantages diminish. NATO forces require man-portable systems combining firepower, flexibility and operational simplicity.

With versatile weapons systems such as Carl-Gustaf®, NLAW and the AT4 family, we give soldiers the tools they need to carry out their missions successfully.

Our world is becoming increasingly complex and technologically advanced. While growing connectivity and digitalisation bring many advantages, they also introduce risks in the form of new threats. At the same time, they make the world more unpredictable. To safeguard our future security, we must push both technological and intellectual boundaries. That is why Saab continually analyses historical and modern military conflicts and links these insights to emerging trends – enabling our customers to succeed on the battlefield.

An unpredictable conflict landscape

The nature of conflict is becoming ever more unpredictable. Current operational concepts may already be obsolete tomorrow. In addition, geopolitical developments – such as the ongoing war in Ukraine – are causing major shifts on every level: political, social and economic, making future projections increasingly uncertain. Military forces, together with their partners, must be able to provide the right solutions flexibly and rapidly – which is no easy task.

What can ground forces achieve?

Many lessons will be drawn from the war in Ukraine – but the first trends with implications for weapon systems are already emerging. The conflict once again confirms the importance of Combat Support and Combat Service Support units; cyber capabilities in particular play a crucial role.

New technologies will largely shape how infantry conducts combat operations by 2040: in addition to threats on land, at sea and in the air, there will be growing dangers from cyberspace and outer space. This so-called multi-domain battlefield presents armed forces with major challenges in protecting their troops, populations and national security. Training and equipment must be improved in light of the opportunities offered by artificial intelligence, robotics and network-centric systems.

On one point, experts agree: the classic role of combat units – the "boots on the ground" – remains a decisive factor in warfare. "Ground warfare will therefore continue to exist. Even though precision long-range operations are becoming increasingly important, soldiers will always be needed to seize and/or defend territory," says Anders Wahlström, infantry expert at Saab. "With versatile weapons systems such as Carl-Gustaf, NLAW and the AT4 family, we give soldiers the tools they need to carry out their missions successfully. Because Saab designs these systems modularly, modern technologies can be integrated directly. As a result, these products will remain effective and reliable through 2040 and beyond."

NLAW

The anti-tank weapon NLAW (Next generation Light Anti-tank Weapon) defeats modern tanks. It is a true "tank killer" for short-range engagements and the best weapon in its class for operations across varied terrain, including built-up areas. The NLAW has a selectable Overfly Top Attack (OTA) mode for tanks and a Direct Attack (DA) mode for more lightly armoured targets. The system is effective from as little as 20 metres and, because it can be fired from an enclosed space, is ideal for fighting in, for example, urban terrain – even when a tank is behind cover. The NLAW is very user-friendly for a single operator and weighs 12.5 kilograms.

Carl-Gustaf®

The latest Carl-Gustaf® M4 is a multifunctional weapon for short-range use, offering tactical flexibility and effectiveness against a wide range of targets. The M4 weighs only about 7 kilograms.

Compatibility with programmable ammunition such as the new HE 448 enables rapid response. Via an interface in the round casing, the ammunition communicates with the new fire-control system (FCS), the FCD 558. The FCD 558 receives precise information about the type of round and the temperature of the explosive charge and combines these data with the target range entered by the user to calculate the ballistic trajectory. The result is quick set-up, high accuracy and strong operational effectiveness.

In March 2024, Carl-Gustaf® was awarded two significant contracts: one from Poland with an order value of SEK 12.9 billion, and another from the NATO Support and Procurement Agency (NSPA) valued at SEK 700 million. Deliveries for both contracts are scheduled for 2024–2027.

AT4

The AT4 is one of Saab's most successful weapons against armoured targets. The AT4 series comprises a selection of easily manoeuvrable, lightweight and disposable weapons designed for straightforward operation by a single soldier. Capable of countering tanks, heavy combat vehicles, and threats within structures and fortifications, the AT4 also serves to safeguard fixed installations, supply points and other critical assets.

Urban warfare: The city as a battlefield

Recent conflicts show that cities are more often the theatre of combat than in the past. Many of the capabilities of the NLAW, Carl-Gustaf® and AT4 are therefore geared towards fighting across diverse environments, including urban areas. Development has taken into account very short engagement distances, complex terrain and the need to fire from within buildings, as well as to engage targets inside structures. At the same time, existing features have been modernised and improved. Greater precision, high hit probability, increased effectiveness, improved user-friendliness combined with low weight, and flexibility in the types of ammunition that can be used are all important aspects.

"Full autonomy still unrealistic?"

Robotics and AI offer promising ways to support infantry. They can help provide better situational awareness and observe the enemy to strike at their weakest point. They can perform rapid analyses to adapt tactical action. And through automation they can pass new information to weapon systems within seconds, gaining a decisive time advantage. "As a company that develops and manufactures missiles, Saab has acquired years of experience with systems that operate without human intervention," Wahlström explains. "That does not, however, mean these weapons act fully autonomously. For now their role is in mission preparation. Truly autonomous weapon employment raises ethical questions." He does not expect new rules or regulations in the near future, pointing to the prolonged approval processes seen in other domains, such as self-driving cars.

Studies also confirm that, for the time being, employing weapons without the human factor tends to be less effective. Machines decide faster than humans, need no breaks and can endure more. But they are not (yet) intelligent enough to replace people. Robots are not more effective than soldiers (only more efficient at killing) and would not act in accordance with international humanitarian law, not least because programmed pattern recognition cannot reliably distinguish civilians from combatants.

Always think one step ahead

The capabilities of soldiers and their weapons will remain decisive in the future. The more complex the threats, the more important training and education become. While live training with outdoor simulators and live firing will remain central components of military training, virtual training also brings many new opportunities. On the one hand, for basic training – where virtual exercises will partly replace live firing for reasons of environment, cost and time. On the other hand, at the tactical level, for realistic virtual indoor training. "We anticipate a growing need for realistic simulations of a wide variety of weapons that replicate true ballistic behaviour and handling", Anders Wahlström explains.

Saab also invests heavily in usability aspects of its weapons. The company collaborates with leading universities and research institutes, and the exchange with customers and experts from many disciplines is an important factor in its success.

Anders Wahlström: "Looking ahead is enormously important, especially for us as a supplier. We must always think one step ahead to give our customers the decisive edge on the battlefield. Forecasts are never better than the assumptions on which they are based. That is why we devote a great deal of time to analysing current events so we can respond quickly and act with flexibility."

Exactly what the year 2040 will look like nobody can say with certainty. What Saab's experts do agree on is that there will be no decoupling of the battlefield from the soldier. Infantry will therefore remain central in the future.

Excellence begins with training – why practice makes the difference between victory and defeat

Nowadays, an effective army needs more than high-performance equipment and a strategy – it must be able to use its resources effectively, be prepared for a variety of scenarios and remain capable of acting under the most extreme conditions. Combat Training Centres (CTCs) and state-of-the-art training concepts provide a wealth of data that are already able to provide answers to tomorrow's questions.

Learning means adapting to a new environment. This requires addressing psychomotor skills in order to handle the appropriate equipment correctly, socio-effective skills to perfect teamwork, and cognitive skills, which are necessary to process information and ultimately make decisions on the basis thereof. About 20 years ago, most nations began investing in modern Combat Training Centres (CTCs) to test the effectiveness of their capabilities under realistic conditions and to prepare their own troops for deployment in the best possible way. After all, there is no substitute for experience. Increasingly sophisticated equipment and complex tasks require repeated training. Only those who have understood their objectives and tasks and practised techniques and tactics have the ability to recall them at any time under time pressure and extreme conditions. Confronting numerous situations during joint training strengthens troop cohesion and makes it possible to deal with an opponent in the first place.

But CTCs can do so much more. They play a central role in the development of new tactics and doctrines, says Hans Lindgren, Head of Business Development for Combat Training Centres at Saab: "In modern CTCs, troops not only train for their next mission. They also test new methods and strategies in simulations and various scenarios to build the skills needed for future conflicts." A quality that is becoming a necessity not least because of the geopolitical situation. Hybrid conflicts such as that in Ukraine require new approaches, and these must also be tested. "More and more armed forces are recognising this opportunity and taking advantage of it. They train more frequently, collect data all the time and everywhere – even during operations – and thus gain an enormous wealth of data," says Lindgren.

Changing locations = increased training effect

The objectives of a training session can be diverse. While individual soldiers can use the immediate feedback mechanisms to practise combat in a realistic way, the training data also provides key insights into whether the methods used and the available technologies are sufficient to achieve the desired results. In this context, mistakes made during training are often more valuable than success, because CTCs provide the space to learn from them, draw conclusions and rethink one's own tactics without endangering a single human life. Along with the sensors and communications software that collect the data, the Exercise Control (EXCON) software is at the heart of a Combat Training Centre. It is responsible for planning, executing and evaluating military exercises. The more regularly training is carried out – ideally at different locations – the better the troops' skills become and the higher the data quality because different factors can be taken into account.

"More and more customers are deciding in favour of a mobile Combat Training Centre. On the one hand for reasons of space, and on the other because they have recognised that training on different terrain offers numerous advantages," explains Lindgren. Studies and reports show that training in different environments – in terms of climate, terrain or enemy threat, for example – leads to increased adaptability and generally improves soldiers' decision-making skills. Mental resilience also increases because different environments simulate the challenges of real operational scenarios. Furthermore, it is possible to train in terrain that may not be available in one's own country. A mobile CTC can do all of this because all of the equipment needed for a training exercise can be quickly and easily transported to different locations in containers.

Joining forces and resources

Training centres can provide various levels of training – from individual training to collective training, to combined training of different units, and even multinational training. Even if the requirements or needs of individual armed forces are very different, the equipment of a combat training centre should ideally not be, for precisely this reason. This is because using the same system makes combined training easy. More than 35 nations worldwide, with focus in Europe and North America, including numerous NATO member states, are already using Saab's GAMER live training system. This system is interoperable and uses a combination of laser and geometric coupling technologies to effectively support various types of operation. The GAMER system has thus become the de facto standard for military training. In the context of NATO countries in particular, which now also includes Sweden, this market penetration offers enormous advantages. With GAMER, CTCs from different nations can be connected to each other 'plug-and-play' and the practising nations have complete interoperability. The system was used, for example, in the recent 'Nordic Response' exercise. Nordic Response is part of the NATO exercise Steadfast Defender 2024, in which more than 20,000 participants are taking part. By using a system that has been tried and tested in international operations, global defence cooperation can be effectively strengthened.

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 also incorporated into the development of new technologies in order to continuously develop cooperation within the alliance.

A new level of realism

While many live training systems in CTCs use a single-path laser to simulate the firing of ammunition, Saab relies on the BT46 two-track laser technology for GAMER, which accurately models the speed, flight time and flight path of the ammunition. This system is currently the most precise and realistic laser-based simulator system in the world. For example, when a vehicle is hiding behind a building, only the real-time trajectory provided by a 2-way laser can determine whether the vehicle or the building has been hit. This factor is extremely important for effective training, especially for longer-range weapons, which are increasingly being used. Among many other features, BT46 offers high accuracy, wireless technology and augmented reality in sights. The setup and control functions are carried out compactly via smartphones and tablets. A scaled-down version of Saab's Exercise Control software can also be installed on these tablets, making exercise control even more mobile. The system displays each trainee and their status in real time and records every shot and hit. Sensors can be attached to weapons, various devices, vehicles and even drones, creating a deceptively realistic live training environment.

24/7 support

While in the past large-scale exercises were often only conducted a few times a month or even a year, today training takes place almost daily. Data is collected in a wide range of situations and sometimes even in action, providing key insights into the capabilities of one's own troops and technologies that are needed for future operations. To ensure that armed forces can concentrate on the essentials during these exercises – namely the execution of an exercise – experts are needed in the background to ensure that everything runs smoothly. Saab offers what's known as an availability concept as part of its CTC. This means that equipment will be replaced within an hour in the event of damage or malfunction. In addition, there are a variety of services: Saab can take over the entire management of a CTC or just provide a few people to support the armed forces team. 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. According to Hans Lindgren, Head of Business Development at Saab's Business Unit Training & Simulation, the needs of individual armed forces vary greatly in this regard. However, in recent years, he has noticed an increasing demand for external support, which is ultimately likely to be linked to the efficient use of scarce resources.

Lessons learnt

Only by recognising tomorrow's challenges can solutions be developed today to meet them. Ultimately, nothing less than the protection of human life is at stake – this applies to the individual soldier in the field and to the societies they protect or defend. In many Western armed forces, the importance of training is already enshrined in the most recent doctrines. According to the NATO Training Directive and the US Army Field Manual, training and the development of capabilities are at the top of the list. They emphasise that sustainable operational readiness cannot be achieved without regular and effective training measures.

Combat Training Centre to Denmark

In June 2025, Saab received an order for the Combat Training Centre from the Danish Defence Acquisition and Logistics Organisation. The order value is SEK 680 million and deliveries will take place 2025–2027. The order includes a comprehensive package of soldier and vehicle training systems, anti-tank and sniper training weapons, as well as communication systems and EXCON software which is used for after-action review. Saab will also provide training support in Denmark at four designated sites.

Effective training is essential to achieving sustainable operational readiness.

Camouflage concepts in the race against modern sensor technology

High-tech sensors that can 'see' through camouflage materials, mist and almost everything else, combined with sensor-data fusion and artificial intelligence, have dramatically improved detection capabilities. Sensors can be integrated into any platform, such as drones, helicopters and aircraft. In combination with precision weapons, this makes military units highly vulnerable. The core question is: how to mitigate this threat?

More than 80% of casualties in Ukraine have been caused by artillery. Once detected by modern sensors, targets can be struck within minutes. Emissions across the electromagnetic spectrum (including IR, radio and mobile phones) are also being localised, and the use of artificial intelligence greatly accelerates sensor fusion and assessment.

For decades Saab has developed camouflage solutions to reduce the vulnerability of units. Survival is, after all, essential to mission success. These solutions span the entire electromagnetic spectrum – ultraviolet, visible and near-infrared bands, as well as short-wave infrared, thermal infrared and radar bands. Saab continuously adapts these techniques in response to the improvement and evolution of sensors.

"It is important to confuse the enemy," says Niklas Ålund, Director Strategy and Business Development at Saab Barracuda. "Your actions should remain concealed for as long as possible, while you apply deception to make the enemy take wrong decisions so that you can retain the initiative in combat."

Major Håkan Darvall of the 18th Swedish Mechanised Regiment: "In Ukraine we see that camouflaging vehicles and static objects is essential to avoid detection, especially by drones and aircraft. Since 2016 the unit has used Saab's static camouflage nets and in 2022 added Mobile Barracuda Systems (MCS) for vehicles. This is important to mask our units against air threats."

Modern multi-spectral CCD systems (Camouflage, Concealment and Deception) ensure that emissions are neither reflected nor transmitted and that signals are absorbed, allowing objects to blend into their surroundings.

MCS does not restrict a vehicle's operational use: it provides continuous protection while driving, whereas the static ULCAS offers extra protection when vehicles are stationary or in position. Together they maximise the camouflage effect. MCS provides the same protection for large and mobile assets.

flict and the experience in Ukraine have made it clear how vulnerable military units are. In particular, the integration of advanced sensors with AI-driven, long-range precision weapon systems poses a major risk of very rapid neutralisation. However, the high demand for modern multispectral camouflage from various NATO countries cannot be met by the current production capacity.

There is growing awareness that long procurement timelines lead to being at the back of the queue of those in need. Saab recognises this and, where requested, implements industrial cooperation arrangements so that the local economy benefits from defence spending and local know-how is developed. This also secures national supply assurance.

Individual soldiers also need modern camouflage – a single person can put an entire unit at risk if detected. The lightweight Barracuda soldier system offers unrivalled protection against all relevant sensors, including thermal. Barracuda camouflage can be shaped to meet user requirements. Almost as important as the product itself is correct handling. That is why users are taught at the Barracuda Academy how to optimise their camouflage using their own signature analysis.

Production capacity versus demand

From a technological perspective Saab has an undeniable advantage: the company produces and integrates complex combat systems across all defence domains (air, land and sea) and therefore possesses extensive knowledge of radar, electronic warfare and detection. This enables it to perfect counter-detection solutions for the Barracuda system. The defence industry is currently seeing unprecedented demand for CCD systems. The return to large-scale con-

The “Loke” Counter-Drone Concept Debuts in NATO Mission

The Swedish Air Force new counter-drone concept Loke has for the first time been in a live NATO mission. The Loke concept is developed by the Swedish Defence Material Administration (FMV), the Swedish Air Force and Saab. The concept has already become a central part of Sweden’s base-defence capability.

The “Loke” counter-drone concept was deployed during the Swedish Air Force’s contribution to NATO operations at Malbork Air Base in Poland between April and September 2025. Military units from 21st Wing and later 17th Wing supported the protection of allied facilities, including a key logistics hub for military aid to Ukraine.

“Effective air operations require robust ground protection. The systems we deployed significantly strengthened base security, both for us and our allies” said Lieutenant Colonel Christian Bertilsson, commander of the Swedish contingent in Poland.

Rapid development

“Loke” was first presented in February 2025 and is built by combining existing technologies into a modular system. It integrates a mobile radar, Saab’s Giraffe 1X, with a Trackfire Remote Weapon Station armed with heavy and medium machine guns, as well as electronic warfare components. The system can track both physical targets and signals in the electromagnetic spectrum, providing early detection and multiple options for neutralisation.

“To counter emerging threats, an optimised sensor-to-shooter chain is crucial. We achieved what many thought impossible in record time, including the necessary education and training to support the mission. The fact that our jointly developed counter-drone systems now are operational in the field is clear proof of how effective collaboration between the Armed Forces and the defence industry can and should be”, said Angelica Persson, Counter-UAS Business Development Analyst at Saab.

Next steps

The Swedish Armed Forces and Saab are continuing development, with 21st Wing now training to operate “Loke” as a platoon-level capability. Lessons learned from recent exercises, including “Baltic Trust in Latvia”, are feeding into the next stage of integration. Full implementation across wartime units is planned by the end of 2025.

With “Loke”, the Swedish Armed Forces, FMV and Saab has shown that rapid, threat-driven development can deliver tangible operational results – turning an idea into a fielded system in record time.

Combating the drone flood

Why C-UAS systems are an absolute priority

The threat posed by unmanned aerial vehicles (UAVs) has evolved in recent years from a marginal phenomenon to a serious threat to armed forces worldwide. This is particularly evident in Ukraine, where low-cost drones are being used effectively against all types of targets such as infrastructure, mechanized units and individual soldiers – demonstrating not only the threat but also the need for effective, cost-efficient countermeasures. Despite significant progress, the question remains: how well are Europe's armed forces prepared for the next generation of drone warfare?

State-of-the-art sensors such as the world-leading Giraffe 1X radar system from Saab already enable the precise detection and classification of targets, even if they are as small as drones. Depending on the type of target, the distance and the environmental conditions, Giraffe 1X can detect targets with a radar cross section (RCS) of less than 0.01 square metres. However, sensitive sensors also mean that more and more data have to be analysed. Thanks to the processing power used in modern C2 systems, as well as artificial intelligence in the future, large numbers of such data points can be processed in a fraction of a second. The resulting high level of situational awareness enables rapid decision-making and supports the selection of the effector.

Ground Based Air Defence systems GBAD consist of three central components

- **sensors – the eyes of the operation;**
- **a command-and-control centre (C2) – the brain; and**
- **effectors – the muscles needed to ward off a threat.**

In December 2025, Saab signed a framework agreement with the Swedish Defence Materiel Administration for the compact radar system Giraffe 1X and subsequently received an order under the agreement with immediate delivery.

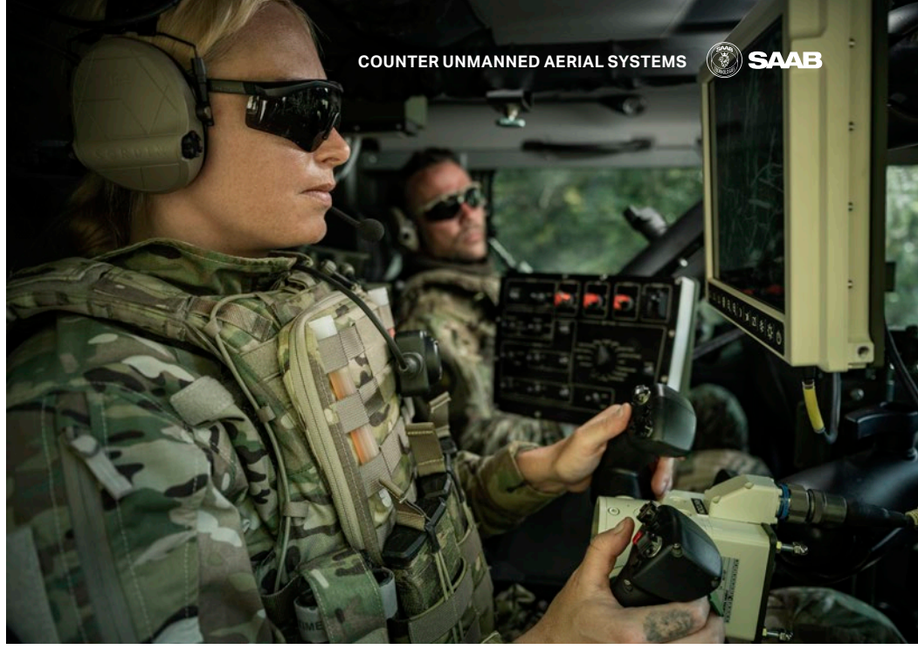
Soft kill vs. hard kill

In air defence, there are two fundamental approaches to threat neutralisation: soft kill and hard kill. This distinction is particularly relevant in the case of drone attacks, as drones can be used both as reconnaissance tools and as precision strike weapons. “When discussing C-UAS solutions, we must first find common ground and precisely define what we are talking about: the Counter–UAS that are used in peacetime to protect civilian infrastructure, or those that must protect troops on the front line from swarms of drones? Are we talking about military (MOTS) or commercial (COTS) products, and how do their acquisition costs differ?” The spectrum of defence weapons is fundamentally diverse, ranging from electronic warfare (EW) and cyber defence to kinetic weapons. However, the cost ratio often remains a challenge with drones, as the cost of deploying and using sophisticated defence systems is often disproportionate to the low cost of drone attacks. While a drone might cost only a few hundred euro, defence with sophisticated weapons can cost several million euro – and have long production times.

Innovation every minute

In Ukraine, the usage of offensive drones for strike, ISR etc. is changing dramatically every three to four months. Therefore the corresponding defence technologies must develop at least as quickly. A remarkable collaboration between the Swedish Air Force, the Swedish Defence Materiel Administration (FMV) and Saab, together with their partners, shows just how fast this can happen: in just 84 days, the “Loke” concept was successfully launched: a mobile, adaptable system for combat units. The modular concept covers the entire kill chain and includes the proven Giraffe 1X radar and a lightweight command and control solution based on the SHORAD concept. Effectors such as a small gun mounted on a Trackfire remote weapon station complete the solution. They can be installed either on land or on water, on naval vessels such as Saab’s Combat Boat 90. This innovative approach offers state-of-the-art technology that is both comprehensive and flexible, providing a decisive advantage over all air threats.

Saab’s Trackfire RWS enables firing on the move and provides cover from naval ships or land vehicles. It has been delivered to the armed forces of Finland, Sweden and other nations.



We always try to stay one step ahead. At Loke, we have therefore not followed a typical product development cycle lasting several years, but have chosen an innovative approach to meet the new challenges. By repurposing existing products and integrating new functions and technologies, we were able to implement the concept in record time. “Loke” is scalable, adaptable to new threats and can be further enhanced with additional sensors and weapon stations. The C-UAS system can even continue to operate during relocation, providing continuous protection even when on the move.

There is no such thing as the perfect system

Saab is already a pioneer in hard-kill effectors, which are used in particular for large, highly complex drones or air attacks by aircraft or helicopters: the RBS 70 NG air defence missile system has a range coverage of 9,000 metres with a maximum operating altitude of 5,000 metres. In addition, the guided missile is impossible to jam, meaning it cannot be disrupted by the enemy. Saab sees great potential in the area of soft-kill effectors – such as jamming or the use of nets – and “hunter” drones (i.e., drones that engage other drones) in the coming years. Together with start-ups and industry, the defence company is researching and developing new options in order to be prepared for the threats of today and tomorrow.

Even though new products are continuously being developed and a large number of highly sophisticated systems already exist, there is no point in waiting for a “golden solution”. There is no perfect C-UAS system capable of defending against all threats, neither today nor in the future. Armed forces and nations must carefully analyse their specific threat situation and regional context and rely on a combination of different systems. Only in this way they address the diverse challenges of modern drone warfare. Joint air defence, for example in the NATO context, is considered necessary, but the alliance still has a way to go to achieve it. Within NATO, the primary focus of armed forces remains the threats and challenges within their own borders. The rapid technological development and the resulting increase in drone attacks are further intensifying the situation.

Technically, much is possible – speed is key

It is clear that the development and integration of C-UAS systems for air defence will be essential in the coming years. Close cooperation between NATO member states would be advantageous here. Interoperable systems will facilitate NATO joint operations. Today, technology is a smaller problem than finding the right balance for ‘cost per kill’. In addition to the standardisation of technologies, the training of our own troops and those within the alliance plays a particularly important role, as does the continuous development of tactics. There is no universal solution, but there are very effective systems and an urgent need to address the growing threat posed by drones.

The Sirius Compact can be integrated onto drones, vehicles, and smaller boats such as Saab's Combat Boat 90 (CB90) or an Unmanned Surface Vessel (USV).

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.

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).

> **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.**

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.

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

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-manoeuvring 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."

Situational awareness **through laser detection**

Remaining deployable is essential to carry out current and future missions. Self-protection systems for combat vehicles therefore play an increasingly important role. The environment in which combat units now operate is constantly and rapidly changing, driven in particular by the fast pace of technological development in weapons systems.

The war and the experiences in Ukraine have taught us important lessons about the modern battlefield. Many engagements are fought in urbanised and complex terrain, and a significant number of combat vehicles are knocked out at short range in direct line-of-sight confrontations. But many units are also lost to long-range strikes from the systems mentioned above. Heavy armour offers protection, but it is often insufficient against attacks from above.

The result is that combat units can suffer heavy attrition in a short time, quickly becoming ineffective and unable to fulfil their missions. Western armed forces are also generally smaller than they were several decades ago, which has substantially reduced endurance.

The conclusion is that the so-called 'hit-and-kill probability' against our own units must be reduced. This can be achieved through good camouflage, masking and deception – but also through the use of self-protection systems. One option is laser detection, immediately followed by protective measures. Detection and analysis must happen ever more quickly – essentially within fractions of a second. If you cannot automate these processes and equip vehicles with modern systems, you will usually be at a disadvantage.

Modern interoperable defence systems such as Saab's Land Electronic Defence System (LEDS-50, the Intelligent Automated Soft Kill Solution) meet these complex requirements. By using laser-warning systems, signals across the full bandwidth are identified. Development is ongoing to counter future threats as well. The system comprises an Active Defence Controller (ADC) and a number of laser-warning sensors. Four LWS-310 laser-warning sensors with built-in anti-reflection capability provide 360° azimuth coverage of the platform. An additional LWS-500 top-attack sensor provides hemispherical coverage.

LEDS-50 systems can be fitted to a wide range of combat vehicles and provide information on the direction of attack and the type of weapon system involved. They can also be used to initiate manual or fully automated deception measures and countermeasures. These range from multispectral masking systems to the deployment or integration of effectors such as a remotely operated weapon station or infrared jammers. This gives crucial advantages: it can influence the outcome and effect of an enemy strike while simultaneously supplying vital information to analyse the incident afterwards.

Many countries now recognise how effective these self-protection systems are. For example, LEDS-50 has been integrated into the Battle Management System (BMS) of the CV90 infantry fighting vehicle. Nations also regularly hold exercises in which allies test techniques for advanced electronic warfare, facing simulated threats that employ the latest electronic defence equipment. Various countermeasures are trialled, including jammers and electronic countermeasures – all aimed at protecting one's own forces and maximising their chances of survival. With active protection systems such as LEDS-50, survivability on the modern battlefield can be increased substantially, thereby improving the likelihood of mission success.

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. 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 – including in 2025.

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 cybercrime are commonplace.

Modular field hospital as an integrated **solution for mobile healthcare**

When it comes to the health of troops, only the best is good enough. The future, in this regard, lies in modular systems for mobile medical care. These flexible, integrated systems can be precisely tailored to the specific needs associated with Role 1, 2 and 3 hospitals, thereby maximising soldiers' chances of survival.

Field hospitals must meet a wide range of demands. Lightweight, compact hospitals can be deployed close to the frontline, and specially packaged variants can – if necessary – be dropped from helicopters or aircraft. Modern field hospitals must also be transportable to multiple locations in a very short time and be equipped with sufficient medical supplies once there. By employing modern camouflage techniques, the risk of detection is reduced and vulnerability decreases. Additional ballistic protection can also be provided.

Mobile medical care must offer more capabilities while becoming increasingly flexible and mobile. This is only possible by moving away from individual products and toward integrated systems, in which all potential uses are considered from the design stage onward. In addition, innovation cycles for medical equipment are becoming shorter, requiring devices and instruments to be renewed and updated more frequently. The trend is clearly toward outsourcing.

Whereas in the past medical equipment – or even tents and containers – were often procured individually and managed by the armed forces themselves, there is now a greater need than ever for integrated solutions that, ideally, are interoperable. Mobile medical care must offer more capabilities while becoming increasingly flexible and mobile. This is only possible by moving away from individual products and toward integrated systems, in which all potential uses are considered from the design stage onward. In addition, innovation cycles for medical equipment are becoming shorter, requiring devices and instruments to be renewed and updated more frequently. The trend is clearly towards outsourcing.

Modern field hospital

In recent years, Saab has specialised in modular, all-inclusive solutions that provide the full spectrum of medical care from a single source – from planning, construction and the delivery of all medical equipment to complete logistics, storage and maintenance. Saab focuses in particular on military hospitals, where capacity is less important than performance. After all, the primary aim is stabilisation rather than long-term treatment.

The solution lies in a series of modules that can be assembled as needed to create mobile field hospitals of any size. Each module functions autonomously but can also be combined with others to form an interoperable whole – a very important feature. In international deployments, operations are usually conducted in close cooperation with other countries. Ideally, these hospitals should be compatible – but unfortunately this is not yet the case due to the lack of common standards. Saab is therefore strongly committed to promoting interoperability in the development of deployable healthcare (DHC) products. It is hoped that NSPA (NATO Support and Procurement Agency) will give even greater consideration to this factor in the future.

10-1-2 timeline

The various modules have been developed with NATO's 10-1-2 timeline in mind, a doctrine for medical treatment and evacuation. This rule provides a clear operational guideline:

- **Within 10 minutes:**
  first aid by medically trained personnel
- **Within 1 hour:**
  treatment by a military physician
- **Within 2 hours:**
  life- and limb-saving surgery

NATO also defines distinct roles for individual field hospitals and their associated requirements. Emergency care is delivered in Role 1 facilities. Saab's smallest solution (FRC, Forward Resuscitation Capacity) fits into just three rucksacks of 30 kilograms each. Rucksack 1 contains the tent, rucksack 2 the medical equipment and rucksack 3 medicines and dressings. Everything is packaged so that the medical team can remove items on site in the correct order. Saab also offers Role 2 and Role 3 field hospitals to enable specialist medical care in the theatre of operations. In addition, support for Strategic Evacuation (STRATEVAC) is provided to transfer seriously injured personnel to hospitals in the homeland.

Alongside rapid action, the mobility of field hospitals is crucial to delivering the right care at the right time in the right place – especially where there is, as in Ukraine, more than one frontline. Logistics are also vital to ensure medicines, hygiene supplies and blood arrive on time. New concepts such as 'walking blood banks', where soldiers can donate blood on site for their comrades, support medical care in the combat zone.

Medical staff and engineer

To erect a field hospital quickly and efficiently, close collaboration between medical personnel and engineers is essential, and this must be considered during the design of mobile field hospitals. For example, a US company produces operating tables that are not only extremely light but can also be assembled in one minute. Every minute saved here has the potential to save lives..

Application in Australia

One of the largest field hospital projects in the world is being delivered by Saab to Australia. The customer is the Australian Defence Force, which has ordered 550 modules – ranging from pharmacy, intensive care and surgical units to radiology, CT scanners, psychiatric wards, and hygiene facilities for the entire medical area. This includes infrastructure such as water supply, showers and toilets, as well as staff and recreation areas. The Deployable Healthcare (DHC) team at Saab also manages logistics and works with more than 300 companies in the local defence supply chain and over 70 Australian SMEs.

With these 550 modules, nearly thirty military hospitals of various sizes can be assembled – including hospitals that meet NATO Role 3 requirements and can perform complex diagnostics and advanced surgical procedures. The modules are stored and maintained at the purpose-built Deployable Health Capability Support Centre in Queensland, ensuring they can be deployed at any time from the nearby Royal Australian Air Force Base in Amberley. Saab experts ensure that the equipment remains in excellent condition, is cleaned after each mission, repaired or updated as needed, and replaced where necessary. "Armed forces today simply lack the manpower and expertise to organise this logistics themselves," explains Amany Wahba, Sales Director Medical Solutions at Saab. "To deliver the Australian project, we employ not only numerous engineers but also ten to fifteen staff members who focus exclusively on supply chain management. For the armed forces, this results in an end-to-end solution that enables optimal medical performance."

Increased need for field hospitals

Beyond all the practical advantages, high-quality medical care in combat zones is also crucial for troop morale. Soldiers expect the best possible medical treatment if they are injured – and naturally, the latest technology is employed. The importance of innovation in healthcare will therefore inevitably continue to grow, along with the demand for advanced products and services that support medical personnel. Whether through video and telemedical assistance or intelligent systems that continuously monitor soldiers' vital functions and provide critical data during treatment, the trend is clear.

Experts agree: the need for fully equipped field hospitals will increase – not just any field hospitals, but integrated solutions from suppliers that enable the armed forces to focus fully on their core missions.

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 saltwater 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 cooperation 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 information 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.

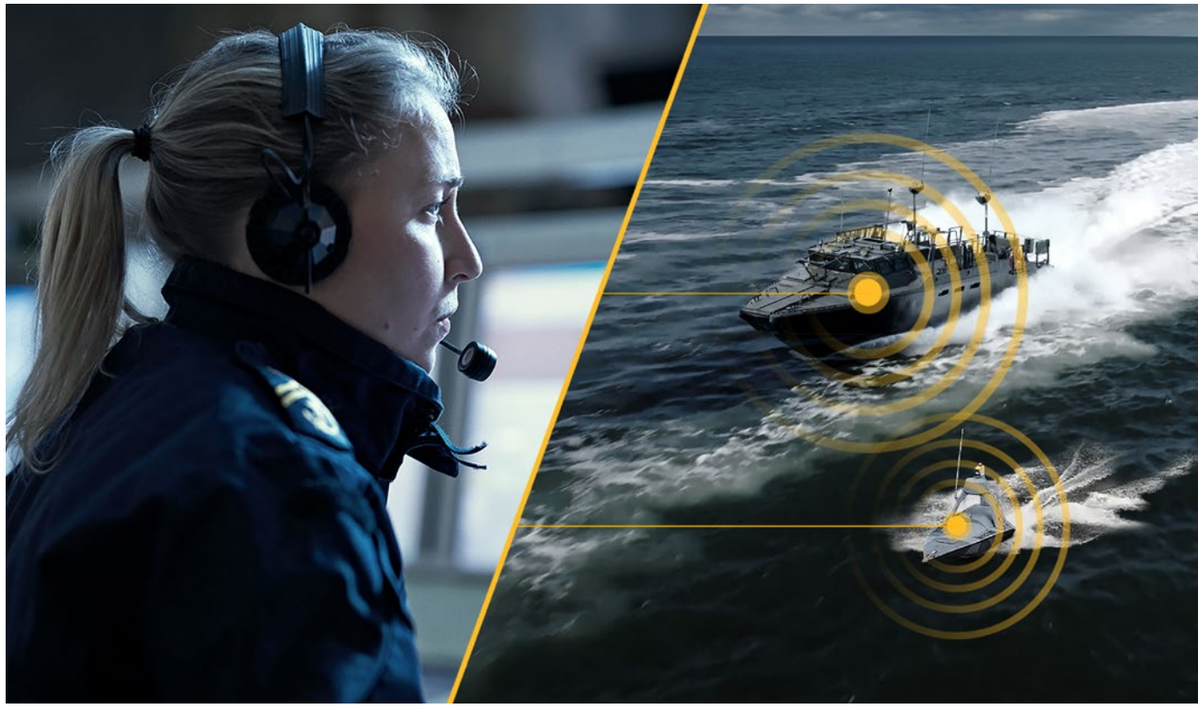
Multiple threat simulation

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 centimeters 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.



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.

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

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 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

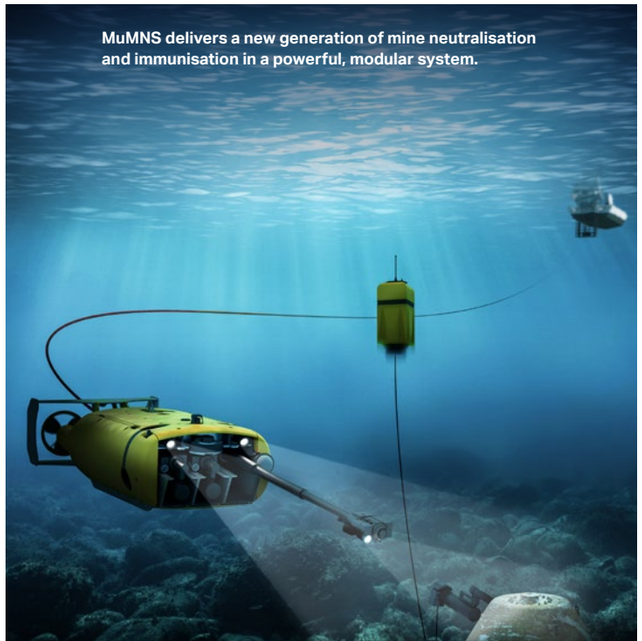
Saab takes a comprehensive approach to critical undersea infrastructure, offering an extensive portfolio of sensors and both manned and unmanned platforms above and below the surface. Saab has supplied more than 900 vehicle systems worldwide – ranging from remotely operated vehicles (ROVs) for work,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

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

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 the Baltic Sea. Most recently, 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.

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.

Advancing Maritime **Unmanned Systems**

In September 2024, Saab participated in REPMUS NATO, the Robotic Experimentation and Prototyping Maritime Unmanned Systems exercise organised by the Portuguese Navy.

The event brought together naval and defence industry leaders to explore cutting-edge technologies in maritime robotics. Saab contributed by deploying two configurations of the AUV62 advanced autonomous underwater vehicle – specifically, the AUV62-AT (Acoustic Target) and AUV62-MR (Mine Reconnaissance) – along with five small unmanned Piraya development platforms.

The AUV62-AT, designed as a training target for Anti-Submarine Warfare (ASW), is currently utilised by numerous navies worldwide. During REPMUS 2024, it demonstrated its vital role in enhancing underwater defence capabilities.

Meanwhile, the AUV62-MR played a pivotal role in Mine Counter Measures (MCM). Equipped with an advanced Synthetic Aperture Sonar, the AUV62-MR was able to scan the seabed with exceptional resolution, coverage rate and navigation. In fact, it was recognised as the highest coverage rate at REPMUS, particularly excelling in shallow and challenging water conditions.

Saab's Piraya development platforms were another highlight of the exercise. These autonomous surface vessels, along with their management systems, performed well. During the exercise, the Piraya team also conducted a test operation for the European Defence Agency (EDA) to evaluate how well autonomous systems can navigate maritime regulations. These tests will continue in Sweden, further enhancing the development of autonomous maritime systems.

REPMUS 2024 was a great success, demonstrating not only the performance and innovation of Saab's unmanned systems, but also the importance of cooperation and shared knowledge within NATO.

Anti-submarine warfare training

In autumn 2023, Saab's underwater systems Seaeye Falcon ROV and the AUV62-AT anti-submarine warfare training target supported elements of two 'operational experimentation exercises' involving over 2,000 civilian and military personnel from 15 NATO nations, Ireland and Sweden.

Effective training against submarine threats

Training for Anti-Submarine Warfare (ASW) missions can be costly and inefficient because real submarines are expensive assets that are often unavailable due to operational commitments. Using them as targets consumes valuable resources and limits training opportunities.

Saab's AUV62-AT provides a highly effective and cost-efficient alternative by replicating the acoustic signatures of various submarines. Easily launched from surface vessels, it supports live ASW training from basic to advanced levels.

Train as you fight

The AUV62-AT has a multi-platform capability, allowing simultaneous interaction with multiple ASW assets and enabling training with a complete taskforce. Its acoustic transducer tail extends up to 75m, delivering a high-fidelity acoustic signature that appears to operators as a real submarine.

A key feature of the system is its sophisticated behaviour. It can undertake evasive actions if it senses detection, such as increasing speed or changing its acoustic signatures. After exercises, the data collected can be downloaded and analysed, giving crews immediate feedback to improve their performance in future sessions.

According to experts, there is a clear trend using unmanned underwater vehicles and also unmanned surface vehicles to complement and enhance the way ASW is performed today and in the future. With the AUV62-AT, Saab is well positioned for the future needs of underwater training.

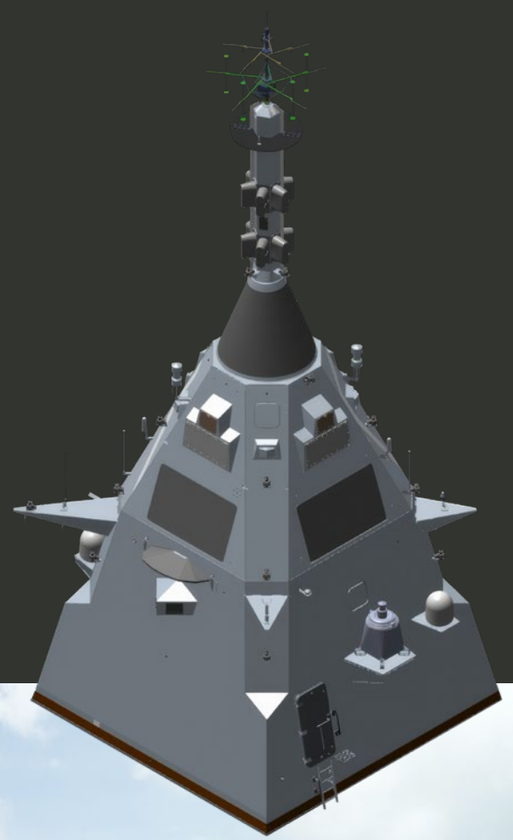
SLIM – Saab Lightweight Integrated Mast

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.



JOINT FORCES

Saab and NSPA sign contract

In March 2026, Saab signed a contract with the NATO Support and Procurement Agency (NSPA) on behalf of the Slovak Ministry of Defence to deliver a comprehensive Warfare Live Training Simulator System (WLTSS). The WLTSS is designed to equip the Slovak Territorial Forces with state-of-the-art training technology, supporting up to 725 soldiers across individual weapons and support weapons systems. The deliveries will be completed in 2026, demonstrating Saab's commitment to customer success.

The contract is part of the trusted multinational NSPA (NATO Supply & Procurement Agency) framework, and this successful collaboration highlights Saab's expertise in advanced training solutions, reinforcing NSPA's role as a strategic partner for multinational defence procurement.

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