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ST Engineering develops the 120mm Ground Deployed Advanced Mortar System (GDAMS) to address modern battlefield needs for enhanced crew survivability.

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Edition Four | December 2024

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Warfighters shouldn't have to choose between mission-critical performance and innovation. That's why Leonardo DRS' proven platform computing & AI, GVA compliant processing systems are both. Our sensor and network integrated systems are linking legacy, current and future capabilities together - connecting warfighters to the actionable mission information they need, all while protecting from cyber threats and reducing size, weight, power and cost (SWAP-C) — ultimately enabling situational understanding.

To find out more, visit Leonardo DRS at:

- **IAV 2025** Booth **#A35**, Farnborough, UK-January 21-23, 2025
- **IndoDefence 2025** Booth **#A003**, Jakarta, Indonesia-January 22-25, 2025

LEONARDO DRS

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Welcome to our fourth and final edition for this year.

As an established web portal for the International Defence & Aerospace Industry, we strive to provide a comprehensive and detailed listing of Military Equipment Suppliers, Products and Services. This magazine is designed to keep you up-to-date with latest news and events within the Defence Industry's Governing Bodies, Organisations and Companies.

A Multi-Media Portal for the International Defence & Aerospace Industry

For more information, technical guidance or the latest subscription packages available for Military Systems, please contact us where one of our team will be more than happy to advise you.

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Land Tactical C4ISR

MORE POWERFUL AND READY FOR TODAY'S COMPLEX BATTLESPACE

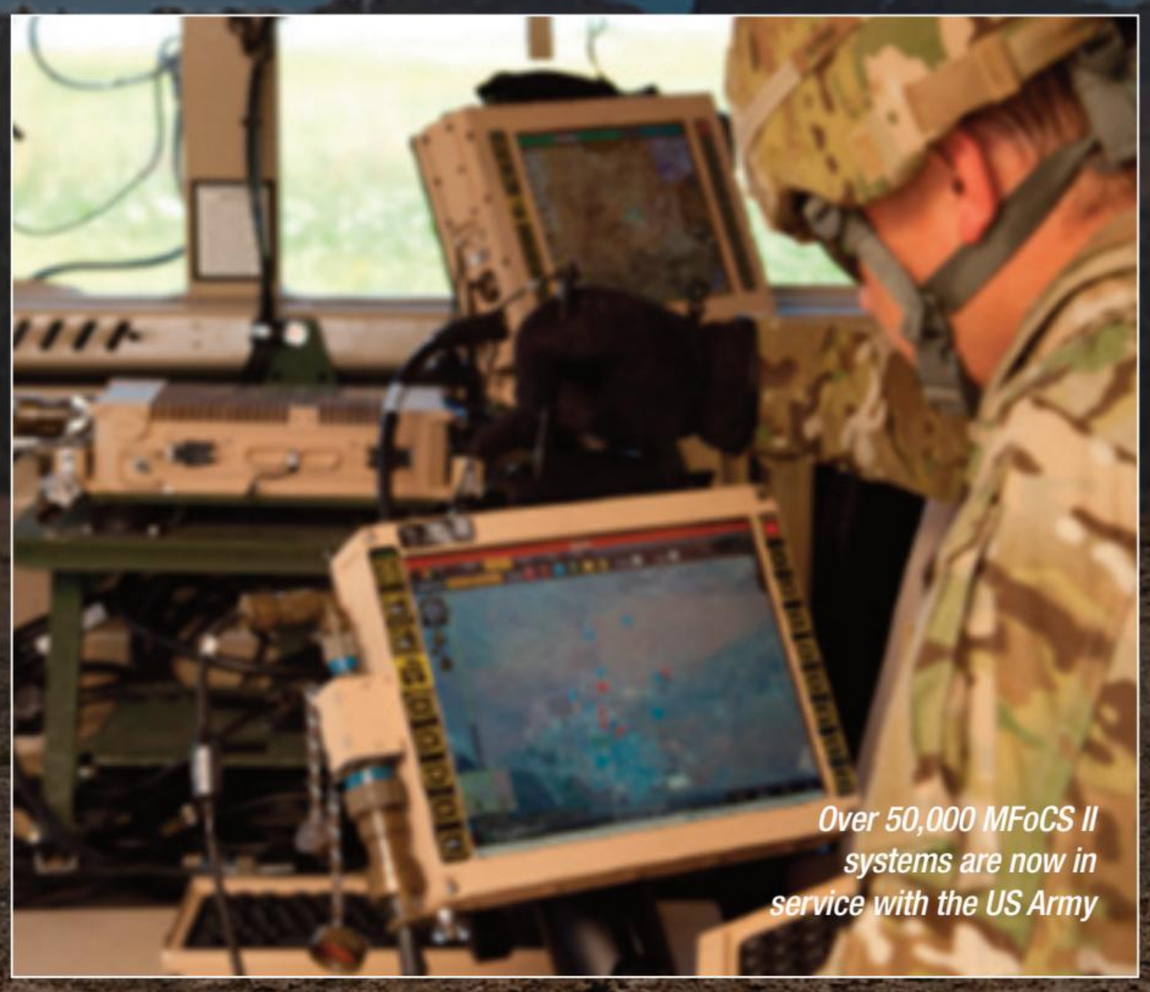
Peter Hurst, Vice President, International Projects & Business Strategy at Leonardo DRS Land Electronics

Through more than 20 years of development and combat experience, Leonardo DRS's industry leading C4ISR integrated platform networking capability has provided commanders and platform operators the ability to easily control and interface with sensors, communications equipment, mission command applications, and navigational devices.

This proven technology has delivered cutting-edge tactical computing and networking solutions to customers around the globe giving them a situational awareness advantage from a workstation in a range of ground combat platforms, fires outposts and command posts.

Today, the Bowman C4ISR system is more powerful than ever with the latest processing systems and a range of upgrades, including A.I. to extend the reach out to the tactical edge. Leonardo DRS has delivered more than 14,000 Bowman units to the United Kingdom's ground combat forces. They have relied on its networking system through numerous military campaigns because of the wide range of capabilities that deliver a common picture for users across the battlespace. From voice, video and data, the devices can be connected across the tactical network with adjacent platforms, remote or mobile command posts, higher headquarters, as well as with coalition partners.

Bowman Tactical User Data Terminals



Over 50,000 MFoCS II systems are now in service with the US Army

Like the U.S. military's Mounted Family of Computer System (MFoCS) C4ISR system from Leonardo DRS, Bowman is designed to be agnostic to the network and applications allowing the end users to adopt best-of-breed solutions in terms of communications and data applications such as Blue Force Tracker.

At the heart of this system is Leonardo DRS's line of ultra-rugged, military-standard qualified hardware and software solutions. The scalable system also provides new capabilities to integrate various platform C4ISR devices with significant reductions in size, weight, power and cost.

More Powerful and Always Rugged

DRS' ultra-rugged tactical computers are designed to allow for ongoing technology insertion and upgrades. Over the course of large-scale projects such as Bowman and MFoCS, Leonardo DRS has been able to use the same base infrastructure to deliver ever-increasing amounts of capability as computing, network and security technology advanced. Leonardo DRS's next generation tactical networking and computing products are now more powerful than ever with Intel multi-core technology, graphical processors, and new interfaces for future expansion

to meet emerging needs. The ability to use the current infrastructure and upgrade the current systems is more cost-effective than buying lower-grade commercial off-the-shelf systems and ensures that there is no compromise regarding the environmental performance of the system.

Leonardo DRS's tactical computing and networking products are the choice of a growing number of demanding end-users. These systems are installed and operational in over 425,000 ground vehicles and command posts with allies across the globe. These systems are delivering unparalleled performance in terms of reliability, availability and cyber secure resilience. In addition to the U.S. and U.K. installed bases, end-users are in the Middle East and Europe with the Polish Land Force and Romanian Army. In Southeast Asia, they are in Thailand and Indonesia as well as Australia and Taiwan among others.

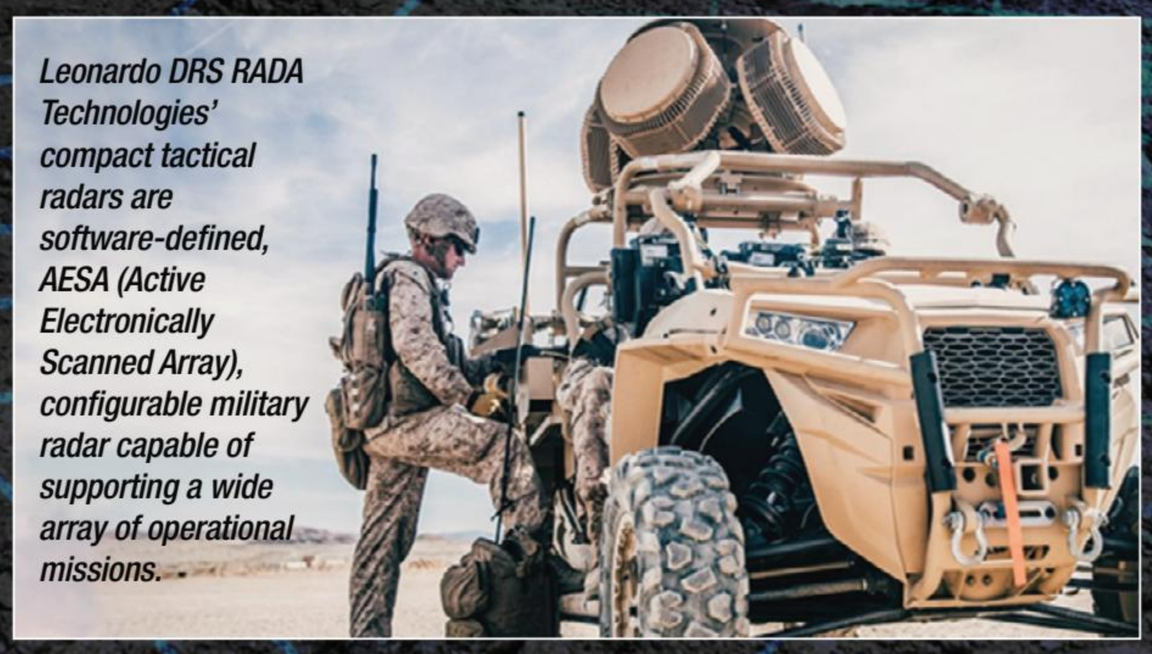
Always Evolving to Meet New Threats

As the battlespace becomes more complex, Leonardo DRS's Land Tactical C4/5i hardware and software architectures are also changing to meet new and emerging requirements. Today, the company has advanced its tactical C4/5i systems by integrating both A.I.-based advanced sensing technologies with network and application-agnostic tactical computing and networking, while adding dismounted soldier situational awareness as a core new capability.

Bringing together our advanced sensing capabilities in areas such as EW, Radar and Electro-Optics with modular tactical, AI based computing is a logical and necessary step in the continuous effort to ensure our customers have the tools to sense and counter an increasing number of asymmetric threats on the battlefield.

A.I. Processors Bring Enhanced Situational Awareness

A.I.-based advanced sensing has the potential to significantly enhance situational awareness, decision making and operational efficiency. In the Intelligence, Surveillance and Reconnaissance space, Leonardo DRS's multi-sourced data fusion capability integrates various sensors to provide a comprehensive operational picture improving reaction times and reducing the cognitive load on commanders and crew by providing actionable options associated with a range of systems such as Electronic Countermeasures and Signals intelligence, Counter-IED and Proximity Protection of mobile and fixed sites.



Leonardo DRS RADA Technologies' compact tactical radars are software-defined, AESA (Active Electronically Scanned Array), configurable military radar capable of supporting a wide array of operational missions.

Dismounted Soldier Applique running Systematic EDGE C2 & Silvus Radio for seamless integration with Mounted C4/5i capability.

The key technologies supporting these developments include A.I. machine learning processors supporting pattern recognition and anomaly detection aided by deep learning which enhances image and signal recognition greatly improving the accuracy of threat detection and identification.

Looking Ahead

As Leonardo DRS drives towards extending the reach out to the tactical edge, the company will be introducing a new secure dismounted soldier applique capable of running over various secure radios and waveforms and of supporting multiple applications such as Systematic Edge as well as tactical air control.

The dismounted soldier system will be designed to be integrated with Leonardo DRS's advanced suite of integrated weapons sights and its next-generation, Blacklab man-portable Intelligence, Information, Cyber, Electronic Warfare and Space sensor.

Bowman is built on a long legacy of proven and reliable technology drawn from large programs such as US Army MFoCS that has grown with the ever-changing battlespace. Tomorrow's Bowman technology will be more powerful than ever and ready for the challenging and complex threats that face today's warfighters.

To find out more, visit Leonardo DRS at:

- **IAV 2025** Booth #A35, Farnborough, UK
  January 21-23, 2025
- **IndoDefence 2025** Booth #A003, Jakarta, Indonesia
  January 22-25, 2025

www.LeonardoDRS.com/platform-computing

LEONARDO DRS

Next Gen Indirect Fires:

Mortar Innovations for Modern Warfare

Modern warfare is undergoing a profound transformation, driven by rapid technological advancements and evolving geopolitical dynamics.

Traditional concepts of battlefield engagements are being redefined by the integration of cyber, space, and information warfare. The rise of drones, artificial intelligence, and autonomous systems has enabled nations to project power with unprecedented precision and minimal risk to personnel. This evolution has given rise to asymmetric warfare, where smaller states or non-state actors challenge larger militaries through cyberattacks, unmanned systems, and disinformation campaigns.

The emergence of hybrid warfare — blending conventional and irregular tactics—has blurred the lines between combatants and civilians. Disinformation and psychological operations are now pivotal, shaping public opinion and destabilising societies even before conflicts erupt. In this complex environment, military forces must become more agile and technologically adept, ready to operate in a multi-domain battlefield where the distinction between peace and war is increasingly tenuous. This shift underscores the urgent need for adaptable, cutting-edge solutions that prioritise speed, precision, and crew safety. Today, modern military operations demand systems that can deliver these capabilities at a moment's notice, making them indispensable to future combat strategies.

This technological advancement is actively driven by ST Engineering, a Singapore technology, defence and engineering organisation. With a focus on designing advanced defence and security solutions protecting cities and safeguarding citizens, ST Engineering has developed the Ground Deployed Advanced Mortar System (GDAMS) and the Super Rapid Advanced Mortar System (SRAMS MkII) to meet this growing demand.

Rapid Deployment: The Need for Speed

Traditional mortar systems often require a "man-in-the-loop" for setup, deployment, and targeting, a process that leaves personnel exposed and vulnerable and slows the tempo of operations at critical moments. The solution lies in rapidly deployable, fully automated mobile mortar systems that can be mounted on vehicles tailored for evasive repositioning. In today's battle landscape, solutions that enable swift, automated deployment are no longer optional—they're essential.

Both SRAMS MkII and GDAMS are designed with "Shoot and Scoot" capabilities, allowing for rapid firing and repositioning, enabling crews to evade counter-battery fire — a critical asset in both offensive and defensive operations. GDAMS, can be deployed within 15 seconds and stow within 15 seconds, ensuring ultimate mobility and responsiveness to shifting battle conditions. This rapid deployment is currently unmatched in the current market and is key to maintaining a tactical advantage.

Platform Agnostic

The combat proven 120mm SRAMS – the first mortar in the world with a recoil force of less than 30 tonnes when firing maximum charge to achieve a range of 10 km. The recoil system absorbs the firing force, reducing the strain on both the vehicle and the loading system, ensuring smoother operation. Weighing only 1,200 kg, it can be integrated onto and fired from onboard a wide range of light tracked or wheeled vehicle via a single electrical interface, bringing great firepower to the lowest echelon.

The GDAMS, in particular has excellent modular compatibility. It is compatible with the existing 81mm mortar barrel, thereby allowing for seamless integration with legacy systems while providing the enhanced firepower of a 120mm system. This modularity ensures flexibility in munitions and operational adaptability. The lightweight mortar design also allows for integration across multiple platforms, be it a lightweight commercial vehicle or a 4x4 military class wheeled vehicles, making it a versatile solution for various operational needs. ST Engineering leverages simulation technology to optimise the GDAMS, ensuring it can withstand the stresses of firing while maintaining a lightweight structure

SRAMS on Bronco

GDAMS is suitable for integration with any lightweight commercial vehicle or 4 x 4 military-class wheeled vehicle.

for maximum ammunition capacity. This next-generation mortar system embodies the future of indirect fires, offering a platform that is agile, modular and supremely capable.

The platform-agnostic nature of both the SRAMS and GDAMS allows for easy integration with local partners and their indigenous Battlefield Management Systems (BMS). They are also fully integrated with advanced Fire Control Systems (FCS) that automate targeting based on coordinates from any command and control system, streamlining mission execution.

Precision Strikes with Minimal Collateral Damage

Modern mortar systems have significantly evolved to meet the complex demands of contemporary warfare. Once primarily used for suppressive fire, they now deliver pinpoint strikes on high-value targets with enhanced precision and targeting capabilities. Advances in GPS-guided munitions and fire control systems have markedly increased their accuracy and lethality. These advancements enable rapid deployment in dynamic battlefield environments, minimising collateral damage and enhancing their strategic value.

These mortars offer a high degree of automation, which significantly reduces the need for manual input during operations. This not only speeds up the firing process but also decreases the margin for human error, resulting in more efficient and effective battlefield support. The increased automation also reduces the training burden on soldiers, allowing them to focus on more strategic tasks and less on operating the mortar.

Unlike direct-fire systems, which require the weapon to be aimed directly at the target, these mortar systems are designed for indirect fire. This means they can engage targets that are concealed behind natural or man-made obstacles, such as hills, buildings, or other terrain features, without the need for a direct line of sight. This capability provides significant tactical advantages in complex or urban environments, where the ability to attack hidden or hard-to-reach targets is crucial. The mortar systems can be employed to support infantry units by neutralising enemy positions, countering artillery, or providing fire support for forces operating in difficult terrain, all while keeping the mortar crews relatively safe from direct enemy return fire. The flexibility and versatility of indirect fire make mortars an essential tool in modern military operations.

GDAMS also leverages digital technology to enhance its role within the battlefield kill chain. Its integration with network systems allows for faster target acquisition, data sharing, and coordination, making it a key element of any digitalised warfare strategy.

Enhancing Crew Safety and Efficiency

In hostile environments, the safety of operating crews is paramount, and mortar systems have historically posed risk to crews due to the combustion gases and pressure waves generated by the blast of the gun. As a result, especially for guns of 120 mm calibre or greater, the operator of the gun must station himself at a safe distance from the blast area, by remotely triggering the mortar firing to avoid injuries due to the blast overpressure generated when fired. However, this method results in a significant reduction in the rate of fire. The problem is accentuated by the development of modern mortar systems that are designed for high rates of fire with semi-automatic bomb loading systems.

One of the standout innovations in the GDAMS and SRAMS MkII is the patented blast diffuser technology. This innovation significantly reduces the harm from the crew by channelling the combustion gases to escape from a series of chambers in the blast diffuser, away from the crew, thus


GDAMS in action


Fully digitalised mission assignment and execution

reducing the gas pressure significantly before the munition leaves the barrel. This allows safer operations under high-intensity conditions and protects the personnel while also minimising the noise exposure by threefold and threat detection of the system. The efficient requirement for just a two-person crew to operate significantly reduces manpower needs without sacrificing firepower. This streamlined setup enhances operational efficiency and survivability during missions.

The Future of Artillery and Mortar Systems

As modern militaries grapple with the challenge of upgrading legacy systems while adapting to rapid technological changes, the need for solutions that bridge the gap between old and new is paramount. Many traditional mortar systems struggle to meet the precision, range, and versatility demanded in contemporary combat.

In partnership with Babcock, ST Engineering is delivering an end-to-end solution for the GDAMS, which includes the manufacturing, support, and training needed to equip armed forces with the most advanced mortar technology available. This collaboration ensures a seamless integration of these cutting-edge systems into military operations, offering comprehensive solutions from initial build to ongoing operational support and training.

Advanced systems like GDAMS are designed to address these needs directly by bridging the gap between traditional and modern capabilities. The system's modular architecture enables seamless compatibility with the existing equipment, extending the life and effectiveness of legacy systems while simultaneously upgrading them with next-generation capabilities. This hybrid approach minimises costs and disruption, enabling militaries to leverage existing stockpiles and infrastructure.

With defence budgets under scrutiny, many governments are seeking solutions that balance cost-efficiency with cutting-edge capabilities. The versatility of 120mm mortars, capable of deploying both traditional and precision-guided munitions, positions them as an attractive option for enhancing tactical flexibility without a complete overhaul of existing systems. Advanced mortar systems like GDAMS reflect the broader trend towards modularity and adaptability in military technology, allowing nations to enhance their competencies without entirely replacing legacy systems, while simultaneously improving overall combat readiness through a rapid transition to next-generation warfare capabilities.

As geopolitical tensions and battlefield dynamics continue to shift, innovative solutions will play a critical role in ensuring that armed forces remain prepared to confront the complexities of today's unpredictable warfare landscape.

RESPONSIVE FIREPOWER ON THE MOVE FOR INFANTRY

The Ground Deployed Advanced Mortar System (GDAMS) is a lightweight mortar system for rapid deployment with patented blast diffuser technology to enhance crew safety.

Key Features

- Suitable for integration with any lightweight commercial vehicle or 4x4 military-class wheeled vehicle
- Rapid deployment and retrieval for survivability
- Automated alignment of mortar system using target co-ordinates from any C2 System
- Digital mission assignment and execution

ST Engineering

Red Cat Introduces

ARACHNID™ Family of Small ISR and Precision Strike Systems at AUSA 2024

Red Cat Holdings, Inc. (Nasdaq: RCAT) ("Red Cat"), a drone technology company building hardware and software for military, federal, and commercial operations, today introduced its ARACHNID™ family of unmanned intelligence, surveillance, and reconnaissance (ISR) and precision strike systems. Red Cat unveiled the Family of Systems at AUSA 2024 Annual Meeting and Exposition in Washington D.C.

Red Cat Holdings, Inc. (Nasdaq: RCAT) ("Red Cat"), a drone technology company building hardware and software for military, federal, and commercial operations, today introduced its ARACHNID™ family of unmanned intelligence, surveillance, and reconnaissance (ISR) and precision strike systems. Red Cat unveiled the Family of Systems at AUSA 2024 Annual Meeting and Exposition in Washington D.C.

The ARACHNID family of systems is purpose built for the U.S. Army's roadmap to integrate UAS and long endurance aircraft in a combined arms fight with synchronized fire and maneuver across various command levels. Red Cat currently addresses the needs of warfighters at the platoon and company level with drones that span capabilities and endurance for short and medium-range operations in air, land, and maritime environments. Future potential partnerships will enable long-range reconnaissance.

Red Cat redefines the future of sUAS for defense applications by combining the capabilities of portable, low-cost, and recoverable ISR drones with precision strike payloads. The company is enabling a shift away from legacy, high-cost UAS to highly interoperable systems that can adapt to a rapidly evolving battlefield. This shift includes layered UAS/LE deployment to shape fires and maneuver, extended reach via networks and autonomy, and reduced cognitive burden with increased safety and survivability for warfighters.

"The U.S. Army has prioritized integrating UAS across military formations from squad to corps and have specific requirements informed by an understanding of emerging real-world threats," said Jeff Thompson, Red Cat CEO. ***"We are introducing the ARACHNID™ family of systems to ensure we can react to the rapidly evolving needs of sUAS for short, medium and long range operations. With future partnerships, our drones can be dropped from long endurance aircraft or integrated into unmanned surface vessels to extend reach and penetration at the battlefield's tactical edge."***

ARACHNID advances Red Cat's established leadership in the sUAS space and brings enhanced capabilities and tech integrations to its existing flagship products from Teal. To reflect this technology evolution and the capabilities of the newest model that Red Cat developed for the U.S. Army's SRR Program of Record, the company has rebranded its flagship within the ARACHNID family of systems:

- **Black Widow™** (successor to Teal 2) is a highly capable, rucksack portable sUAS designed specifically for operation in Electronic Warfare (EW) environments. A fully modular architecture enables swift adaptation to mission requirements including short range reconnaissance and secondary payload operation. Black Widow™ is significantly enhanced from the Teal 2 model with longer endurance, EW resilience, and advanced autonomy.

- **WEB™** (Warfighter Electronic Bridge) is a Ground Control Station purpose built to operate Red Cat's entire ARACHNID family of systems for military operations. WEB is fully integrated with Kinesis and ATAK to provide seamless integration with platforms and enhance mission effectiveness. WEB can also function as a stand-alone GCS for other non-Red Cat platforms, offering multi-domain versatility.

To address the needs of medium-range reconnaissance and persistent strike systems, Red Cat is accelerating the development of its FANG™ line of First-Person View (FPV) drones. Additionally, Red Cat's product roadmap includes TRICHON™, which will build upon the FlightWave Edge 130 Blue, a military-grade VTOL tricopter for medium-range mapping, intelligence, surveillance, and reconnaissance.

"The Pentagon's Replicator initiative established a bold mission to accelerate the deployment of attritable sUAS to the warfighter. In concert with Replicator's mission we are accelerating the development of our products that will enhance the effectiveness and safety of military and security operations," said George Matus, Red Cat CTO. "In many ways, domestic UAS innovation has been spurred by learnings in Ukraine and Israel, where drones have clearly demonstrated asymmetric warfare. The ARACHNID family of systems represents what we believe the future of drones needs to look like."

The new family of systems will leverage ongoing industry collaboration, underpinned by the Red Cat Futures Initiative. Both through Red Cat's agile internal research and development, as well as robust partnerships, the family of systems will continually iterate with new capabilities across hardware and software. Red Cat has the ability to manufacture these systems at a high production rate with superior quality to meet the demands of our customers globally.

To meet with Red Cat and see the Black Widow™ and rest of the family of systems, visit booth 330 at AUSA October 14-16, 2024.

For more information about the Red Cat family of systems and capabilities, visit:

https://redcat.red/solutions/family-of-systems/

RED CAT

Memory Safety, Cybersecurity, & Military Systems

In the current digital era, the intersection of cybersecurity and military technology has brought new levels of vulnerability to critical defence systems.

With the increased digitisation of military operations, from weapons systems to autonomous drones, the risks of cyber espionage, sabotage, and operational disruption continue to grow.

These vulnerabilities threaten national security, as adversaries can exploit software flaws to intercept communications, manipulate battlefield data, and disable critical systems. Addressing these cybersecurity risks, particularly in software-heavy command-and-control structures and autonomous technology, is paramount.

In response to these mounting threats, the White House Office of the National Cyber Director (ONCD) released a seminal document in 2024, "Back to the Building Blocks: A Path Toward Secure and Measurable Software." This report provides strategic recommendations, including using memory-safe programming languages to mitigate vulnerabilities and improve resilience across military technologies. Memory-safe languages, such as Ada, SPARK, and Rust, help secure military applications by preventing common memory errors that attackers could otherwise exploit. This article explores the critical concept of memory safety, its role in bolstering cybersecurity in military contexts, and how adopting secure languages is fundamental to addressing modern defense challenges.

Cybersecurity Risks in Military Technology

Cybersecurity risks in military technology have become a critical concern as digital warfare advances and reliance on technology deepens. Military systems, encompassing weapons, communications networks, and critical infrastructure, are increasingly software-driven, introducing potential cyber-attack vulnerabilities. Threats include cyber espionage, sabotage, and data manipulation, each capable of undermining national security.

One key risk is the exploitation of software vulnerabilities within command-and-control systems, which could allow adversaries to intercept communications, disrupt operations, or manipulate battlefield data. The threat extends to autonomous systems, such as drones or unmanned vehicles, which could be hijacked or rendered inoperative. Additionally, supply chain vulnerabilities present a risk, as unauthorised access to code during the development or integration phases could lead to the insertion of malicious software.

Cyber-attacks can also result in data breaches that expose sensitive information, such as strategic plans or personnel details, potentially compromising entire operations. As militaries rely on interconnected systems, the risks of widespread cyber contagion escalate, where a breach in one area could propagate through multiple networks.

Introducing the White House ONCD document

Organisations leading technological innovation must adapt and respond to the ever-changing landscape of cyber threats. This year, the White House Office of the National Cyber Director (ONCD) released a document titled “Back to the Building Blocks: A Path Toward Secure and Measurable Software." This pivotal report demonstrates various technological approaches and methodologies that should be addressed.

One of the White House's key recommendations is adopting memory-safe programming languages to mitigate significant vulnerabilities that can lead to security breaches.

What is memory safety?

Memory safety, a key concept in software development, addresses how an application handles memory operations, such as reading, writing, allocation, and deallocation. A memory-safe application operates within the bounds of its allocated memory -- it doesn't access or modify memory locations that it's not allowed to access, avoiding data races, and frees memory after use. Improper management of memory could result in severe problems ranging from crashing the application to security vulnerabilities that attackers can exploit.

Numerous software bugs can lead an application to read or write outside its allocated memory space. Safety measures should be enforced manually or by using memory-safe programming languages to avoid such bugs. While manual application of these measures is tedious and error-prone, the latter option provides dynamic and/or static built-in checks and tools to support the aim with minimum manual effort.

Memory safe languages

A memory-safe programming language enforces measures to prevent memory misuse instead of relying on developers to add proper checks in their code. These measures range from the most conventional, such as bounds checking, to more sophisticated ones, such as variable ownership.

Memory-safe languages help protect against these bugs and manage memory automatically rather than relying on programmer-provided checks, thus mitigating most memory safety issues. However, they differ in the level of protection, mechanisms, and support tools.

Ada and SPARK are strongly typed languages that provide memory safety through a combination of language features, run-time checks, and support for static and dynamic analysis tools.

Ada is a safe programming language widely used for developing safety-critical applications. It enforces memory safety through language constructs that entail extensive run-time and compile-time checks. Strong typing, formal parameter modes, protected objects, and safe pointers are among those constructs.

The built-in checks prevent errors, including buffer overflow and out-of-bounds read/write. Strong typing and parameter modes prevent injecting wrong data that modifies memory or possibly alters control flow. Protected objects ensure that accessing shared resources is safe and free of race conditions. Pointers, the leading cause of many memory bugs in other languages, are safer in Ada by provisioning safe accessibility rules and null exclusion, which prevents null pointer dereferencing. Some features provide similar functionality to pointers but without the overhead and potential memory safety issues, so pointers do not need to be used.

Moreover, Ada's memory safety is backed by dynamic and static analysis tools that detect errors that are often difficult to track down during runtime and compilation.

The SPARK language, drawing on its roots in Ada, is listed as a memory-safe language by NIST. It supports Ada’s applicable memory safety features; a difference is that in SPARK, all checks are statically proven, whereas in Ada, many are enforced at run time. In addition, SPARK includes a safe pointer facility based on an ownership mechanism.

Rust supports memory safety through several mechanisms, including variables’ immutability, ownership, borrowing, and bounds checking. In Rust, variables are immutable by default, which helps to protect against unintended changes. The Rust compiler manages memory using a system of ownership, which checks that each value in the program has a unique owner. When the owner goes out of scope, the memory is automatically released. Borrowing allows multiple references to have access to a variable, but only one mutable reference is possible at a time; this property is enforced in the presence of concurrency (threads), which prevents race conditions. Compile-time flow analysis checks that each pointer dereference is valid (i.e., the pointed-to value exists). There is no concept of a null pointer (thus, no way to dereference a null pointer). Run-time bounds checking verifies that the code accesses memory within the bounds of arrays and vectors, preventing buffer overflow.

Rust has a mode called “unsafe Rust,”' which allows programmers to disable some safety measures for more flexibility. However, unsafe Rust doesn’t disable the borrow checker or bounds checking.

In conclusion, as military technology advances, the imperative for robust cybersecurity measures becomes increasingly critical. Adopting memory-safe programming languages, as recommended by the White House ONCD, marks a significant step towards mitigating vulnerabilities in software-dependent military systems. However, securing military technology will require continuous innovation, adapting to new threats as they emerge, and implementing advanced protections across the entire software development lifecycle. The future of military technology will likely see even greater reliance on complex, interconnected systems, heightening the need for secure-by-design principles and vigilant cybersecurity practices to safeguard national security in an evolving digital battlefield.

eod uk

Products, Training & Consultancy for Counter EO Expertise

EOD UK was formed in 2002 and is owned and managed by former military Bomb Disposal Operators with extensive experience gained on a myriad of operations worldwide, both whilst serving and in the commercial & humanitarian sectors.

EOD UK specialise in Explosive Ordnance Disposal, Counter Terrorist Search, Counter Improvised Explosive Device, Maritime, Aviation and Venue security.

EOD UK offers a range of its own products and can supply bespoke equipment packages and training services.

Their client base includes Non-Government Organisations, military, media, manufacturing companies, commercial EOD companies, security companies, the financial sector and facilities management companies.

EOD UK TRAINING

EOD UK provides comprehensive training packages to suit the clients' needs. EOD UK will design and deliver bespoke training courses at the clients' location or EOD UK can utilise modern training facilities in the UK.

All of EOD UK's instructors are retired military/police officers who have a wealth of operational experience. EOD UK only employs instructors with qualifications from renowned centres of excellence such as the UK Defence Explosives, Munitions and Search School or the US Naval School, Explosive Ordnance Disposal. Through their partner companies EOD UK can offer recognised qualifications such as NVQs.

Whether the need is for a single day of threat awareness training or a 12 week EOD operator course EOD UK has the experience and expertise to meet your particular requirements.

Course design is based on the proven Systems Approach to Training utilizing a design map that encompasses all aspects of training design, including the development of the project plan, conducting a needs analysis, determining the course objectives and module outlines; development of the instructional strategy, validation and evaluation.

CASE STUDY – MINE RISK EDUCATION (MRE)

EOD UK Ltd were contacted by a training provider to review their training materials and lecture content used in the delivery of a Mine Risk Education (MRE) module which formed part of the company's Hazardous Environment Training (HET) courses delivered to NGO's and UK government agencies.

EOD UK Ltd visited the company's training venue in south east England to gather information and access how MRE was being delivered and how it could be improved. EOD UK then worked with the client and using the Systems Approach to Training re-wrote the training material, designed and installed a realistic training lane for MRW. An EOD UK trainer then delivered the new training module to the next HET course shadowed by instructors from the client company so they could competently deliver the ERW training module for future courses.

EOD UK is retained by the company to periodically review course content to ensure it is kept relevant and up to date.

EOD TRAINING COURSE – CIED DETECTOR TRAINING IN NORTHERN IRAQ

EOD UK Ltd was contracted by a leading supplier to the United Nations to design and deliver a training course on a CIED detector. The course was

conducted at a UN location in Erbil, Norther Iraq.

EOD UK Ltd liaised with the equipment manufacturer, supplier and the UN to conduct a Training Needs Analysis, write a course programme and produce student notes. EOD UK then deployed a Subject Matter Expert to deliver the course in Erbil.

EQUIPMENT SUPPLY

EOD UK Ltd supplies bespoke equipment packages and also our own range of products called the Evolution Series, these products have been designed by the user for the user.

We have unrivalled expertise in this field and have supplied packages to users all over the world across a range agencies involved in the whole spectrum of EOD related operations.

CONSULTANCY

EOD UK offers a range of consultancy services, these include:

- Equipment Evaluations
- Equipment selection advice
- Needs Analysis Reports
- Advice on setting up and developing EOD organisations
- Threat Assessments
- Development of Standard Operating Procedures (SOP)

EOD UK ensures that we assign a subject matter expert to each of our consultancy tasks; our service supplies the client with information that is concise, relevant and to the point.

CASE STUDY - VENUE SECURITY ASSESSMENT

EOD UK was contracted by a UK government department to review and assess security aspects for a freight distribution hub at a high security site in central England.

EOD UK provided a security cleared SME who conducted a Needs Analysis Visit to the site and met with staff at the centre and walked through all procedures for screening goods in to the site and evaluated Standard Operating Procedures (SOP).

EOD UK then produced a Needs Analysis Report with which to assist the management at the site to assess what screening methods, equipment and staff training was required to ensure security at facility.

EOD UK was then asked to assist with staff training development, selection of updated screening equipment and deliver a general training day for staff from various sites on explosive hazards.

RUSLYN REELS – Packreel and Cordwheel

EOD UK is the official UK distributor for the Ruslyn Cordwheel and Packreel. The Cordwheel and Packreel are lightweight and stackable. The reels can be utilised for a variety of uses such as hook and line, firing cables, communications cable and many others. EOD UK holds a limited stock of black and green reels' other colours are available but have minimum order quantities. Please contact us for a quote.

3-D PRINTED TRAINING AIDS

3 D Printed training aids from EOD UK Ltd provide those involved in delivering training and education in the Counter Explosive Ordnance/Explosive Risk Education sector, safe, realistic and cost-effective models for use in both a classroom and field environment.

EOD UK produces the models taken from direct field scans from the original ordnance to produce accurate and detailed models.

Classroom Models

These detailed models can be stripped to component level and are ideal to demonstrate the how the munition functions as well as for recognition purposes, these models are ideal for training operators who will be dealing with the threats on operations.

Field Models

These models are designed for recognition and for field training exercises, the models are a mix of printed infill material and non-expanding foam. Metal can be incorporated into the model for use with metal detectors.

Materials

Most models are printed using a PLA filament (polylactic acid with additives) other filaments may be used too such as ABS, PETG & TPU

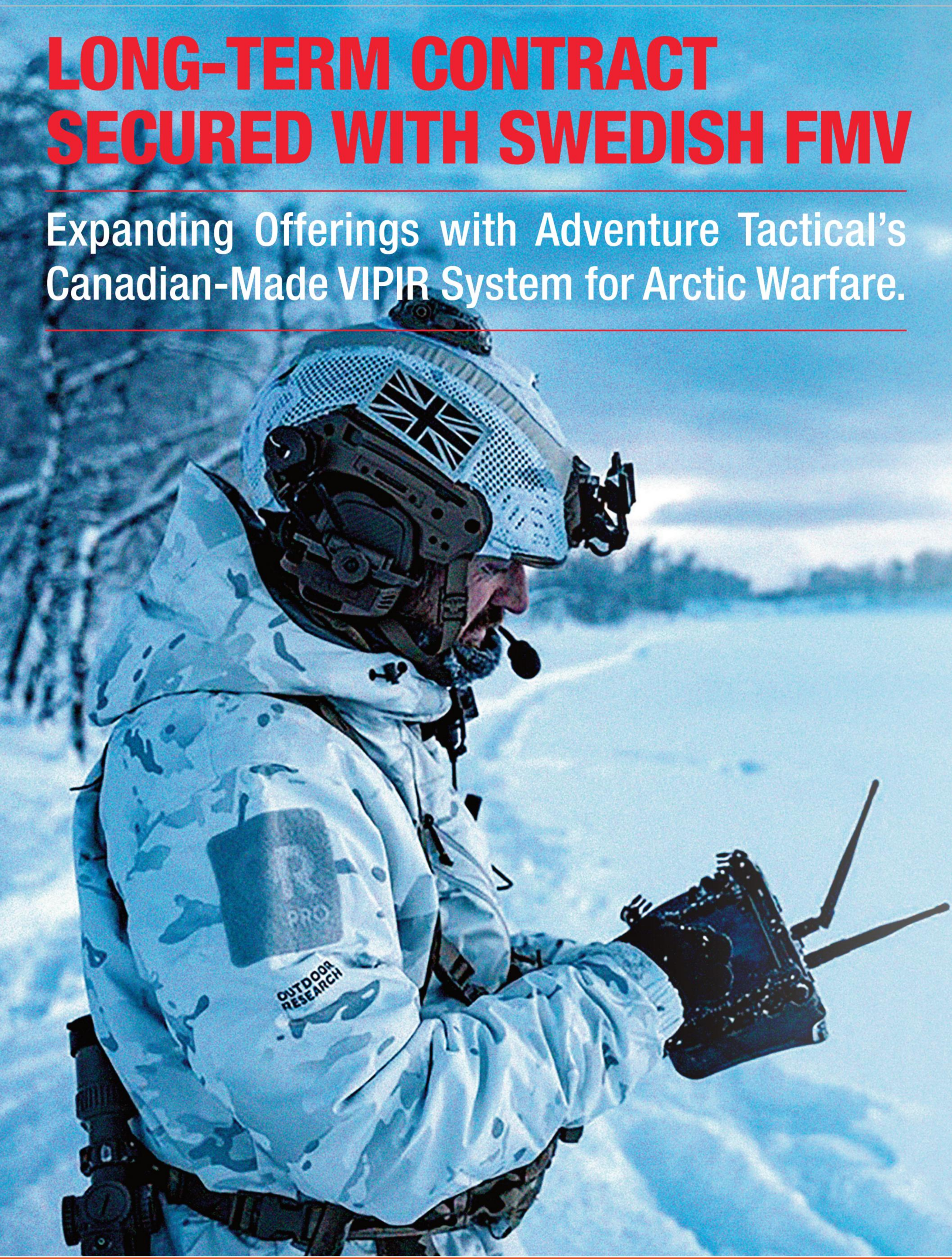
Colour Matching

Where possible the models are coloured matched as closely as possible using commercially available filaments. If direct colour matching is required, this is possible but will add significant cost to a model. Customers requiring colour match should contact EOD UK to discuss their requirements.

www.eoduk.co.uk

LONG-TERM CONTRACT SECURED WITH SWEDISH FMV

Expanding Offerings with Adventure Tactical's Canadian-Made VIPIR System for Arctic Warfare.



In a significant move to bolster Arctic warfare capabilities, Promoteq has secured a seven-year framework contract with the Swedish Defence Materiel Administration (FMV), partnering with Avon Protection to provide cutting-edge respiratory and identification solutions tailored for the extreme conditions Swedish Armed Forces often face.

This contract, as originally reported by Joint Forces, includes advanced respiratory systems such as the FM54 respirators, CS-PAPRs, and ST54 SCBA units, which are essential for safeguarding troops against the harsh Arctic elements.

The contract also marks an important expansion: the integration of the VIPIR infrared signaling device, crafted by Adventure Tactical, a specialized division of the global leader in IFF solutions, Adventure Lights Inc. This Canadian industry leader has developed VIPIR specifically to endure extreme conditions, making it a perfect fit for Arctic operations. With a proven track record spanning over three decades and widespread use among Nordic military forces, the VIPIR device plays a pivotal role in ensuring reliable identification and tactical advantage in challenging environments. This addition underscores the increasing emphasis on Identification Friend or Foe (IFF) capabilities, especially in Arctic operations where the environment heightens the need for clear and reliable identification among military personnel.

The Role of IFF in Arctic Warfare

Arctic warfare presents unique challenges that make IFF systems indispensable. Operating in the Arctic means contending with near-constant snow cover, frigid temperatures, and visibility obstacles such as blizzards, fog, and extended periods of darkness. These conditions complicate traditional means of identification, making it easy to mistake allies for adversaries. Additionally, everyone on the field wears similar white camouflage to blend with the environment, further complicating identification and increasing the risk of friendly fire.

Why VIPIR Stands Out as an IFF Tool

The VIPIR device has proven its value as an effective IFF tool in Arctic operations. Developed in Canada, where manufacturers understand the demands of cold-weather environments, VIPIR has been in production for over 30 years and is trusted by military forces throughout the Nordic countries. VIPIR's design includes multiple light modes, such as visible and infrared, allowing for both overt and covert identification. This adaptability is essential in environments where troops must signal allies without revealing their position to potential threats.

Built to withstand extreme conditions, VIPIR is waterproof up to 100 meters and highly resistant to impacts, ensuring it remains reliable even when temperatures drop drastically. Its intuitive one-hand operation and programmable IR modes make it a practical tool for soldiers operating in demanding conditions, where every second counts.

Strengthening Swedish Arctic Readiness

The inclusion of VIPIR in the FMV contract demonstrates Promoteq's dedication to equipping the Swedish Armed Forces with comprehensive tools to enhance their Arctic warfare readiness. The suite of respiratory and identification solutions, tailored for Sweden's specialist military units, aligns perfectly with the nation's strategic focus on safeguarding Arctic interests. This contract strengthens Sweden's capability to operate in the region safely and efficiently, ensuring that personnel have the tools to survive and excel in some of the harshest environments on Earth.

Promoteq's contract with FMV marks an important step toward a more secure and strategically equipped Swedish Arctic force, ready to respond to challenges and maintain situational awareness with advanced IFF capabilities, represented by the reliable VIPIR system.

For the original article and further details on Promoteq's partnership with FMV, refer to Joint Forces' coverage.

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MASTSYSTEM IN THE SARA PROJECT:

Cutting-Edge Mast Systems for Defense and Aerospace testing

In Defense and Aerospce testing, accuracy and reliability are the key to success. To make sure radar and communication systems work as expected in real-world conditions, advanced technology is essential.

A great example of this is the collaboration between Contact Corporation and Mastsystem Int'l Oy. Together, they've developed innovative solutions that meet the demanding standards of Defense and Aerospce sectors. One notable outcome of this partnership is the creation of a wire antenna mast trailer system for Scientific Applications & Research Associates (SARA), which uses Mastsystem's EXL mast.

Contact Corporation and Mastsystem: A Strategic Partnership

Contact Corporation, based in Winchester, Virginia, has been a major player in tactical communications since 1997. As the North American and Canadian distributor for Mastsystem, Contact Corporation integrates composite mast systems for military clients like the U.S., Canadian Armed Forces and other Defense agencies. They specialization ranges from fully integrated trailer mast systems to specialized power solutions, focusing on reliability and adaptability for Defense and Aerospce.

Mastsystem is well-known for its wide range of telescopic mast solutions, recognized for durability, easy setup, and robustness in tough environments. Together, these two companies have created systems that meet the modern demands of Defense and Aerospce customers.

SARA Project: A Case Study on Innovation

The wire antenna mast trailer system for SARA Inc showcases this partnership's success. SARA Inc is a U.S. Department of Defense contractor that focuses on Defense technology applications and research. The vehicle mounted telescopic mast system supplied to SARA is specifically engineered to test low-level continuous wave signals, a critical element in evaluating both communication and radar systems across various platforms, including military aircraft and naval

vessels. The system includes antennas that can extend up to 200 meters in width and 24 meters in height. This impressive range allows for comprehensive testing of large platforms, such as military aircraft and naval vessels, ensuring that these systems can perform effectively in real-world scenarios. At the heart of this system is Mastsystem's EXL mast, which is rugged and quick to deploy.

Stats on the wire antenna mast trailer system

1. Quick and Simple Deployment

One of the best features of this system is how quickly it can be set up. The telescopic mast, mounted on a trailer, can be deployed by a small, trained team in just a few hours. This saves time and reduces labor costs, which is especially important in situations where rapid deployment is crucial.

Once in place, the EXL-mast stays stable, even in harsh weather conditions. This ensures reliable results, regardless of the environment.

2. Versatility and Adaptability

The wire antenna mast trailer system is flexible, able to support various antenna sizes based on the needs of each test. Whether testing for large aircraft or smaller vessels, the system can be adjusted to fit the situation. This adaptability makes it a vital tool for Defense and Aerospce projects, which require flexibility as technology evolves.

3. Effective use in diverse environments

Radar systems play a critical role in tracking aircraft, ships and other targets. The vehicle-mounted telescopic mast can be used in various environments, making it perfect for radar testing. This is crucial for improving situational awareness during military operations and providing accurate data for decision-making. By providing a reliable means of testing communication and radar systems in diverse environments, the trailer system helps ensure that these technologies can perform effectively in any location. This supports the broader goals of maintaining operational readiness and effectiveness on global scale.

Conclusion

The deployment of the wire antenna mast trailer system at SARA Inc.'s Colorado Springs facility proves its real-world effectiveness. The picturesque backdrop of Pikes Peak highlights the system's capability to function effectively in diverse environments, from rugged terrains to urban settings.

Testing and validating communication and radar systems is crucial for staying ahead of emerging threats and ensuring military readiness. The wire antenna mast trailer system aids in developing advanced technologies, improving overall military preparedness.

As the Defense and Aerospce industries continue to evolve, innovations such as the wire antenna mast trailer system will play a critical role in ensuring the reliability of vital technologies. The teamwork between Contact Corporation and Mastsystem is certain to drive future advancements in Defense and Aerospce industry.

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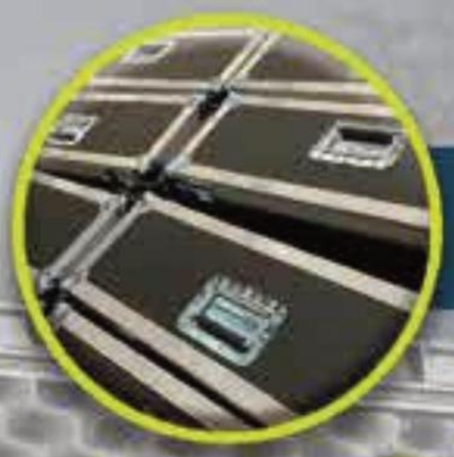

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AUTONOMOUS TECHNOLOGIES:

PIONEERING THE NEXT GENERATION OF DEFENSE SYSTEMS

Robotic technologies are rapidly redefining the landscape of global defense. From precision drones to specialized bomb disposal units, these advancements are bolstering military operations while safeguarding personnel.

This article examines the transformative impact of robotics in modern warfare, the emerging technologies driving these changes, and the indispensable role of connectors and cables in enabling these innovations on the battlefield.

Robotics is revolutionizing how defense organizations operate, offering significant advantages in troop protection and operational efficiency. Militaries worldwide are incorporating these technologies across the value chain, ranging from reconnaissance and surveillance to autonomous weapon systems and logistics support.

The defense industry has embraced robotics with enthusiasm. The sector is second only to technology in its adoption of robotic systems. The robotics market will grow at an impressive compound annual growth rate (CAGR) of 28.8%, reaching an estimated $568.1 billion by 2030. Notably, industrial robots are anticipated to experience faster growth than service-oriented robots over the next decade.

This momentum comes amidst a backdrop of global digital transformation, heightened geopolitical tensions, and inflationary pressures on defense budgets. As a result, the development of robust and dependable robotic systems has become a top priority, offering enhanced tactical capabilities while reducing risks to human soldiers.

Cutting-Edge Technologies for Modern Battlefields

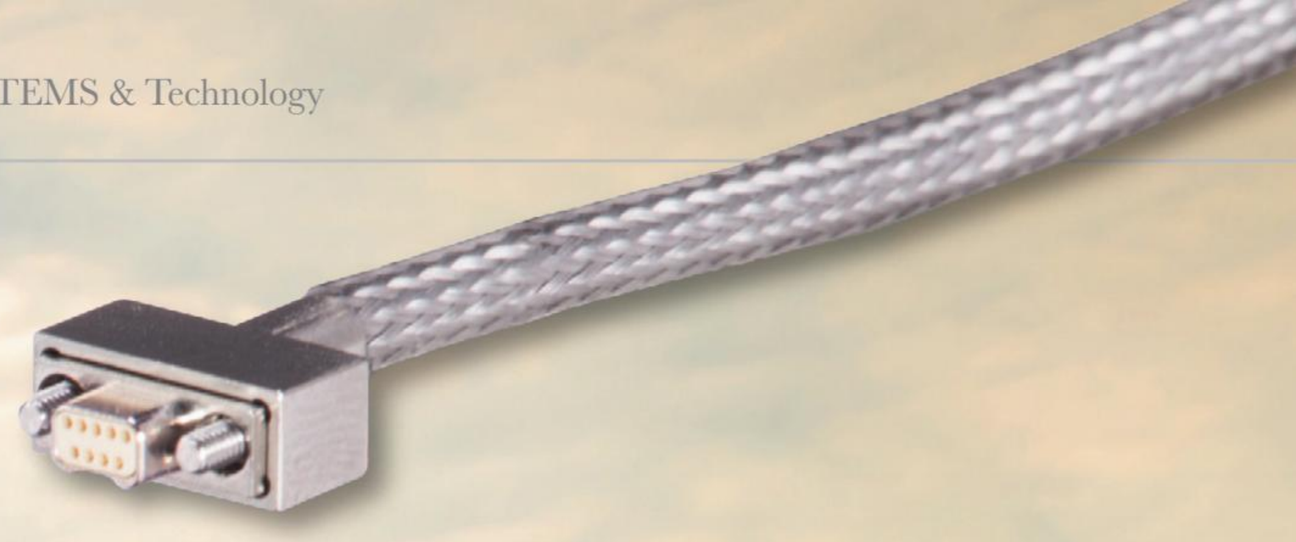
One of the most established applications of robotics in defense is explosive ordnance disposal (EOD). These robots are invaluable for tasks such as identifying, neutralizing, and removing explosive devices. Similarly, drones—also known as unmanned aerial vehicles (UAVs)—have become integral to various military operations. From intelligence gathering and precision strikes to surveillance and force protection, drones provide clear, detailed insights at a fraction of the cost of traditional aircraft. Crucially, these devices also minimize the risk to personnel by enabling remote operations.

While drones were initially limited to aerial applications, their utility has expanded significantly. Today, unmanned systems operate across land and sea, encompassing unmanned ground vehicles (UGVs), unmanned surface vessels (USVs), and unmanned underwater vehicles (UUVs). These systems offer significant advantages, including larger payload capacities, greater resilience to risks, and enhanced power output compared to other autonomous platforms.

Advances in artificial intelligence (AI) and telecommunications are further enhancing the capabilities of these systems. AI enables the deployment of autonomous systems for tasks like logistics, combat support, and manned-unmanned teaming (MUMT). This integration allows human operators and robotic units to work seamlessly together, leveraging the strengths of both. Research and development initiatives are also exploring innovative technologies such as exoskeletons to reduce injuries during heavy lifting and precision-guided munitions that minimize collateral damage in conflict zones.

The Essential Role of Connectors and Cables

As robotics becomes more deeply integrated into defense systems, the components enabling these technologies must be both reliable and adaptable. Modern military technology demands equipment that is smaller, lighter, and more powerful, ensuring easier deployment and



enhanced stealth capabilities. However, these systems often operate in extreme conditions, requiring durable connectors and cables designed to withstand harsh environments.

Connectors and cables are the unsung heroes of robotic systems. They must meet stringent requirements, including resistance to tensile and torsional stress, as well as adaptability to fluctuating temperatures, oils, and chemicals. These components are critical for ensuring the seamless operation of sensors, detectors, and circuits that drive autonomous systems.

The design of these connectors goes beyond physical resilience. It is also essential to consider the data protocols utilized by the system's electronics. These protocols influence the number of connections required, which in turn affects the connector's size and construction. By optimizing these elements, designers can ensure that connectors and cables meet the demanding requirements of modern defense applications while maintaining performance in diverse and challenging environments.

The Road Ahead: Robotics as a Force Multiplier

The integration of robotics into defense systems is more than a technological advancement; it represents a strategic shift in how military operations are conducted. By leveraging autonomous technologies, armed forces can enhance their combat effectiveness, improve logistical efficiency, and protect personnel from unnecessary risks.

Unmanned systems, such as drones, UGVs, USVs, and UUVs, are not only improving operational capabilities but also serving as force multipliers. These technologies allow for broader operational reach and more precise execution of missions, all while reducing the burden on human soldiers. As AI and robotics continue to evolve, their applications are expected to expand even further, encompassing areas such as autonomous supply chains, advanced reconnaissance, and smart targeting systems.

Supporting Innovation with Robust Infrastructure

The success of these innovations depends heavily on the infrastructure that supports them. As military robotics becomes more sophisticated, the importance of reliable connectors and cables cannot be overstated. These components are essential for ensuring the resilience and functionality of robotic systems, particularly in the demanding environments of modern battlefields.

Moreover, as the defense industry continues to prioritize digital transformation, the integration of new technologies must be seamless. This requires a holistic approach to system design, one that accounts for both the technical and environmental challenges that autonomous systems may face. By addressing these considerations, the defense sector can maximize the potential of robotics while minimizing risks.

A Future Defined by Innovation

Robotic technologies are not merely augmenting existing military capabilities—they are reshaping the nature of warfare itself. From groundbreaking advancements in unmanned systems to the critical components that enable them, every aspect of this evolution is paving the way for a safer and more efficient future in defense.

As these technologies continue to advance, the defense sector must remain committed to innovation. By investing in robust designs and supporting infrastructure, military organizations can ensure that robotics remains at the forefront of their strategic initiatives, offering unparalleled advantages on the battlefield.

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Here are the four benefits to expect from Nord-Lock Black washers.

1. Unparalleled performance

If forces from vibrations or loads put bolted connections under pressure, Nord-Lock black washers will prevent any rotation by increasing the preload as soon as any rotation starts. This ensures that bolts cannot loosen unintentionally, regardless of the intensity of vibrations or dynamic loads.

2. Outstanding corrosion protection

The base coating beneath the black color provides the high-performing corrosion protection that characterizes Nord-Lock wedge-locking washers. To ensure all washers meet satisfactory levels of corrosion resistance, we continuously perform testing in the Neutral Spray Test.

3. Streamlined operations as one step gets cut

Nord-Lock black washers can help you lower operation costs and save time since the painting job is already done. This could otherwise mean strenuous work, which is not something anyone preparing for critical, potentially dangerous missions would want to deal with.

4. Global availability

Wherever the location, Nord-Lock black washers are always close at hand. Nord-Lock has a far-reaching, cross-continent presence, ensuring that customers can expect swift support and delivery. This can be a critical factor when there is much on the line.

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POWERING PROGRESS:

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From military-grade generators built to handle the toughest terrains to eco-friendly propulsion systems, Fischer Panda UK is driven by a commitment to keeping people moving, working, and exploring. For over three decades, this family business has been at the heart of mobile power innovation, serving the Defence, Marine, and Vehicle sectors with an eye on quality, reliability, and sustainability. Today, as a trusted name across the UK and Europe, Fischer Panda UK combines technical expertise with a personal approach that keeps customers returning year after year.

Fischer Panda UK: A Journey of Progress Since 1994

It all started in a small facility in Verwood, Dorset, where Fischer Panda UK first began supplying mobile power solutions to customers looking for reliable, robust equipment. Founded in 1994, the company quickly grew beyond a simple generator supplier to become a leader in comprehensive, integrated solutions that are trusted across Europe. Today, Fischer Panda UK is not just a fixture in the UK—it has expanded with facilities and staff in key European locations, ensuring fast, reliable service for customers throughout the continent. Listening to customers' needs and adapting to deliver the best solutions remain core values.

Barry, one of the founding members, recalls: *"We didn't just want to sell products; we wanted to solve problems. For us, it was always about making life easier for our clients, whether they're on the front lines of defence or deep in the wilderness. That drive has taken us a long way, and we're grateful to have built strong relationships across Europe."*

Pioneering Power Solutions for Defence and Industry

When it comes to Defence, Fischer Panda UK stands out. Their military-grade generators—designed for extreme environments, from the icy grip of -45°C to the sweltering heat of 55°C, and high altitudes up to 3,000 metres—are trusted by NATO, European, and US armed forces. Designed with the latest water-cooling technology, these generators operate quietly with minimal exhaust heat, a critical advantage for military operations that demand stealth and durability. Fischer Panda's unique "tunnel" system integrates power, cooling, and heating within a compact design, transforming military shelters and command posts across remote locations into efficient and reliable hubs of power.

Marine and Vehicle Expertise

In the Marine sector, Fischer Panda UK is a name recognised for reliability and innovation. For decades, their compact, quiet marine generators have been a top choice for boatbuilders and operators alike, whether for leisure or commercial vessels. With a focus on reducing environmental impact, the company has developed electric propulsion systems that offer a clean, quiet alternative to fuel engines—answering the demand for sustainability in the marine market.

The company's expertise extends to specialist vehicles, where Fischer Panda UK's advanced power systems are designed to perform in even the harshest conditions. From innovative air conditioning solutions to desalination units and hybrid power systems, Fischer Panda UK ensures that its clients have the reliable, adaptable solutions they need. This commitment to high-performance technology makes Fischer Panda a valued partner across sectors where reliable power is essential.

A Vision for Sustainability and Hybrid Systems

As more businesses seek environmentally friendly solutions, Fischer Panda UK is at the forefront of developing sustainable, hybrid power systems. These systems blend battery storage with renewable energy sources to reduce environmental impact without sacrificing performance. Representing leading brands such as Clayton Power and EFOY fuel cells, Fischer Panda UK provides power options that utilise methanol or hydrogen for a cleaner, greener approach.

"We're seeing a major shift towards hybrid systems," Barry notes. *"Our clients want to cut down on fuel consumption, reduce emissions, and increase efficiency, and we're here to make that happen."*

The company also pioneers' solutions in water and fuel purification, essential for military and humanitarian efforts. With innovations like the H2O Pro system, which generates 114 litres of clean drinking water per hour from virtually any source, Fischer Panda's technology is invaluable for disaster relief and remote missions.

A Family Business with Global Reach

While Fischer Panda UK has expanded into Europe, becoming a global name in mobile power, it's never lost the personal touch that started it all. *"At the end of the day, we're still a family business,"* says Barry. *"We're proud to have grown our reach, but we've never lost that personal approach. We're here to listen, to adapt, and to make sure our customers get what they need—whether they're right here in Verwood or anywhere across Europe."*

The team at Fischer Panda UK is ready to help power the future of mobile solutions. As industries evolve and the demand for sustainable, high-performance power solutions grows, Fischer Panda UK will continue to lead the way, offering innovation, reliability, and a service that's personal, professional, and always ready to adapt.

To learn more about Fischer Panda UK's full range of solutions or to speak to a member of their team, or visit Fischer Panda UK's website - **https://www.fischerpanda.co.uk**. Whether you're seeking reliable power for a marine vessel, specialist vehicle, or Defence application, Fischer Panda UK has the experience, technology, and passion to meet your needs.

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- **Border Security, Immigration and Customs Enforcement; Disaster Preparedness/Emergency Response**
- **Geophysical, Oil & Gas and Alternative Energy; Meteorological, Frequency and Weapon Systems Testing**
- **Transportation, Aviation, Aerospace and Construction; Entertainment, Logistics, Engineering, Municipal & Corporate Programs**
- **Global Support of Special Events; Political, Commercial, Industrial, Sporting, Civic and Numerous other Industries**

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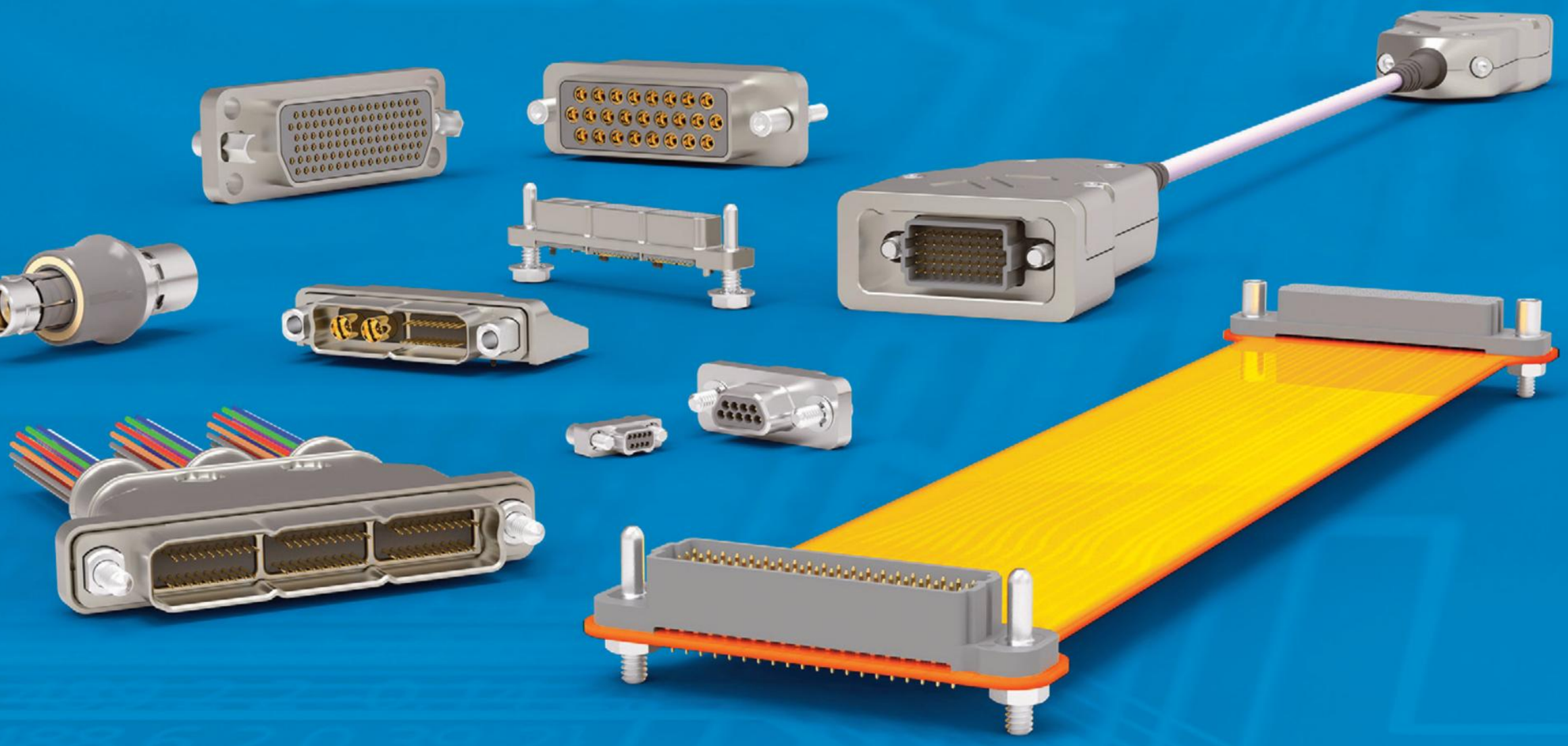

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Equipped with 32GB memory (models available up to 32TB) and available with FIPS 140-3 encryption, DataBunker is easy to transport and mission-ready. Trusted by the US Military and Rail Industries, it’s a proven shield for critical data in the toughest environments.

BATTLE-TESTED DURABILITY

DataBunker meets and exceeds military standards for impact, temperature, and corrosion resistance:

- Withstands 25,000 lbs of pressure, 1400°F for an hour, and 48 hours in saltwater.
- EMP-protected, diesel fuel-resistant, and resilient to harsh chemicals.

Data Bunker
by ThermoDyne

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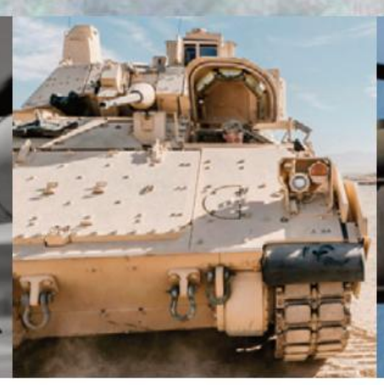
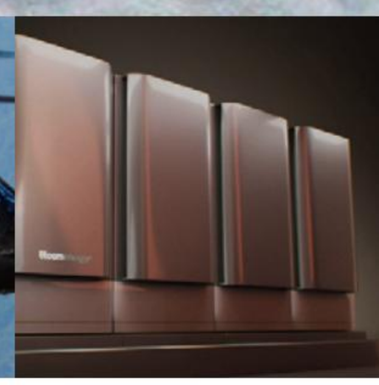
PROTECT YOUR DATA WITH DATABUNKER BY THERMODYNE.

THERMODYNE ADVANCED MICROPOROUS INSULATION SOLUTIONS FOR DEFENSE APPLICATIONS





ThermoDyne provides specialized, high-performance microporous insulation systems designed for critical, high-temperature defense applications. With over 24 years of expertise, we create custom-engineered thermal insulation systems to meet the stringent demands of defense operations, including:

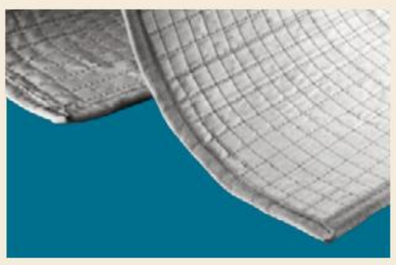
- Aerospace Defense (for both military aircraft and spacecraft)
- Combat Naval Vessels and Marine Systems
- Missile and Weapons Systems
- Ground Combat Vehicles
- Aircraft Black Box and Data Recorder Systems and Insulation
- Advanced Fuel Cell Systems for tactical applications

SUPERIOR MICROPOROUS INSULATION CORE TECHNOLOGY

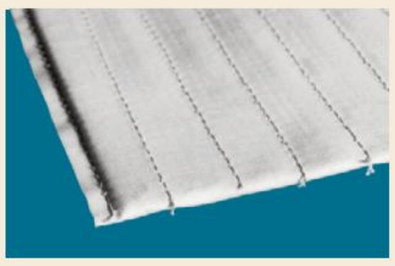
ThermoDyne's proprietary silica-based microporous insulation core is specifically engineered for the defense sector. It offers unmatched thermal conductivity and a reduced profile, meeting the space and weight constraints typical of military systems. Our solutions provide reliable protection under extreme conditions and are customizable with textile or metal shells to fit highly specific defense requirements. ThermoDyne's high-performance insulation materials are trusted and specified by numerous prime defense contractors. We are the only provider with a dedicated NSN number for our insulation solutions, uniquely positioned to serve the specialized needs of the U.S. Government and military contractors.

PRODUCT CONFIGURATIONS FOR DEFENSE APPLICATIONS

Our product forms support a range of defense use cases:



Flexible Forms (ExcelFlex. DynaGuard):
Ideal for curved or irregular military equipment surfaces, crafted with high-temperature cloth for added durability and resistance to extreme vibration and shock.



Ladle Liners (DynaGuard):
Designed for moisture-prone environments, featuring hydrophobic core materials for robust performance even from underwater exposure.

Panel Systems (DynaGuard):
Dense, highly effective insulation panels for simplified installation in military hardware.

Board/Rigid Products (DynaGuard):
Rigid insulation solutions are precisely fabricated for field assembly in complex defense systems.

ThermoDyne fabricates intricately designed sub-assemblies incorporating our materials typically made with stainless steel. inconel or titanium.

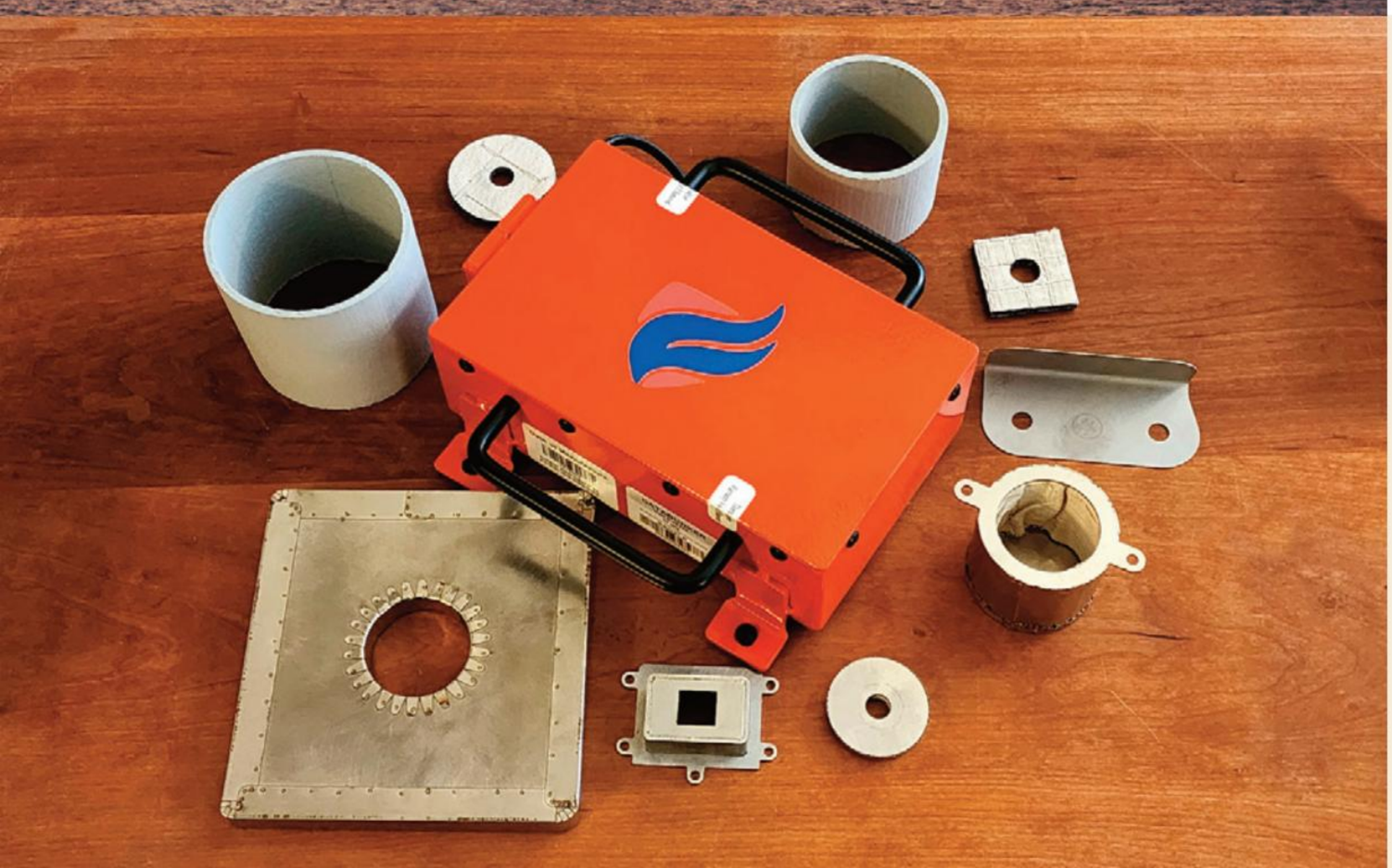
THERMODYNE IS YOUR SOLUTION FOR MISSION-CRITICAL THERMAL PROTECTION FOR DEFENSE PLATFORMS AND ADVANCING THE RESILIENCE OF MILITARY TECHNOLOGY WORLDWIDE.

DEFENSE CASE STUDY: U.S. NAVY FIRE PROTECTION SOLUTION

ThermoDyne recently developed an advanced fire protection system for U.S. Navy combat vessels, addressing the uncompromising requirements for space efficiency, survivability, and structural integrity.

Key achievements include:

- 15-minute survivability in ISO 9705 and UL1709 tests
- Zero system breach, no emissions, and no melting during testing



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POWER EVERY PART OF YOUR DEFENCE

Original Equipment Manufacturers (OEMs) around the world rely on Cummins products to help their equipment exceed performance expectations, and military equipment is no exception.

Since World War 1, Cummins has been a critical partner in supporting military operations, consistently earning top marks for durability, dependability, and performance.

Cummins supplies powertrain, drivetrain, and power generation solutions to defence forces worldwide, with thousands of Cummins-powered vehicles and power generation units in active service.

The Power and Delivery Each Force Needs

By starting with commercial off-the-shelf (COTS) technology and tailoring it to meet exact specifications, customers gain advantages in pricing, reliability, real-time data access, and improved global delivery times.

Cummins offers a wide range of off-the-shelf engines, from 74 to 1000 hp, the industry's most comprehensive portfolio of drivetrain components as well as generators for various military applications. As vehicles face new requirements for more power density and improved fuel economy, Cummins easily adapts. By leveraging solutions that have already proven themselves in both military and commercial applications, Cummins engineers can customize solutions to meet specific defence application requirements.

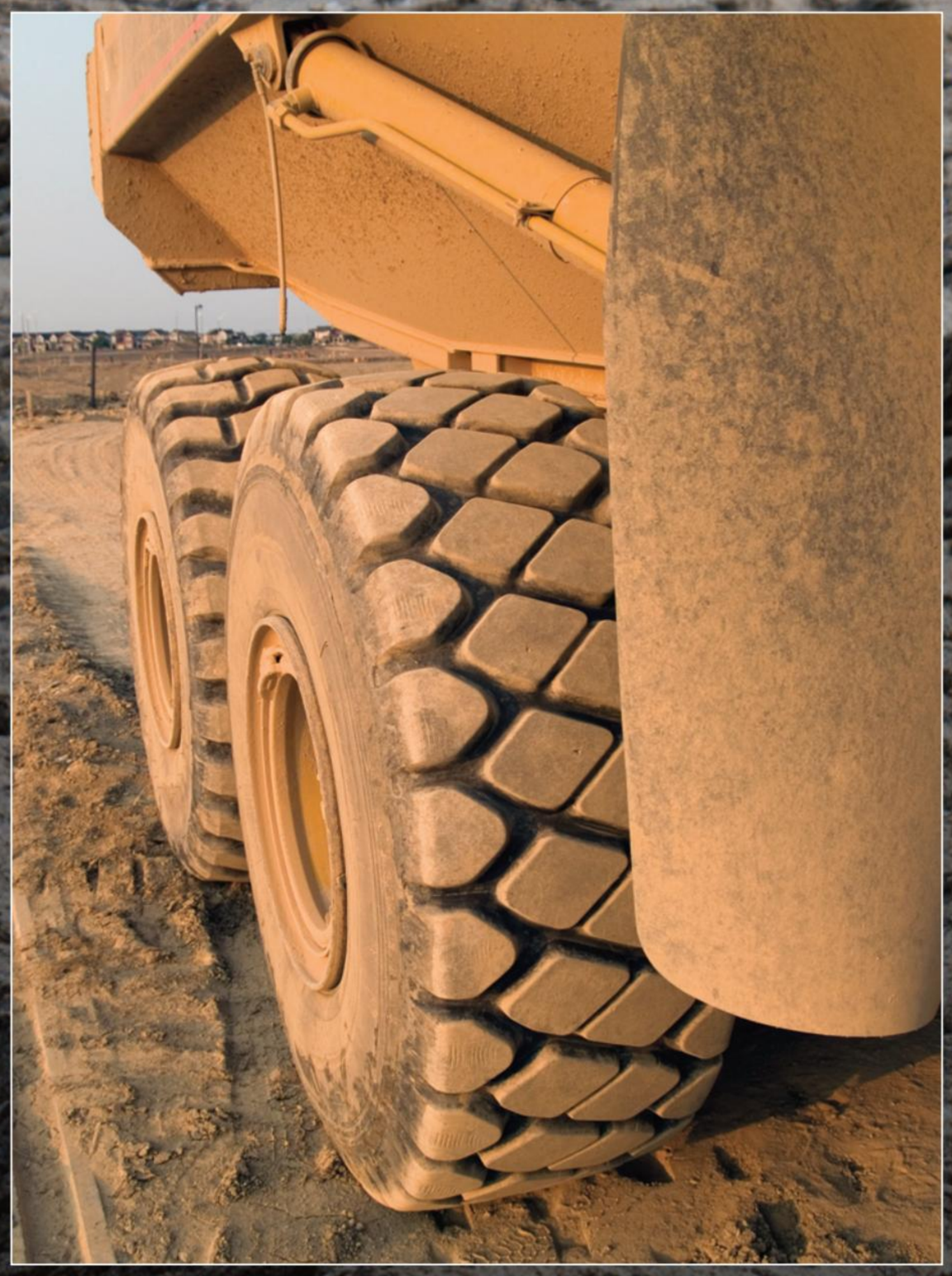
Integrated Power for the Defence Industry

Cummins integrated power delivers choice, advances sustainability, enhances the customer experience, and drives innovation. The commitment is to empower customers with top-tier options that meet mission needs through a continually expanded portfolio and partnerships. Complete powertrain solutions are now available—from engine to transmission to axles—ensuring every component works seamlessly together.

Cummins' components business now inclusive of the largest portfolio of drivetrain and braking systems in the industry, thanks to the inclusion of the Meritor product lines, ensures Cummins is positioned as a true platform solutions provider for integrated powertrain systems. With Cummins' integrated power, customers can trust that their entire powertrain is supported and that their issues can be resolved.

POWERING MISSIONS ON LAND

Since the 1970s, Cummins has been a leader in developing engine technologies for the U.S. Army, building on a legacy that began with WWII products. Advanced test cells and rigorous on- and off-road testing ensure the highest quality and performance of Cummins products. When customers need to cover ground, Cummins engines provide a tactical advantage with greater range and efficiency. Whether powering armoured fighting vehicles (AFVs), armoured personnel carriers (APCs), tactical trucks, heavy artillery, missile launchers, or unmanned ground vehicles (UGVs), Cummins leverages 105 years of expertise in R&D (Research and Development) (Research and Development), engineering,



system integration, and technical guidance. The company offers solutions for diverse applications, locations, and conditions, supported by comprehensive service and support.

Cummins provides a comprehensive portfolio of technologies to ensure engine availability while meeting the latest emissions regulations. The engines are also capable of operating with a wide range of military fuels, including NATO F-34 and F-54, JET A-1, JP-8, AVTUR, F24, and Hydrotreated Vegetable Oil (HVO).

Continuous innovation ensures the delivery of optimal solutions to meet customers' needs.

An Engine for Current and the Next Generation of Combat Vehicles
Whatever the objective, Cummins provides dependable and innovative power solutions to achieve it. For example, the Advanced Combat Engine (ACE) delivers 2,424 lb-ft of torque with just 14.3 liters of displacement. ACE also features innovative Opposed Piston (OP) technology and an advanced two-stroke diesel combustion system with pistons working in opposite reciprocating action. This design results in high power-to-weight and power-to-size ratios, as well as low heat rejection, making ACE ideal for combat vehicles with limited space for engine systems. Additionally, ACE offers improvements in fuel economy, cooling efficiency, and increased vehicle range.

The compact four-cylinder ACE incorporates advanced technologies not currently found in diesel combat engines and is designed for infantry fighting vehicles and main battle tanks. Its modular design allows for configurations in three-cylinder and six-cylinder arrangements, delivering power from 750 to 1,500 horsepower.

Engineered to operate in full desert conditions with all specified military fuels, ACE also serves as a potential facilitator for hybrid electric powertrains in next-generation combat vehicles. Scheduled for production in late 2027, ACE's adaptability extends beyond military applications to commercial uses requiring high power in constrained spaces.

POWERING MISSIONS ON SEA

Shipbuilders and naval operations around the globe depend on Cummins for continuous improvement and innovation. Offering a broad range of power from 4.5 to 95 liters—including propulsion engines, auxiliary engines, and marine generators—Cummins provides solutions that meet customer needs and exceed military and security requirements.

Many of Cummins' marine engines are approved by major marine classification societies worldwide, such as the American Bureau of Shipping. Notable features include independent safety and alarm systems, dual-walled fuel lines, and duplex filtration.

In 2004, Cummins pioneered diesel electric propulsion using AvK® and Stamford® alternators. Today, over one thousand Cummins diesel electric generators power Platform Supply Vessels and Offshore Service Vessels globally.

All Cummins marine engines can run on JP-5, JP-8, kerosene, and biodiesel. With a history of delivering reliable, durable diesel engines to

the marine market since 1919, Cummins continues to push the boundaries of innovation.

Receive support at major ports on every continent through the Cummins distributor network — anytime day or night. With Cummins-powered vessels operating in every time zone, get unmatched access to technical experts around the clock and attain parts worldwide through three major distribution centers in Memphis, Singapore, and Belgium.

POWER TO SET UP BASE

As today's defence systems become more agile and sophisticated, there is a greater reliance on associated power generation solutions. From Basic Expeditionary Airfield Resources to Advanced Medium Mobile Power Sources (AMMPS), Cummins delivers the military experience and technical capabilities needed to meet demanding performance, logistics and mobile power requirements.

From powering command centers, mobile hospitals, and infrastructure at forward operating bases to missile defence and directed weapon systems, Cummins Power Generation provides the expertise and innovation to keep your mission on track — anywhere in the world.

Rugged Mobile Power: 5kW to 60 kW Prime Power

The Rugged Mobile Power (RMP) Unit is a version of the original AMMPS generator, designed for use by both US and non-US militaries in tactical environments and beyond. It offers significant operational benefits across all military services, including a reduced logistics footprint, enhanced unit mobility and transportability, and lower operations and maintenance (O&M) costs. The RMP line includes generator sets ranging from 5 kW to 60 kW in both 50/60 Hz and 400 Hz.

These generators are versatile enough to support microgrid solutions without requiring external control devices. Additionally, service personnel can connect up to 6 units in parallel to create a network configuration.

The RMP products are backed by deep defence experience and technical expertise.

Over A Century of Serving Customers

In August 2022, Cummins acquired Meritor, Inc. The integration of Meritor's people, technology, and capabilities has positioned Cummins as one of the few companies offering fully integrated powertrain solutions. Now operating as Cummins Drivetrain and Braking Systems (CDBS) within the Components segment, the unit continues to provide Meritor-branded solutions across both combustion and electric power applications.

Designed and Engineered for High Performance

Meritor-branded solutions deliver innovative products with superior performance, efficiency, and reliability, solidifying Cummins as a leading global supplier of drivetrain, mobility, braking, and aftermarket solutions for commercial vehicles and industrial markets. Serving diverse sectors, including commercial truck, trailer, off-highway, defence, specialty, and

aftermarket, Cummins excels in designing, engineering, and manufacturing high-performance drivetrain solutions that ensure mobility and safety for tactical-wheeled vehicles worldwide.

Engineering teams prioritize customer needs, ensuring that end-user requirements drive the engineering process. Ongoing efforts to redefine the global defence portfolio around customer demands underscore the company's unwavering commitment.

Scalable Tactical Vehicle Solutions

Meritor's ProTec modular solutions for tactical vehicles deliver high performance, efficiency, and reliability. The ProTec Independent Suspension Axle Systems (ISAS), paired with durable ProTec All-Wheel Drive Beam Axles, offer the dependability required on the battlefield. The ProTec ISAS family provides a two-tiered approach to protecting military personnel while supporting mission success. The weight-efficient, payload-enhancing design increases vehicle capacity for additional armour in combat environments. The strong yet lightweight differential carrier ensures durability without compromising weight savings. ISAS solutions are scalable for light-, medium-, and heavy-duty tactical wheeled vehicles.

Optimized for the military market, ProTec solutions meet stringent specifications, performance requirements, and sustainability targets. For over 110 years, Meritor-brand axles have been the choice of the U.S. Army for 2.5- and 5-ton vehicles. The ProTec All-Wheel Drive Beam Axles provide the range and performance needed in military applications.

Now, Cummins offers more than just engines for defence vehicles. With a wide range of industry-leading drivetrain systems, including axles, brakes, suspensions, drivelines, and aftermarket parts, Cummins brings its commercial and industrial expertise to the military market.

Call In Expert Support

Cummins Care is a solutions center dedicated to preventing issues while providing quick and accurate answers. Its mission is to elevate customer service by being available 24/7/365, offering faster and more personalized attention with rapid results.

From the moment a customer engages with Cummins Care, they gain access to experts with specialized skills, experience, and in-depth knowledge tailored to military equipment needs. Additional support is available through regional and language-specific experts and resources at care.cummins.com.

Cummins ensures that military equipment remains mission-ready by delivering a seamless support experience from supply lines to battle lines, on land and at sea.

READY FOR ACTION

From power range and innovation to world-leading reliability and electronic integration, Cummins is committed to ensuring military vehicles perform with distinction, ready for action 24/7. Discover how Cummins can power your next mission:

www.cummins.com/engines/defense

TSS INTERNATIONAL BV

is proud to announce the launch of its new Website www.better-helmet.com

As the official distributor of SKYDEX Technologies, Inc. TSS will be the European point of contact for all enquiries and deliveries of Skydex Isofit Helmet Protection Systems.

Available in two sizes, the isofit helmet protection system acts as a liner and protective layer inside the ballistic helmet. This functions as an upgrade of the helmet, offering:

- *More comfort*
- *increased stability*
- *superior and battle-proven impact protection*
- *extremely light-weight protection*

The patented isofit liner is easily adjustable with one hand by means of a turn dial, operable for both left- and right-handed users. The liner is 360º adjustable, meaning that it snugly fits all around the head, instead of just on the nape and forehead.

The impact protection is provided by SKYDEX pads, which are easily placed with a hook-and-loop system (like Velcro). Derived from the blast-energy mitigating technology which has also been battle proven in 35.000+ armoured vehicles worldwide, the pads protect the operator's head upon impact by a projectile, adding to the safety and security provided by the ballistic shell of the helmet. The pads compress, reducing the kinetic energy down to compliant levels. The SKYDEX pads are light weight, easy to place and to clean and still function after impact, outperforming traditional foam solutions in multiple characteristics.

Ballistic Trauma Reduction Layer (BTRL)

Complementing the SKYDEX Isofit helmet Protection System is the range of trauma protection layers for ballistic vests. These thin and lightweight sheets, the BTRL, are designed to be used in synergy with the ballistic plates. Together, they provide optimal protection, significant weight savings and a reduced backface signature and chance of injury after impact. An energy reduction of up to 50% can make the difference between being injured & sidelined and continuing the mission.

Visit **www.better-helmet.com** for more information about Skydex Isofit Helmet Protection Systems.

Visit **www.tssh.com** for more information about TSS International BV and Armour Mobility products, such as SKYDEX blast mats, Heavy Duty Runflat Wheel Assemblies, brake upgrades, suspension systems, self-sealing fuel tanks, vehicle intercoms and more.

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A TSUNAMI HAS PASSED

SAVING LIVES BASED ON HUMAN FACTORS ANCHORED ON R&D PART 1

In several of these articles we have made the point that Survival Systems Limited's (SSL)ability to trade and succeed is based on effective R&D coupled with manufacturing and customer service excellence.

Being a small Canadian company with a worldwide reach into a largely unregulated market demands that you have to have something that stands you apart from the competitors.

From its inception SSL's founder and then its, now, current owner have adopted this three pronged approach to doing business recognising the value of independent R&D and emphasising and commissioning additional R&D because the three elements feed off each other. The more R&D you undertake and implement the better the equipment is. This in turn allows you to excel at customer and product support and gain more user feedback which generates more R&D. In simple terms it's a lifesaving loop of applying science and ingenuity whilst continuing to gain the information from thought, study and user feedback to generate more focused science and R&D.

The R&D comes from 4 sources internal, external and then two renowned academics and consultants. Being on top of the external R&D is essential and the internal resources and the two external consultants are key to this. They also drive a lot if not most of the innovation and thinking behind the excellence of Survival Systems Limited's lifesaving products and training.

SSL's philosophy of "Creating A Standard" has had profound influence in improving training technologies, personnel protective equipment, and training programs. Two renowned consultants executing the underlying R&D have been Dr Chris Brooks and Michael Taber PhD. Together in

R&D is designed to test a theory and depends on instrumentation to observe and record, dummies to initially examine a theory, real people to observe the effect all to achieve survival.

Image credit: Michael J Taber.

addition to applying their own encyclopaedic knowledge and experience they have launched several practical R&D activities, testing their, our, and others' theories, examining proposals and making sure designs are fully tested before becoming available to the customers and clients. In short R&D makes sure the visions of the future become the art of the possible in saving lives. That lifesaving R&D can be equipment, training or physiologically orientated: the R&D covers them all as does SSL's products and services.

Chris who has sadly died is remembered for being a Tsunami of knowledge, experience and common sense, a hugely experienced and knowledgeable flight surgeon and aviation medicine consultant rooted in the reality of flying, and yes flight accidents and disasters. Understanding the reasons for death and injury and crucially survival, working out what caused them, how to prevent them and identifying and explaining the lessons of survival and fatalities. A link to a detailed and fulsome obituary is below and a subsequent article will cover more of his activities and achievements.

https://www.legacy.com/ca/obituaries/theglobeandmail/name/christopher-brooks-obituary?id=56514603

Mike continues his R&D work informing lobbying: for more effective regulation, improved (more and better) training and greater understanding of the equipment and physiological issues. He is editor of Handbook of Offshore Helicopter Transport Safety: Essentials of Underwater Egress and Survival and an example of his work which illustrates the thinking and thought processes that SSL benefit from is below. His scientific paper publishing on the subject is prolific and his membership of scientific, legal and practical bodies considerable. We are working on a new project, the results of which one day will reinforce prior revelations that retention training in required in the pursuit of enhancing and preserving workers' lives.

Retention of helicopter underwater egress training (HUET) skills: How long do we remember the critical tasks?

Michael J Taber, PhD
VP Research and Development
N2M Consulting Inc.

Without question, helicopter underwater egress training (HUET) has saved countless lives in real-world events. This fact is noted by governmental accident investigation agencies around the world (National transportation Safety Board, Transport Canada, European Union Aviation Safety Agency, Australian Transport Safety Bureau, and the Civil Aviation Authority, to mention a few). But how long do crew and passengers remember the critical tasks needed to successfully egress a capsized and flooded helicopter? Surprisingly, very little research has explored that specific question.

Despite mandated HUET program requirements for military and civilian personnel, only four known research studies have empirically examined performance of HUET skills beyond the competency assessment which occurs during training. One of the first reported studies to examine HUET retention was completed by Summers (1996) for the Industrial Foundation of Accident Prevention (IFAP). The study was designed to specifically answer the question of whether it could be expected that employees would be competent in helicopter underwater escape given the training schedule that was in use at the time (2-year renewal). After testing 174 offshore workers on a HUET declarative questionnaire, Summers (1996) noted that skill decay occurred across all participants regardless of the number of times they had completed the training in the past. It was further noted that the 2-year retraining schedule was insufficient in ensuring that the offshore workforce would be fully prepared to remember the steps needed in the event of a ditching which resulted in a capsize of the helicopter. Mills and Muir (1999) performed the first known HUET practical skills retention test to examine the demonstration of procedural underwater egress tasks on offshore workers at six months, one year, 18 months, two years, three years, and four years after their most recently completed HUET course. In the Mills and Muir (1999) study, it was found that after only six months, some individuals were unable to meet basic minimum criterion needed to successfully egress the training simulator. It was further identified that more than a third of the 52 people, who volunteered to take part in the study, failed to egress unassisted and that those who had several training courses performed no better than those who had only one previous HUET course. Similarly, Kozey, McCabe, and Jenkins (2007)

Image credit: Michael J Taber.


Image credit: Michael J Taber.

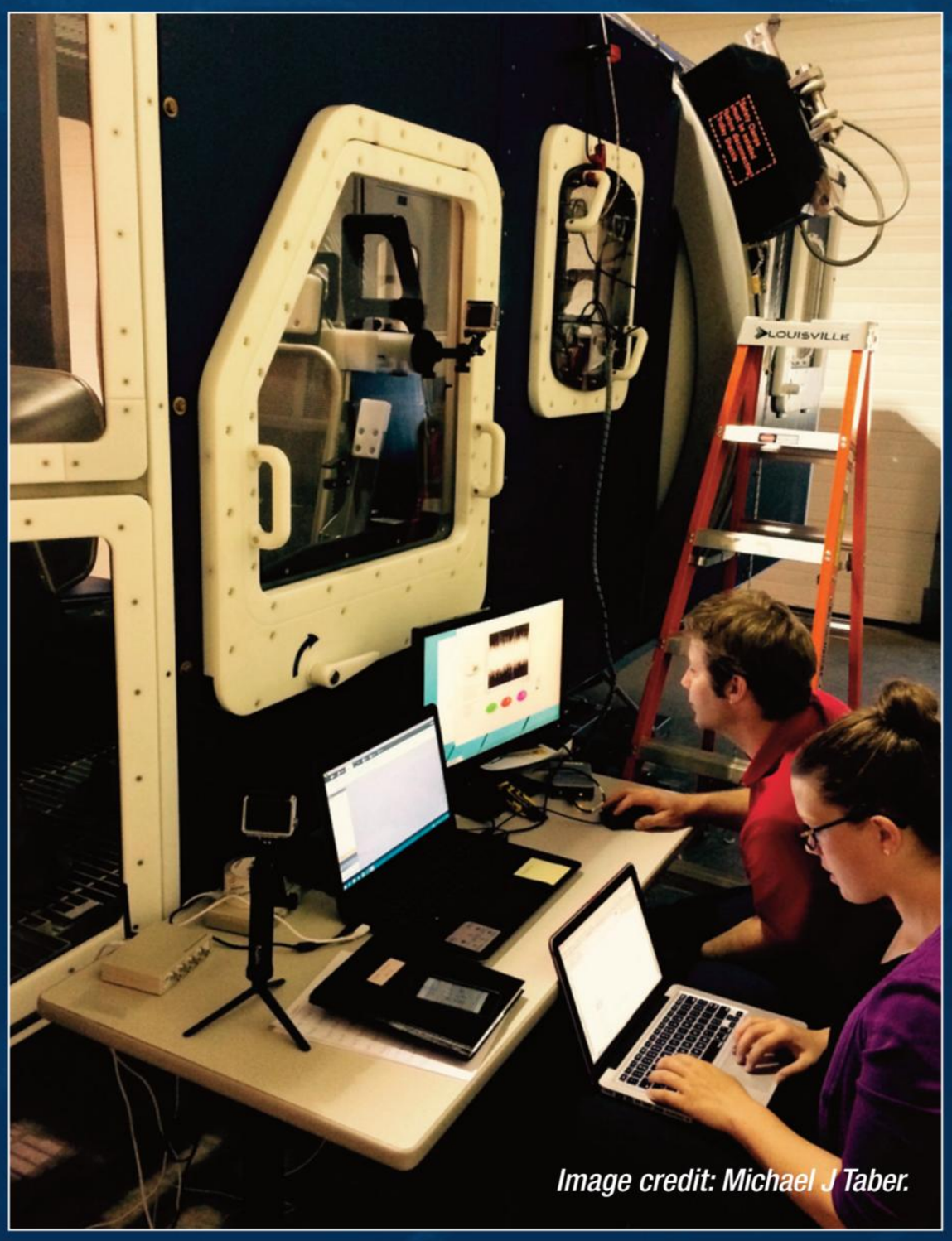

Image credit: Michael J Taber.

indicated that nearly 50% of individuals who had not been given the opportunity to jettison an emergency exit underwater during initial practical HUET skill demonstrations failed to perform the necessary tasks after a retention period of six months. Finally, Taber, Kozey, and McCabe (2012) clearly demonstrated that after training volunteers in four different HUET methods, the results showed that without having the chance to practice the use of emergency breathing systems during initial HUET, it was significantly more likely that the person would attempt to egress without it and required more assistance from training staff. These results, taken together with anecdotal evidence, suggest

Image credit: Michael J Taber.

that current HUET programs for offshore workers may not be sufficient to prepare them for a real-world event. Interestingly, no known HUET retention studies have been carried out with military personnel.

Skill acquisition and transfer to the real-world are only part of the HUET process. One of the primary aspects associated with this training is the ability to recall the steps necessary to complete the complex tasks during egress. The steps (discrete motor responses) need to be performed in a precise order and, during a real-world event, are often completed in conditions that are less than desirable (e.g., cold water, low light, reduced visibility, limited time related to breath-hold capabilities, inverted, multiple snagging possibilities) and possibly after being injured.

Real-world events have shown that procedural skills which are not practiced on a regular basis are particularly susceptible to forgetting. As an example, the Australian Transportation Safety Board (2022) concluded the following:

> *The operator rostered the pilot under supervision for MPT flying without ensuring that helicopter underwater escape training (HUET) had been completed in accordance with the operations manual. Although the pilot under supervision had completed HUET in 2009 and 2011, the lack of recency reduced their preparedness for escaping the helicopter following submersion (p. ii).*

Similarly, the Canadian Forces Flight Safety Report (2008a) noted that although the crew members of the CH124 (Sea King) ditching were able to egress, they all reported:

> *escape actions diverged by some degree from established, and taught, egress procedures. One of the crewmembers accidentally unfastened his backpack while intending to undo his lap belt. Two aircrew undid their lap belts before the aircraft's motion ceased. Both pilots and the TACCO had difficulty locating and utilizing escape hatch handles. One of the crew could not locate the activation lanyard for his life raft (p. 31/39).*

Retention of complex skill sets, and the integration of new information / equipment is also discussed in a CH149 (Cormorant) Canadian Forces Flight Safety Report (2008b). In the report it is noted that because one of the crew members was not current in underwater egress training, the member had never been formally trained in the use of emergency breathing; therefore, it was not part of their egress plan.

HUET skills are only ever practiced during training as it is not currently possible to complete the full egress process on a real helicopter and at present, no known "dry" simulator exists at local heliports. Therefore, the limited practice of complex set of skills associated with an egress from an inverted flooded helicopter creates a situation in which personnel are unlikely to remember every step in the correct sequence. Major aspects of the egress will likely be recalled (e.g., jettison the exit, undo seat harness); however, the finer details of exactly how and in what order to accomplish each task are more difficult to remember over time.

Despite the known challenges associated with egressing from a flooded and capsized helicopter, little empirical research has specifically explored the different training methodologies used to prepare personnel for performance of the skills in a training environment and even less has considered the retention / performance of those skills beyond the initial certification process. Taber (2016) suggests that one of the main issues related to retention is the fact that individuals are trained to complete the HUET skills and immediately tested without a consolidation period or a requirement to demonstrate a whole-task performance which can be

evaluated for retention (see also Taber, Kozey, & McCabe, 2012; Taber & McGarr, 2013). Specifically, Taber (2014) writes, "There is no time allowed for consolidation of information (typically 24 h) (Walker et al., 2003), nor is there a requirement for delayed recall skill demonstration. Worse yet, individuals in the offshore are not retested for at least three years. In fact, in some offshore jurisdictions individuals do not need to demonstrate their ability to perform underwater escape tasks for a period of 48 months" (p. 273). From a military / para-military perspective the Royal Canadian Air Force HUET program ranges between 2 to 10 years depending on operational roles, the US Coast Guard requires training once every 6.25 years, and the Royal Canadian Mounted Police train every 5 years. It should be noted that none of these training / retraining schedules have been empirically tested and are not supported by any specific research findings.

Although HUET programs have been around for more than half a century, it is currently not possible to answer one of the most basic questions regarding the efficacy of the training. How long will we remember what to do in a ditching? Until focused HUET skill retention research is completed for the various operational roles and the associated fidelity of training, the answer may not be as long as we hope it to be.

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The benefits of bringing external thinking to SSL are numerous: the first is not an obvious one in that it challenges SSL's thought processes. A second is that it brings thoughts and ideas from other areas to SSL. This helps the internal thought processes and procedures in many ways. We all benefit in at least two major areas by having R&D challenge us; we have a clearer understanding of our thinking and are helped to find, understand and then exceed best practice.

However, there are other benefits. SSL believes in not just being part of the community but of trying to help lead it. Sharing our R&D is part of this. Convincing people of the safety and operational benefits of flight and egress safety has to be the right thing to do. Bringing forward thinking of the benefits of effective training to operators and users has to be beneficial. In this a common hymn sheet helps.

Flight safety (and safety of operators and users of other vessels that venture close to or into or above the water) has an impact on operations. For the military the loss of a vessel or aircraft and crew will adversely impact the operational plan and future force capability. You would not deliberately move into effective enemy fire if you could avoid it, so why do the enemy's job for them by not husbanding your assets? From a civilian perspective failure to apply it effectively has an adverse effect on future business and profit and loss. In both cases it is people's lives and those of their family that you are playing fast and loose with. We expect the operating crew of an aircraft or vehicle or boat to be adequately trained and undergo refresher training especially in hazardous environments. Why not the passengers?

Image credit: Michael J Taber.

Paying little heed to calls for reasonably thought through mandatory training, including refresher training, for passengers in hazardous environments, for example, should be resisted. Turning blind eyes and deaf ears to ideas for training which can change casualties into survivors is non sensical. It simply turns situations which can be fraught with danger into a race to the bottom, literally. SSL's modus operandi is Enhance and Preserve Life through a three-pronged approach of safety education, training technologies, and applied research and development and Messrs. Brooks' and Taber's industry dedication continues to help SSL provide leadership to the industry and the sector.

SCHROTH®

Mine Blast & Utility Seat Systems

The **SCHROTH** Mine Blast Protected Seat Systems are tubular lightweight systems with a unique resettable Energy Absorbing (EA) system designed into the seat.

The EA design and technology comes from the years of experience **SCHROTH** has with energy management in seatbelt systems. The design of the seat gives the occupant not only excellent protection in a mine blast event, but also offers excellent protection in the event of an accident or impact. The All Belts to Seat (ABTS) design allows the vehicle manufacturer to optimize the installation of the seat within the hull. An integrated footrest can also be incorporated into the seating system for additional lower-leg protection. The unique **SCHROTH EA** technology is tunable to match the size and weight of the vehicle as well as the level of protection required and the available space within the vehicle interior. The EA is also designed to reset itself and offer high levels of protection for the secondary (slam down) event.

The Mine Blast protected seating system is available in two versions:

- **SU-62 compact forward- or rear-facing seat**
- **SU-63 side-facing seat with full or side specific headrest for exceptional side impact protection**

The **SCHROTH** seating comes standard with an ECE certified lightweight 4-point harness restraint. Restraint systems with ECE complaint 5-point seatbelts are also available.

SCHROTH offers the ideal system for military personnel & troop transport configurations.

www.schroth.com

KEY FEATURES

- Quick release, wall-mounted interface
- Modular construction
- Spring Loaded Self-Folding, storable seat pan
- Foldable backrest

CUSTOM APPLICATIONS

Our lightweight seat systems may be adapted to many ground vehicle applications. We can assist with interface, integration, installation and ergonomic requirements as well as any vehicle specific seat modifications that may be required.

CONTACT:

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E-Mail: **werner.koch@eu.schroth.com**

PRECISION IN DEFENSE:

NEDINSCO'S SOLUTION FOR ADVANCED WEAPON ALIGNMENT

In military operations, precision can mean the difference between mission success and failure.

For applications demanding the utmost accuracy, even the slightest misalignment can have substantial consequences. Recognizing this critical need, Nedinsco offers a sophisticated solution in weapon alignment, designed to ensure pinpoint accuracy and operational flexibility. This advanced boresighting system is integral for the precise positioning and alignment of weapon systems on various military platforms.

The challenge & Nedinsco's solution

Nedinsco's Weapon Alignment solution is specifically engineered for high-stakes military environments, harnessing state-of-the-art optical technology and precision calibration techniques. This solution ensures reliable, accurate weapon alignment, enhancing combat effectiveness and reducing errors. Built with a modular design, our boresights can be seamlessly adapted to fit diverse vehicle types and configurations, making it a highly versatile tool across military platforms.

The boresight is crafted to be intuitive and user-friendly, with a straightforward interface that simplifies operation even in high-stress scenarios. Its robust construction guarantees performance in the most demanding environments, while its capabilities offer unmatched precision, reducing calibration time, minimizing ammunition wastage, and ensuring precision. Designed for aligning optical systems and weaponry, Nedinsco's

NEDINSCO VENLO

boresights eliminate guesswork and provide rapid, repeatable results. Key benefits include:

- **Unmatched Precision:** Achieving 0.1 mrad accuracy, the weapon alignment system ensures precise targeting, enhancing combat effectiveness and increasing the likelihood of accurate first hits.
- **Versatility Across Systems:** Our boresights are compatible with various calibers and weapon platforms, making it a versatile solution adaptable to a wide range of military applications.
- **Resource Optimization:** By minimizing ammunition wastage, the boresight optimizes resource use, delivering cost-effective performance and allowing operators to focus on their mission objectives.
- **Durability and Reliability:** Featuring a unique clamping mechanism for stability and a rugged design for harsh environments, Nedinsco's solution is trusted worldwide by defense forces for its consistent, proven reliability in the field.

Nedinsco's boresights are the ideal solution for achieving precise alignment of weapon systems. These units simplify the alignment process, enabling accurate targeting and minimizing setup time. Explore more about Nedinsco's boresight technology at **[Boresights on Nedinsco's website]** ***(https://nedinsco.com/product-categories/boresights/).***

The development process

Nedinsco's process is designed for excellence at every stage, from initial concept to final support. This rigorous approach ensures that each product not only meets but exceeds industry standards.

At Nedinsco, we work closely with our customers to design and develop solutions that are precisely tailored to their unique requirements. Each system undergoes rigorous testing to meet the highest standards of safety and performance, ensuring reliability in the most demanding conditions. From seamless installation to ongoing maintenance, our comprehensive support services guarantee long-term operational satisfaction and effectiveness.

Built to Military Standards

In compliance with MIL-STD-810 and other military standards, Nedinsco's products are engineered to endure extreme environmental conditions. These rigorous tests guarantee that each system meets the durability and reliability demands essential for defense operations.

Trust Nedinsco's leading technology

By integrating Nedinsco's boresights into your alignment systems, you gain enhanced accuracy, operational efficiency, and reliability. Our technology delivers unparalleled precision across various military platforms, ensuring that your systems perform optimally in every mission.

For further insights on Nedinsco's weapon alignment solutions, our dedicated team is ready to assist. Reach out at **info@nedinsco.com** or call **+31 (0)77 355 87 77** with any inquiries.

WWW.NEDINSCO.COM

Svenska Kraftprodukter AB:

Our Role in a NATO-Aligned Sweden

Sweden's recent NATO membership brings changes on many levels, and at Svenska Kraftprodukter AB, we see how our responsibilities are evolving.

Our role now extends beyond supporting private and public clients with energy solutions and crisis management equipment; we are also contributing to Sweden's security preparedness within a larger, international framework.

For us, NATO membership deepens our commitment to energy security and crisis readiness. What was once local emergency backup—our generators—now becomes part of a more comprehensive preparedness strategy. As Sweden integrates into NATO's infrastructure, the need for resilient energy resources,

reliable backup solutions, and effective crisis response measures grows significantly.

In practical terms, we are ready to support both local municipalities and national defense with essential energy solutions that can withstand disruptions. Our generators, designed to provide reliable backup power, are crucial in ensuring that critical infrastructure remains operational during unforeseen events. We are actively adapting our offerings to align with both NATO standards and the unique needs of Sweden's energy landscape.

At Svenska Kraftprodukter AB, we take pride in being part of Sweden's proactive response to evolving security needs, now underscored by NATO's collective defense principles. Through these changes, we are committed to our mission: delivering essential energy solutions that enhance resilience, protect communities, and contribute to a safer alliance!

info@skpab.se
Tel: **+46 20 226600**
www.skpab.com

Svenska Kraftprodukter

Quantum Innovating Forward

WITH SUSTAINABLE SOLUTIONS

Quantum
MARINE STABILIZERS

Quantum Marine Stabilizers have been pushing the boundaries of Marine Engineering for many decades.

From being the innovators behind Zero Speed™ technology, to the extendable XT™ Fin Stabilizers and MAGLift™ Rotors, the engineers at Quantum have revolutionized marine stabilization several times, improving both safety and operations onboard.

Therefore, it comes as no surprise that Quantum continues innovating forward. What is the latest technology, worthy of bringing to market? As stabilizers are traditionally known as big consumers of energy, exploring new solutions for reduced power consumption and sustainability are certainly relevant today.

In 2024, Quantum launched two new systems that challenge the status quo in marine stabilization: the F45, Electric / Hydraulic Hybrid Power System and the e-FIN, the Company's first fully electric stabilizer system. Read on for a deep dive into what makes the two systems so revolutionary, how they can be applied.

The F45 – Electric / Hydraulic Hybrid Power System

The F45 is an Electric/Hydraulic Hybrid Power System that represents a big step forward in marine stabilization, especially in terms of efficiency, energy recovery and energy storage.

This power system can be combined with any Quantum fin or rotor and delivers impressive energy savings at zero speed and underway mode.

F45 Key Advantages

- **Reduces power consumption- up to 60% - 80%**
  By reconfiguring and simplifying the design, this system is able to use power as needed, when needed versus a traditional system that must remain running at 40% capacity, even at idle. Results show the overall cost to run the system is reduced by 60% at zero speed and 80% recovery in underway mode, representing enormous savings.

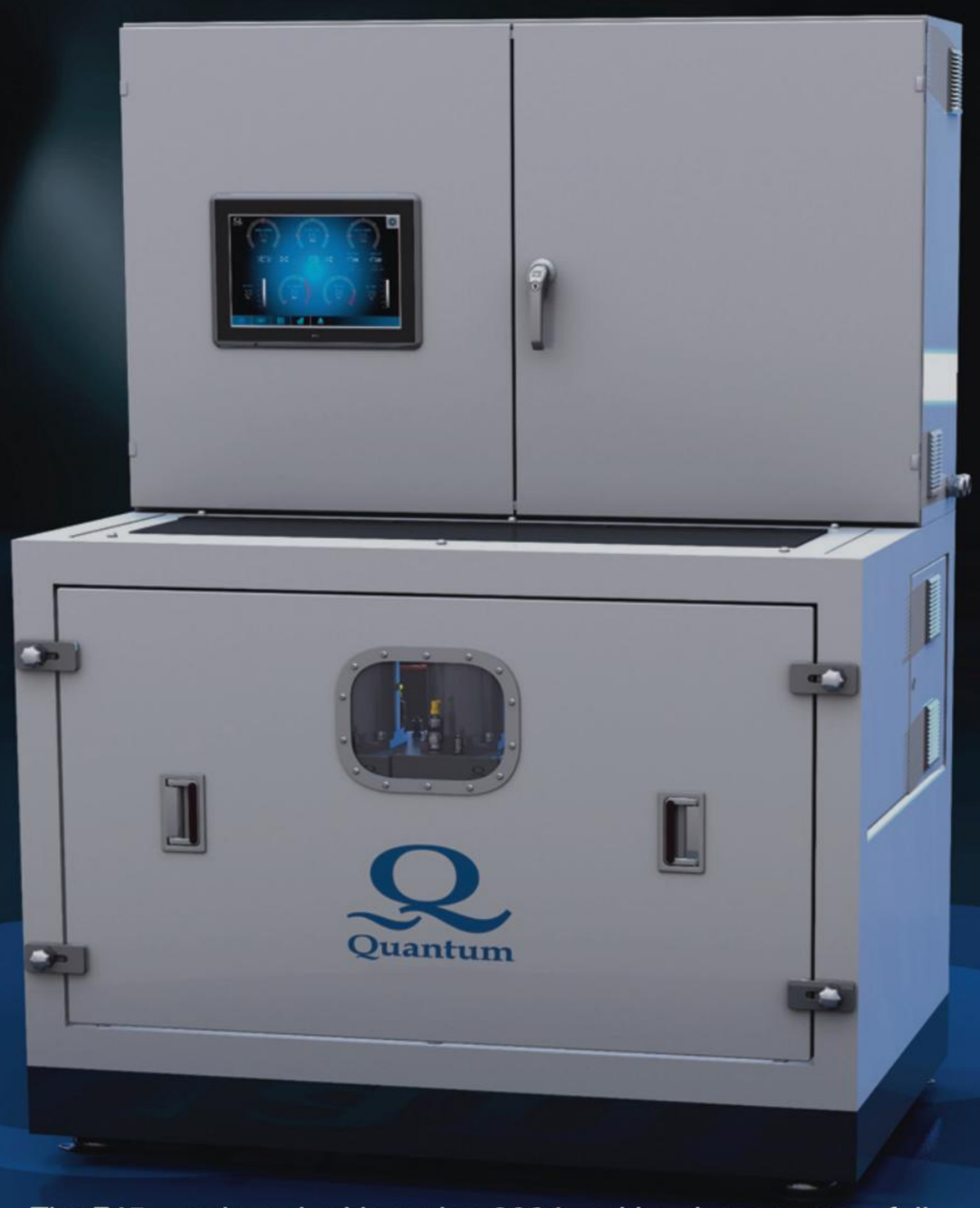
- **M.E.S.S. - Mass Energy Storage System**
  M.E.S.S. is an effective innovation to manage the unavoidable spikes that occur from running a stabilizer system. It prevents the power compromises such as "diming lights" and protects the useful life of the generator. The F45 uses flywheel technology for the following reasons:
  - managing the large spikes
  - its compact size
  - robust capabilities
  - long-term service life

- **4X quieter than any other Quantum system to date**
  Independent, 3rd party testing was conducted by J&A Enterprises to test for audible noise radiating from the unit and structure borne vibration noise transmitted through the isolation mounts. The results were impressive, with sound readings at 63dB's, four times quieter than a traditional hydraulic system to date.

- **Longer Periods of Running Without Required Maintenance**
  This is important for military operations, ensuring the ability to stay on mission with less down time.

- **Smaller Footprint**
  The installation space required is typically smaller than a traditional stabilizer system.

- **F45 New Controls Offer Greater Precision**
  The new 5000S Control System collects more data and delivers more precise movements to the stabilizers, leading to an even better overall experience.



The F45 was launched in spring 2024 and has been successfully installed aboard a 47m vessel. The system is available as of now for all vessel over 65m and can easily be retrofitted.

The e-Fin Electric Stabilizer

The e-FIN is Quantum's first-ever fully electric stabilization system and is unique to all other electric stabilizers on the market. A team of 15 in-house Hydrodynamics Engineers, Naval Architects, Control Engineers, Electrical Engineers, and Mechanical Engineers from the US and The Netherlands have collaborated on this game-changing technology. The result is a highly innovative system, that reduces energy consumption by 60% - 80%, targeting vessels in the 40m-65m range.

e-Fin Key Advantages

- **E6 Controller & HMI Screen**
  The new E6 Control is similar to the latest 5000S platform, with a touch screen interface and modular programing for independent functionality. Both controls also use the latest system software and have an active maintenance algorithm.

- **Sustainable Energy Storage System**
  The e-FIN is considerably more efficient due to the electrolytic capacitors for power storage. Stabilizers generate large fluctuations when they are moving versus stationary, causing cyclical loading to the ship's grid. One of the key features is that the e-FIN storage system can be charged when the fin movement is low, and discharge energy to the drive motor when fin movement increases. Furthermore, in underway mode, the fins can generate power that can be stored for future use.

- **Smaller hull unit & fewer components to install**
  The smaller size of the hull unit compared to a traditional hydraulic unit, along with fewer components, makes the e-FIN easier and faster to install and service.

- **In-house Custom Designed Reduction Gearbox**
  The purpose-built gearbox is capable of handling up to 10 million cycles.

- **Extremely Cost-Effective to Maintain**
  Expected to run up to 15,000 hours between service intervals.

- **Quieter than a Traditional Hydraulic System**
  Due to fewer noise generating components and the optimized gear design.

- **Minimal Heat Dissipation**
  No cooling required due to the efficiency of the system.

- **Power Smoothing**
  Energy storage system to reduce power fluctuations common to all stabilizer operations.

- **Easy connection to AC or DC Bus**
  Plug and play operation.

- **EPU Designed to Meet Electrical Safety Requirements**
  Compliant with EEE45 rules, DNV, Lloyds and ABS and CE Certified.

- **All Aluminum Construction**
  Best weight to torque/power ratio.

The e-FIN is available now and can be built or retrofitted into any vessel between 40 and 65 meters.

For more information on Quantum's latest innovations reach out to info@quantumstabilizers.com or visit www.quantumstabilizers.com

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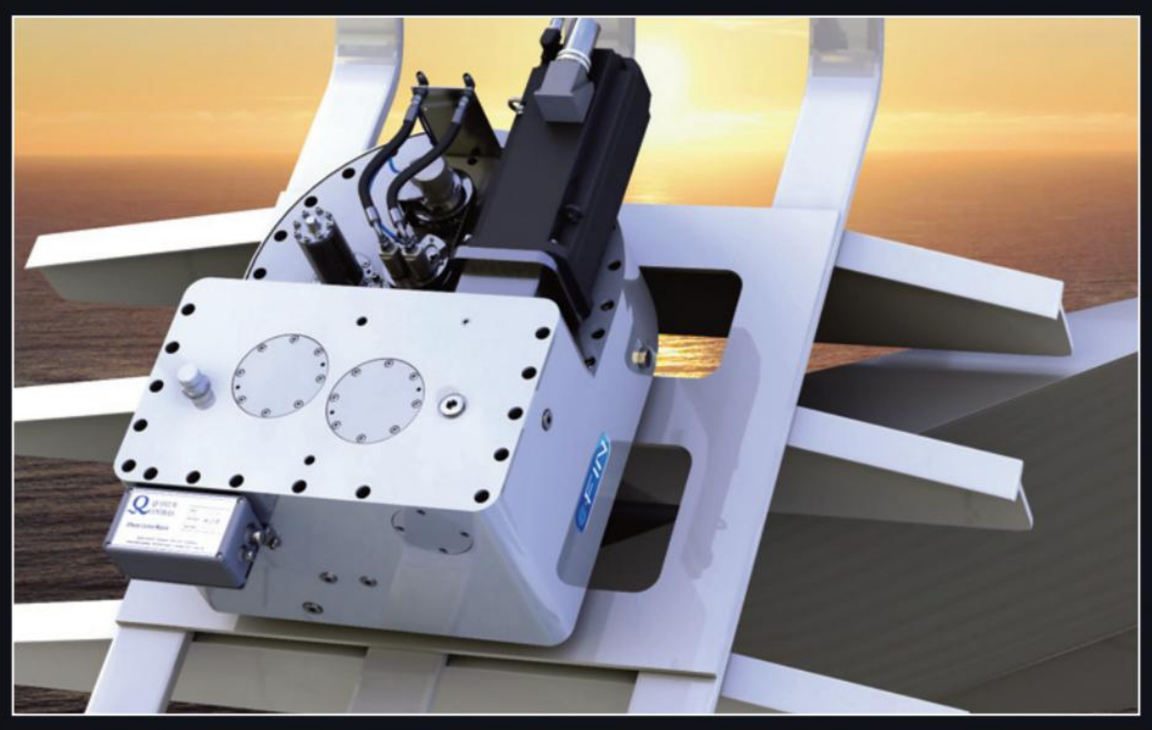


piedrafita

INNOVATION IN MOBILITY AND PROTECTION FOR ARMOURED VEHICLES

The European defence industry is engaged in a new era of technological advances aimed at improving the mobility and protection of armoured vehicles.

One of the key players in this landscape is Piedrafita, a Spanish company that is developing an innovative suspension technology with a focus on improving the performance of armoured platforms. This development is part of the European project SRB (Hydro-pneumatic Rotary Suspension for Armoured Vehicles), within the EDIDP programme (European Defence Industrial Development Programme), which aims to boost the European Union's industrial and technological capabilities in the field of defence.

Piedrafita is at the forefront of this project, contributing its advanced rotary hydro-pneumatic suspension systems, which not only offer significant improvements in terms of mobility, but are also designed to withstand the most extreme conditions, reducing operating costs and improving the maintainability of armoured vehicles. We explore the details of the technology developed by Piedrafita, its key features and its impact on the future of European defence.

Rotary technology: Innovation in armoured vehicle suspensions
The rotary hydropneumatic suspension system being developed by Piedrafita represents a significant advance in armoured vehicle engineering. The key feature of this technology is its fully rotary design, which means that both the hydropneumatic spring element and the hydraulic damper are operated by rotary mechanisms. This provides control of the suspension's progressivity throughout the vehicle's travel, which significantly improves its behaviour in rough terrain.

The increased effective suspension travel compared to current solutions is one of the most notable improvements. This allows vehicles equipped with this system to offer greater mobility, improving both their ability to overcome obstacles and their performance in extreme environments. In addition, the suspension can be equipped with a height adjustment system, offering flexibility according to the operational needs of the vehicle.

Digital control and predictive maintenance

One of the most innovative aspects of Piedrafita's suspension system is its ability to integrate digital control, which facilitates predictive maintenance tasks. Through the Digital Suspension Controller (DSC), operators can monitor in real time key parameters such as system pressure and temperature, as well as vehicle chain tension in the case of tracked armoured vehicles.

This continuous monitoring capability not only improves vehicle safety, but also allows operators to anticipate potential failures and make adjustments before they become serious problems. This reduces downtime and maintenance costs, resulting in increased operational availability.

Supporting Capabilities: A European-made system

Another key feature of Piedrafita's technology is that it is entirely manufactured in the European Union, which guarantees its independence from foreign regulations such as the ITAR (International Traffic in Arms Regulations of the United States). This approach not only ensures that the system meets European quality and safety standards, but also provides a more cost-effective solution compared to other alternatives on the market.

In addition, the system has been designed to perform well in a wide range of temperatures and under extreme conditions, making it ideal for missions in demanding environments such as deserts or arctic climates. This level of robustness ensures that the armoured vehicles can operate effectively in any type of mission, regardless of the environment.

Interoperability and adaptability

Interoperability is another pillar of Piedrafita's innovation. The suspension system is compatible with different platform shapes, which means that it can be adapted to armoured vehicles of different configurations with minimal specific modifications. In addition, it is adaptable to vehicles of different weight categories, making it a versatile solution for different types of armoured vehicles, from light to the heaviest.

This modular and adaptable approach allows armoured vehicle manufacturers to integrate Piedrafita's technology without the need to completely redesign the undercarriage or vehicle structure, reducing both development costs and implementation times.

Missions and operations: Performance under extreme conditions
The system's ability to operate in harsh environments and under extreme conditions is one of the aspects that makes it ideal for military vehicles. Armoured vehicles equipped with this technology are able to operate with optimal performance in difficult terrain conditions, from rocky surfaces to deep mud, and in extreme temperatures, whether in the scorching heat of the desert or in arctic climates.

In addition, the suspension system is designed to be easily replaceable, making it easy to maintain in the field and minimising downtime during missions. Its symmetrical design also allows the system to be installed on both sides of the vehicle with minimal alterations, increasing its versatility and reducing the need for specific parts for each side of the armoured vehicle.

Logistics:
An efficient and maintenance-free system

One of the main logistical benefits of the Piedrafita suspension system is its self-contained, maintenance-free nature throughout the expected life of the vehicle. This means that operators will not have to worry about component wear and tear during extended missions or in environments where access to regular maintenance is limited.

This maintenance-free approach not only reduces operating costs, but also increases the availability of the vehicles in the field, allowing them to be operational for longer without the need to stop for overhauls.

User experience:
Improved mobility and availability

When it comes to user experience, vehicles equipped with Piedrafita's technology will offer enhanced mobility and availability. The rotary hydropneumatic suspension provides a smoother and more stable ride, improving both operator comfort and vehicle efficiency in complex missions.

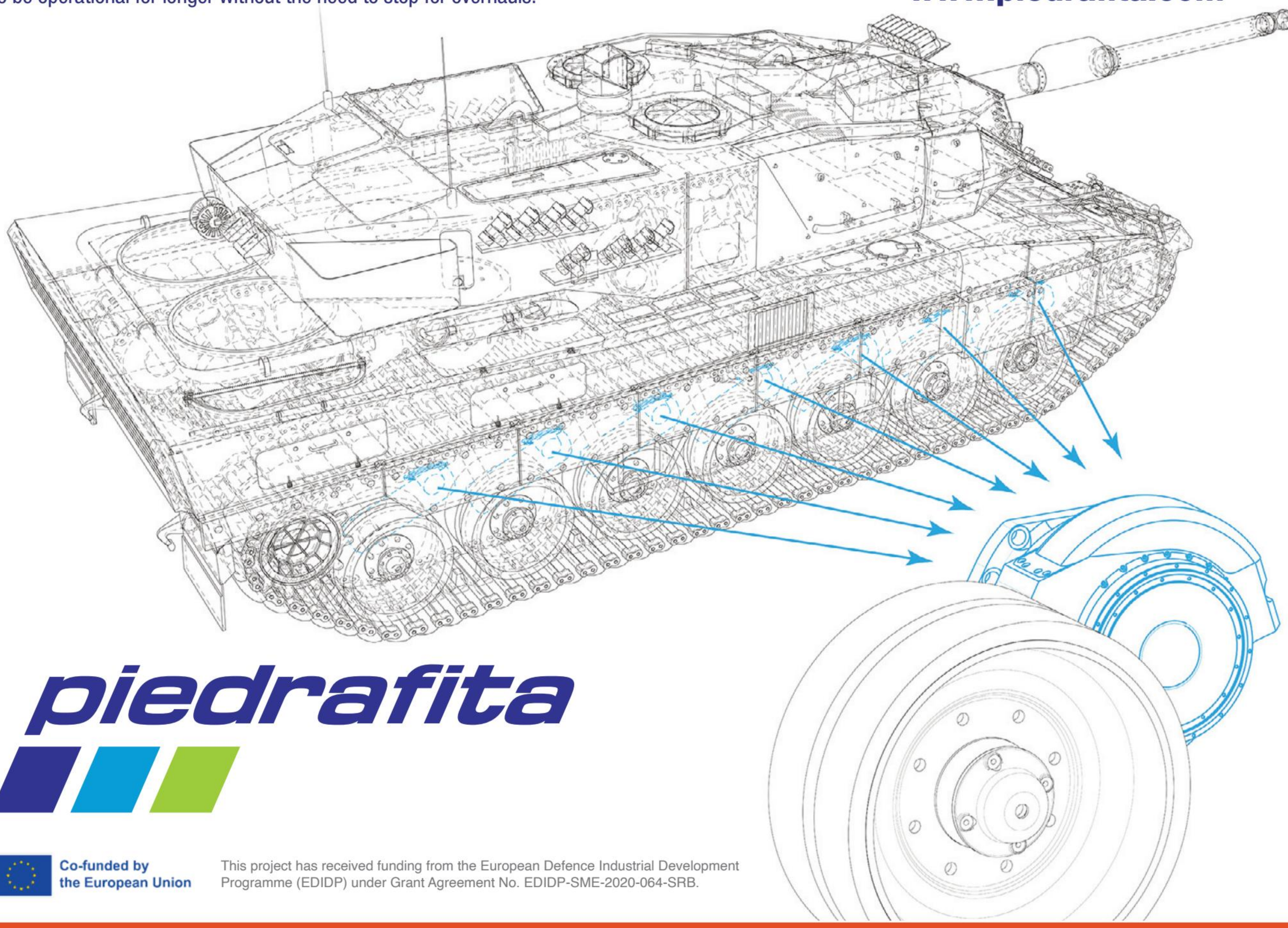
In addition, the system is designed to maintain a constant characteristic across the entire temperature range, ensuring predictable and reliable performance regardless of weather conditions.

Conclusion

Piedrafita's hydropneumatic rotary suspension system represents a major breakthrough in armoured vehicle engineering, combining technological innovation, logistical efficiency and operational versatility. Through its participation in the SRB project and the EDIDP programme, Piedrafita is helping to define the future of European armoured platforms, offering solutions that improve both mobility and mission-critical vehicle protection.

With a focus on sustainability, interoperability and cost reduction, this system is set to play a key role in the development of the next generation of armoured vehicles, ensuring that European armed forces have the best technological tools to operate successfully in any environment.

www.piedrafita.com



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Co-funded by the European Union

This project has received funding from the European Defence Industrial Development Programme (EDIDP) under Grant Agreement No. EDIDP-SME-2020-064-SRB.

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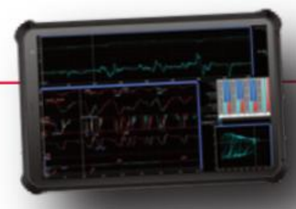
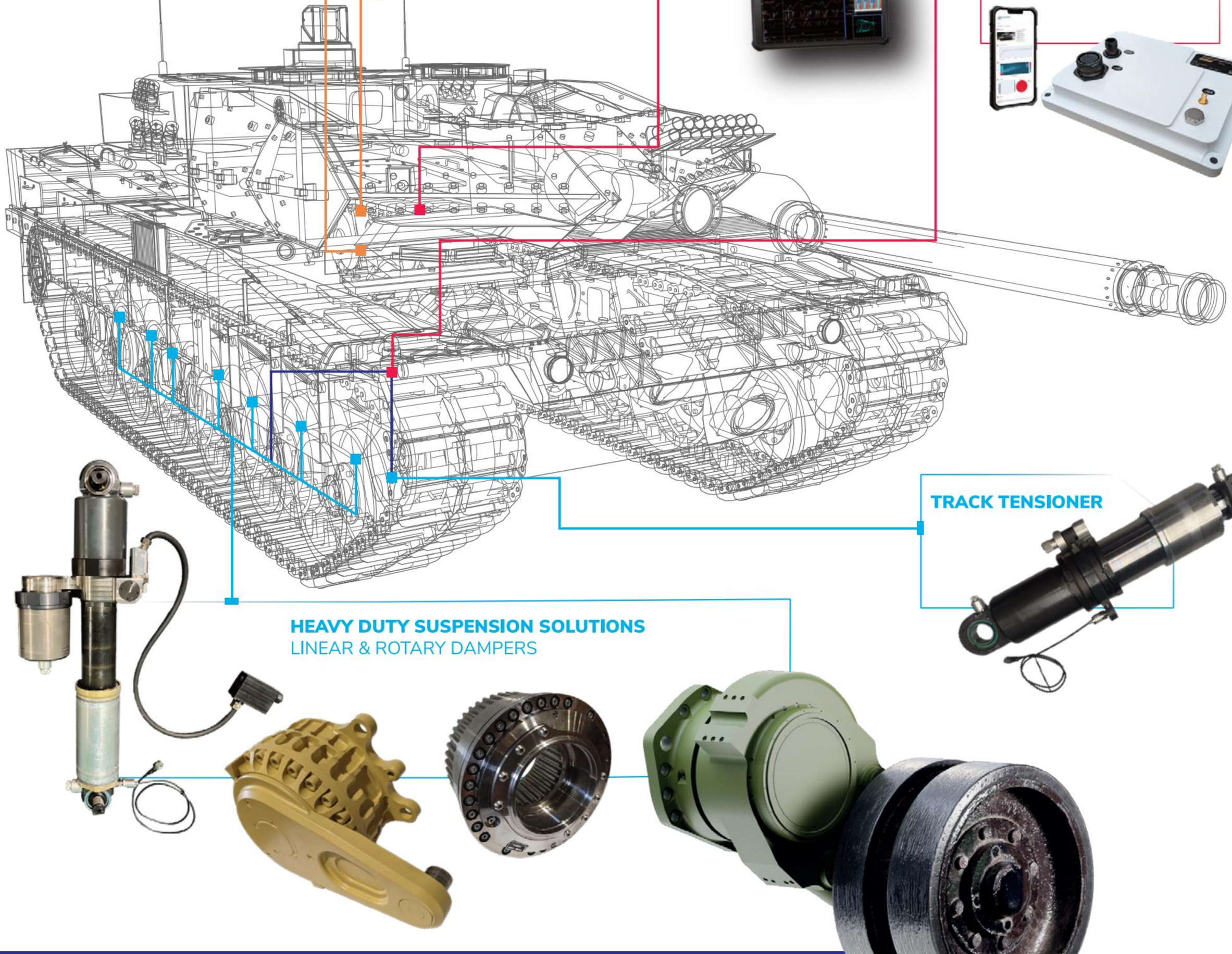


DIGITAL SUSPENSION CONTROLLER - HUMS



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Weatherhaven

Sheltering troops, wherever they're deployed

From it's founding in British Columbia in 1981, Weatherhaven has been driven by an innovative and can-do spirit of rising to the challenges set by customers who need reliable, robust and simple re-deployable shelter and infrastructure solutions for use in the most challenging environments found on Earth.

Be it military camp systems suitable for Worldwide deployment at a moment's notice; or scientific infrastructure which will spend life deployed at the ends of the Earth in temperatures which never get much above -30oC; these are the places you will find Weatherhaven's equipment.

Weatherhaven began with founder Jim Allan thinking "I can do that better" whilst trapped in a storm on Mt Logan – Canada's highest peak, for over a week in inadequate shelter, to the company it is today, having delivered over one billion dollars of equipment to customers in more than 75 countries, in every environment from polar to desert. Weatherhaven is constantly developing their product range as well as their production capabilities and now have more than a dozen manufacturing facilities covering The Americas, Europe, Africa and the Middle East. Weatherhaven are ideally situated to respond to demands no matter where from, or how urgent.

As one of the World's leading provider of high specification rapidly re-deployable technical infrastructure to remote sites operating in the world's harshest environments, for over 40 years, Weatherhaven has designed, manufactured and deployed innovative shelter systems for innumerable military, exploration and medical applications. Weatherhaven delivers re-deployable Command Post, Medical and Technical Infrastructure to NATO and allied forces, this has recently included high specification winterised medical and accommodation soft shelter infrastructure to Ukraine.

Weatherhaven's re-deployable infrastructure systems are completely modular and scalable to offer clients maximum operational flexibility. Designed from the outset to be simple and rapid to deploy, rugged and long lasting. This simple mythology means that post deployment no long-term traces of the deployment are left, thus allowing the environment to rapidly return to is natural state.

Weatherhaven is much more than just a systems manufacturer, key to the company's development across the years has been their ability to deliver high quality capabilities quickly to any part of the globe. From the first "turn key" resource exploration camps in Northern Canada which contained everything the user required (including the proverbial kitchen sink) to operating in the harshest Northern Latitudes of the Canadian Tundra, to their first military camp delivered at the rush to allied forces stationed in Kuwait following the first Gulf conflict. They have proven again and again that by having control of their key supply chain combined with a global manufacturing base allows them to rise to the challenges set by the constantly changing defence and economic landscape.

None of these recent challenges have been more complex, or in the end as rewarding, as the Covid 19 epidemic and the international response to that. Faced with non-functioning international supply chains which

disproportionally impacted the manufacturing industry, closed international borders and the richer nations monopolising supplies, Weatherhaven rose to the challenge to deliver multiple Covid resilience hospitals to some of the Worlds more desperate countries. This included field hospitals to Chile and Columbia with the first one operational in under 6 weeks, and isolation hospitals facilities to Sierra Leone, Mauritania, Guinea and Chad.

In total since 2020, Weatherhaven has proven itself as one of the World's leading high quality field hospital providers having delivered over 25 re-deployable medical capabilities worldwide, both in response to Covid and in response to renewed military demand. With deliveries to a European nation recently completed, South American nations underway and negotiations with Eastern European countries ongoing, the medical market has become once again a lucrative prospect for Weatherhaven.

Over the last four decades Weatherhaven has also evolved from the specialist custom designer for remote site infrastructure, to one of the world's leading engineering design and programme management organisations, delivering high value defence projects worth hundreds of millions of dollars to NATO nations.

Once again Weatherhaven will be displaying their capabilities at DVD 2024, based on the Steering Pad on stand SP15. On show in this iteration will be Weatherhaven's tried and tested Mobile Expandable Container Configuration (MECC) the "3 in 1 expandable container" based on the universal 20' ISO container footprint. Complementing the MECC is the 'new boy' in Weatherhaven's stable, the Tactical Re-deployable Expandable Container Capability (TRECC), a much smaller rapidly deployed shelter system which can be mounted on light vehicle trailers or air-portable pallets.

The Weatherhaven MECC is the Western militaries most popular expandable containerised shelter system, with nearly 4,500 variants of the MECC delivered in the almost 30 years since it was first put into production. Since the first MECC were designed and delivered in response to the 1995 Kobe earthquake in Japan, it has been constantly evolving into the robust universally popular system we field today and can be found on almost every major NATO deployment.

Knowing their customer base well, the MECC is designed and manufactured by Weatherhaven on simple basic principles – robustness, rapidly deployable, simple to use, low annual support costs, ease of in-field repairs or parts replacement, simple to repurpose and a long lifespan. These principals allow for the holy grail of low through-life costs. The durability of the MECC has been well proven over the years and Weatherhaven regularly see MECCs with 20+ years' in-service life and are still going strong. Japan still has the majority of the original 100 MECCs they ordered in 1995 in-service today.

A key aspect to the MECCs attraction is the available space once deployed, giving over 40sqm of clear workable floor area on the 8'6" high standard container configuration. Weatherhaven's unique design and build methodology adds to this versatility by giving the user the ability to simply strip back installed equipment to the basic MECC chassis and quickly reconfigure to a different role to which it was previously used. Some MECCs have lead a varied life going from being a vehicle maintenance facility, to a kitchen, to a command post. This allows customers to continually re-role the core MECC unit to meet new requirements whilst minimizing the financial outlay and manufacturing lead-time. The MECC minimises transportation footprints whilst maximizes capability; when packed, the MECC will contain everything the operator needs, including for example desks, chairs, IT screens, radio equipment, map tables as well as all deployment equipment. In the basic MECC fitment operators still benefit from approximately 85% of the storage volume they would find in a comparable empty basic ISO container.

The MECC can be operational in under 15 minutes by 2-3 personnel wearing full operational equipment loads. It can be operated directly from the prime mover vehicle or any other 20ft ISO container transportation capable truck, mounted onboard a trailer system, or be ground based. The MECC has the ability to be complexed with other Weatherhaven containerised and soft-shelters to provide larger, weather-proof, continuous facilities.

At DVD 2024 Weatherhaven will be showing a MECC which perfectly highlights some of these capabilities. To prove the robustness of the Weatherhaven MECC, they have always chosen to demonstrate using real equipment, not showroom only models. The MECC on display at

DVD this year is nearly 20 years old and has travelled the globe a few times. Originally designed as an engineering workshop, it is now the basic open-plan configuration to highlight the space and opportunities available.

Internal fittings for the MECC can be as varied as the roles it is used for but includes standard systems such as lighting (white and or tactical) power distribution, heating ventilation and air conditioning (HVAC) and power supply. Provision of power can be external user supplied or onboard, integrated power systems including traditional generator sets, hybrid power modules and renewables sources.

Weatherhaven are very pleased that the MECC on display has been enhanced by the addition of the SAAB Barracuda MCS and ULCAS a true Multi Spectral Camouflage System. This new development for Weatherhaven is in reaction to the reality of modern warfare where the high value activities conducted in the MECC system would make it a prime target for opposition forces. Integration of the Barracuda system also allows operators to dramatically reduce the time taken to bring a MECC into operation, allowing key functions on the battlefield to be more efficient and reducing the time taken to protect these assets and functions. More details on how the Barracuda system reduces detection and thus enhances battlefield survivability can be found at https://www.saab.com/products/mcs-mobile-camouflage-system.

Weatherhaven's more recent developments in the small expandable shelter market, the Tactical Redeployable Expandable Container Capability, the TRECC, will also be on show. The TRECC has been in development over the last 6 to 8 years in response to the recognition that warfighting was becoming a much faster moving operation, with the time taken between targets being acquired and engaged rapidly reducing; as has been borne out over the last 2+ years in the Ukrainian conflict. The TRECC is a family of rapidly deployable capabilities in a secure container, based on the same key principles as for all their expandable containers. The ease and speed of use being key, with maximum flexibility built into the system to meet ever changing user requirements.

The TRECC is built on a common architecture principle, which allows Weatherhaven to supply TRECCs in various dimensions to meet different use cases without having to carry out expensive and long redesign work. This has allowed Weatherhaven to produce different size TRECCs to meet individual customer specifications, such as the TRECC-T for the HMMWV Trailer, the TRECC-P which is compliant with NATO 436L aircraft pallet systems, and the TRECC-H which was specifically designed for CH47 internal load carriage.

Built around speed of deployment, the TRECC can be operational in well under five minutes from arrival at location, with deployment easily achievable by only one person if necessary. Trailer mounted TRECC-T systems also benefit from its "get out of trouble" capability, allowing it to be driven off quickly without being fully packed away if necessary, which further increases survivability.

The TRECC is gaining popularity across NATO forces which appreciate the rapidly deployable, simple to use, multipurpose shelter systems where ground based tents are no longer the acceptable solution. After an initial delivery to NATO Command troops based in Belgium, Weatherhaven has also delivered the TRECC to the British Army and US Army and with multiple requirements being responded to in North American, Europe, the Middle East and Australasia, it's clear that the TRECC will be the platform of choice for applications where speed, capability, simplicity and versatility are the defining requirements.

Away from the Defence sector, Weatherhaven have always been considered by Western nations scientific and exploration organizations as the go-to company for shelter infrastructure to keep their staff and equipment safe and operational in the most remote and extreme environments found in the Polar regions. Ranging from supply of their small Weatherhaven Endurance shelter for staff accommodation or the luxury Polar holiday market, to innovative large area drill shelters. The latter have been used to support the Ice Core Drilling experiments for scientific research into the millions of years of weather data captured in the ancient ice shelves of Antarctica.

From the North Canadian and Alaskan drilling and mining fields, to the South American high Andes mountain range, for the best part of 40 years Weatherhaven have been housing large numbers of workers in high-quality exploration camps. These home-from-home camps providing all the necessities and luxuries expected to support skilled workers in remote and hostile areas.

Looking forward, Weatherhaven aim to maintain their presence at the forefront of the Worlds deployable capabilities by providing infrastructure that is both energy efficient to transport and operate. By ensuring our equipment can be manufactured, transported and deployed in the most efficient manner coupled with high quality materials, providing high thermal efficiency and a long in-service life, Weatherhaven strive to ensure the customer receives maximum return for their investment whilst minimising the impact on the planet. For both environmental and cost reasons, Weatherhaven delivers on the principle that after use there should be no lasting traces of deployment, just satisfied customers.

www.weatherhaven.com

Weatherhaven

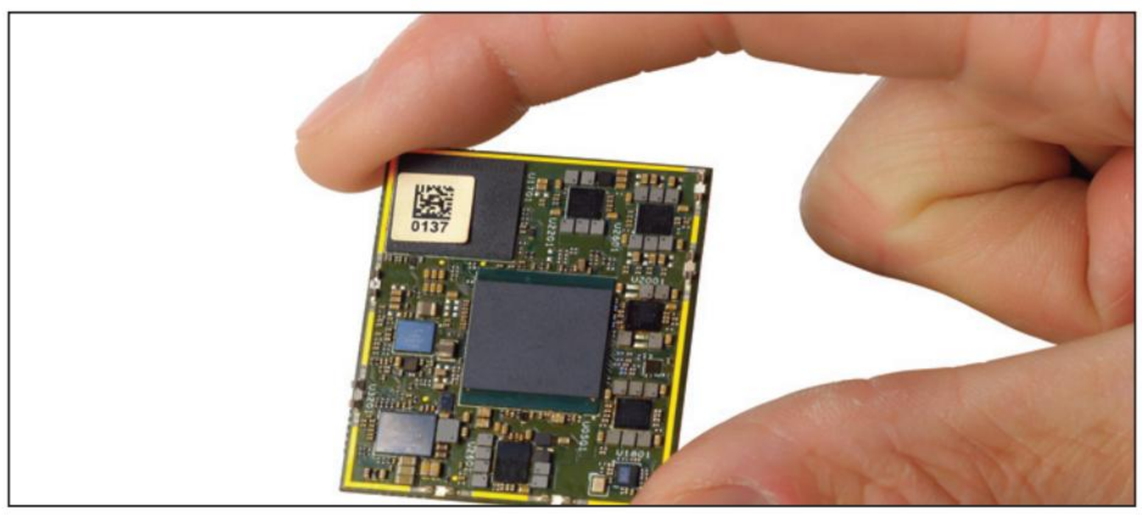
Teledyne FLIR: Interview

INTERVIEWEE: Dan Walker, VP Product Management, Teledyne FLIR

1. What are the key factors driving the growth of the thermal camera market in Europe in 2024?

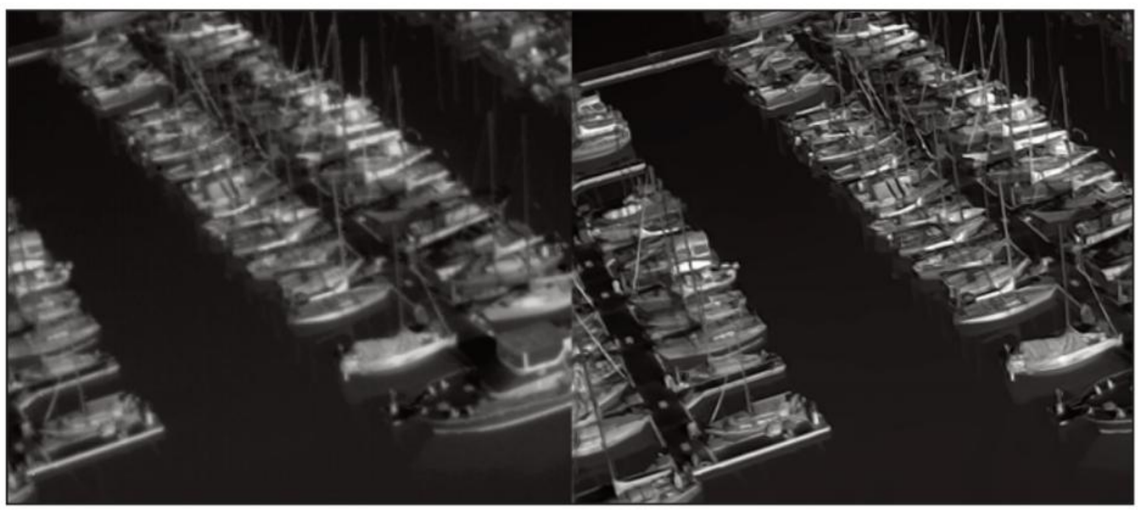
Technological innovations like improved resolution and sensitivity have enhanced thermal cameras' effectiveness and accessibility, and this, combined with rising security concerns regarding border security and defense in Europe, are driving demand for advanced surveillance. Widespread adoption of thermal cameras in public and private sectors and European governments' investments in national security and infrastructure have both supported market growth.

2. What are the latest technological advancements in thermal imaging that are influencing the market?



The key advancements in sensor technology are the enhancement of thermal camera resolution and sensitivity, making them more versatile and powerful. As a market leader, Teledyne FLIR develops high-resolution thermal sensors and now offers advanced embedded software for better image processing and automated data analysis. Our advanced video processor, the FLIR AVP, powers Prism™ AI software and computational imaging at the edge. This small, lightweight, low-power module offers best-in-class AI performance, enabling seamless integration into UAVs, robots, gimbals, handheld devices, and fixed-mounted security systems.

3. How are innovations like higher resolution and improved sensitivity impacting the adoption of thermal cameras?



Higher resolution improves thermal image quality, aiding object identification and analysis. Increased sensitivity (measured in milliKelvins) enables the detection of smaller temperature differences, which is crucial for security and surveillance in low thermal contrast scenes. These detection capabilities broaden applications to challenging environments not just at night, but including fog, smoke, and dust. Advances in uncooled thermal sensors have made high-sensitivity cameras more affordable and accessible. These enhancements also boost effectiveness when integrated with other technologies, such as drones and autonomous vehicles.

4. Which sectors are the largest consumers of thermal cameras in Europe, and why?

In Europe, the military and defense sectors are currently the largest consumers of thermal cameras for advanced surveillance, advanced warning systems, and target acquisition, and have found them crucial for night operations and in adverse weather. The automotive industry uses them for advanced driver-assistance systems (ADAS) to enhance night vision and detect pedestrians and animals. Industrial applications include optical gas imaging (OGI), inspections, and maintenance, ensuring safety and efficiency. Because they are highly effective in low-light conditions, firefighting and rescue operations rely on them to locate hotspots and survivors. Security and law enforcement use them for perimeter monitoring and intrusion detection.

5. How is the use of thermal cameras in non-traditional sectors like automotive and optical gas imaging evolving?

Technological advancements and growing awareness have expanded thermal camera use into non-traditional sectors, including automotive and OGI. Thermal cameras enhance night vision and excel in long-range detection scenarios, even in low-visibility conditions like darkness, smoke, and fog. Beyond detecting pedestrians, they are also effective at identifying other vehicles or obstacles on the road. Perception engineers can integrate Teledyne FLIR's Prism AI-Auto into ADAS and autonomous vehicle systems as a software framework that provides classification, object detection, and object tracking.

Gas imaging cameras perform infrared gas detection, spotting methane (CH4), sulfur hexafluoride (SF6), hydrocarbons, and hundreds of other industrial gases quickly, accurately, and safely—without shutting down systems. These cameras can be used to scan broad sections of equipment rapidly and survey areas that are hard to reach with traditional contact measurement tools. OGI cameras can also detect leaks from a safe distance, displaying these invisible gases as clouds of smoke.

6. What external factors are impacting the thermal camera market in Europe and why?

Several factors are driving the growth and adoption of thermal cameras across Europe. Heightened security concerns related to terrorism and border security are boosting demand for surveillance and perimeter protection. Government initiatives in safety regulations and border control are supporting the market through funding for advanced surveillance technologies. The growth of industrial automation increases the use of thermal cameras for monitoring and maintenance, detecting equipment failures, and optimizing processes. Additionally, thermal cameras aid in environmental monitoring, such as detecting heat leaks and monitoring wildlife. This contributes to energy efficiency and conservation efforts.

7. Has the war in Ukraine had a significant impact on the thermal camera market?

The war in Ukraine has boosted the demand for advanced intelligence, surveillance, and reconnaissance (ISR) technologies. Thermal cameras are increasingly being used on ISR platforms for night vision, target acquisition, and monitoring movements. Driven by military and humanitarian needs, these factors are evolving the thermal camera market in Europe.

8. How are thermal cameras being integrated with Artificial Intelligence?

AI integration with thermal cameras such as Teledyne FLIR's Boson® and Neutrino® enhances their capabilities and applications, while AI algorithms improve image processing. This makes object identification easier in low-light conditions. Prism AI's powerful, efficient perception software enables object classification, detection, and tracking of crucial targets. In industrial settings, real-time AI analysis detects anomalies like overheating equipment, making it crucial for predictive maintenance and security. AI-powered thermal cameras offer automated monitoring and alerts that are invaluable for perimeter security.

9. What are the key success factors for integrators developing products that include thermal camera modules?

To successfully integrate thermal camera modules, consider key factors like thermal sensitivity (often measured as Noise Equivalent Temperature Difference (NETD)) for detecting small temperature differences and resolution for clear, sharp images. Specific spectral ranges, such as LWIR for general imaging and MWIR for specialized applications, are important, as is ensuring that your system is compatible with system components. Choose between cooled (higher sensitivity, more expensive) and uncooled (cost-effective, durable) sensors. As the world's largest volume manufacturer, Teledyne FLIR offers industry-leading experience and innovative hardware and software to guide seamless integration. This ensures quality, performance, reliability, and low-risk supply.

10. What is the future outlook for infrared camera use?

As sensor technology advances, thermal cameras will see increasing adoption across various industries. Regulatory efforts are boosting trust and reliability, and market expansion is being driven by demand in security, surveillance, industrial automation, healthcare, and environmental monitoring. Key trends include SWaP-optimized modules for increased accessibility, continued AI integration, and IoT connectivity.

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Fortifying the Frontlines:

Cybersecurity in Tactical Wireless Communication

Explore the crucial role of cybersecurity in tactical wireless communication for military and emergency response, and the latest advancements in protecting these vital networks.

In the high-stakes fields of military operations and emergency response, tactical wireless communication is a lifeline. These networks — often the only means of coordination and information exchange in critical situations — increasingly become targets for sophisticated cyber threats. Protecting them is not just a technical challenge, but also a matter of national security and public safety.

Cybersecurity in tactical communication

In the realm of tactical communication, cybersecurity is a paramount concern. Often deployed in demanding environments, tactical radio networks confront distinct cybersecurity challenges. The limited bandwidth and high error rates characteristic of military VHF/UHF-band radios hinder the creation of robust networks.

Technical limitations, combined with the essential requirements for mobility and swift deployment, render these networks particularly vulnerable to various cyber threats. These include signal jamming and interception and unauthorised access, which can compromise the integrity and confidentiality of critical communications.

Recent advancements and solutions

Recent technological strides have significantly bolstered the defences of tactical communication networks. Advanced encryption methods, such as the Advanced Encryption Standard (AES) and Data Encryption Standard (DES), have become staples in securing radio communications. These cryptographic

techniques ensure that even if communications are intercepted, the information remains unintelligible to unauthorised parties.

Illustrative of these advancements are case studies from military exercises and emergency response scenarios. For instance, DARPA's Rapid Attack Detection, Isolation and Characterization Systems program showcases how integrating cybersecurity into the fabric of tactical networks can effectively counter cyberattacks, ensuring resilience and continuity in critical communication channels.

Expert insights and future trends

In the sphere of tactical communication, experts agree that the key to future security lies in continuous innovation and adaptability. One of the most promising emerging trends is AI-based threat detection, which offers advanced capabilities for preemptive security measures. This technology utilises artificial intelligence to identify and neutralise potential threats before they can cause harm. Additionally, the development of cross-layer security frameworks is gaining momentum.

These frameworks integrate security functions across all communication layers, providing a more comprehensive and unified defence strategy. This holistic approach is essential in adapting to the rapidly changing and increasingly sophisticated landscape of cyber threats, ensuring robust protection for critical communication networks.

Key takeaways

The ongoing battle to secure tactical communication networks against cyber threats is relentless. As adversaries evolve, so must our cybersecurity measures. The importance of continual advancement in this field cannot be overstated — it's a race where staying ahead is the only option.

To stay informed about the latest developments in tactical communication, visit platforms like Barrett Communications' blog, which can provide valuable insights and updates for those keen on delving deeper into this subject.

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JFD SUCCESSFULLY MOBILISES

the NATO Submarine Rescue System (NSRS) during complex international exercise, Dynamic Monarch

- **As global experts in Submarine Rescue JFD operates the NSRS during one of the most challenging Submarine Rescue exercises globally**
- **Further enhancing skills and expertise during multi-nation exercise which focuses on interoperability and collective competence**
- **Continuing to demonstrate specialist expertise and capability supporting a rapidly evolving submarine industry**

JFD, part of James Fisher and Sons plc, participates in Dynamic Monarch 24 mobilising the NATO Submarine Rescue System (NSRS) as part of a multi-nation exercise to test and refine submarine intervention and rescue capabilities in some of the most challenging environments.

Completed on 19 September off the coast of Norway, Dynamic Monarch 24 was the first in cold waters since 2014 providing an important opportunity for participating Navies to demonstrate the latest submarine rescue technology and operational procedures within a complex and challenging scenario.

Having managed the NSRS In Service Support (ISS) contract since 2015, on behalf of NSRS participant nations, UK, France and Norway, JFD is responsible for maintaining the system in a rescue ready state so that it can be called upon to respond to a Disabled Submarine (DISSUB) as rapidly as possible.

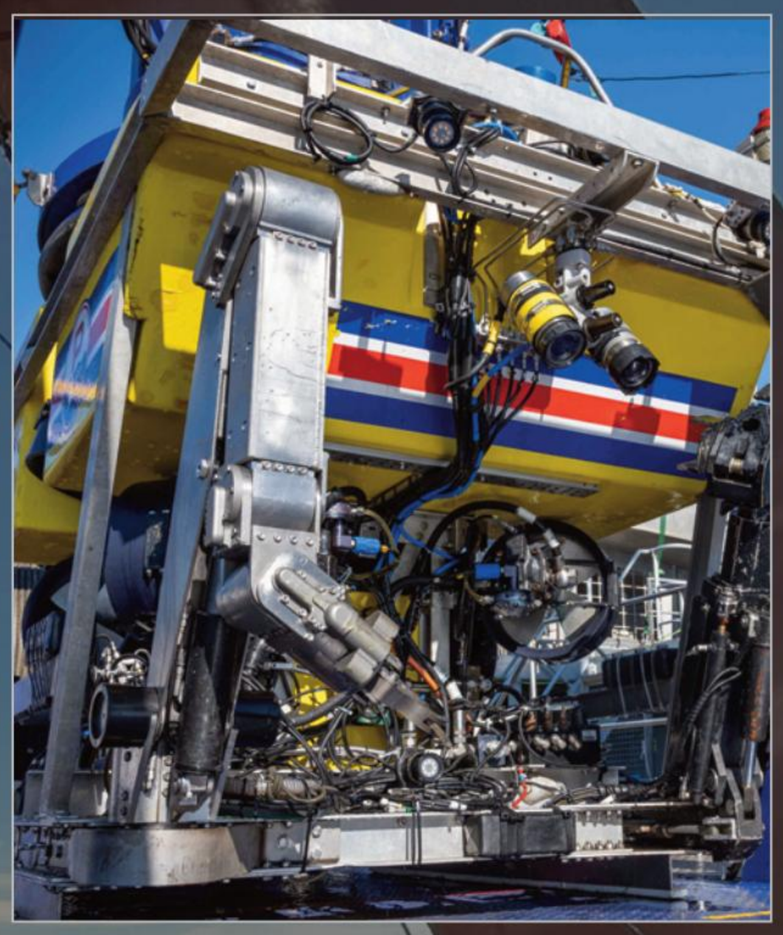
Richard Devlin, JFD Defence Director said:

"We proudly support the NSRS with a full availability contract recently transitioning from the Second into the Third ISS contract following award in 2022 for a further potential nine years maintaining our support to the UK and Partner Nations.

Throughout the duration of the ISS contracts, JFD has developed a unique relationship with the NSRS system which is further strengthened through a programme of regular exercises, critical to ensuring both personnel and equipment and fully prepared for the complexities of a real-life rescue operation.

This has been an excellent training period for NSRS, the team have admirably demonstrated the capability at sea to a wide audience of military observers and the UK MoD."

Participating Forces from the US, Germany, Canada, Netherlands, Poland, Sweden, Türkiye and other allied navies joined the NSRS Participant Nations to practice interoperability and improve combined submarine rescue operations and share best practice during various scenarios where reaction time and specialist equipment are essential.



JFD mobilised the NSRS rescue system and associated assets from Edinburgh in Scotland, UK to the exercise location off the southeastern coast of Norway. The system considered one of the most capable in the world, successfully operated the Submarine Rescue Vehicle (SRV), rated to 610msw, in difficult environmental conditions. During the operational phase of the Exercise the SRV completed a series of mates with a Swedish GOTLAND Class and a Norwegian ULA Class submarines, conducting dry transfer of personnel from submarine to the SRV.

Concurrently the NSRS Intervention System, mobilised to the French Navy ship BSAM Rhone, from Portsmouth, UK. The Intervention System conducted a number of serials where the Remotely Operated Vehicle (ROV) was deployed.

Over the course of the ten-day exercise, other successful rescue scenarios were performed alongside the 'URF' Rescue System and HSwMS BELOS from Sweden, and TCG ALEMDAR from Türkiye. Richard continued:

"Participating in Dynamic Monarch not only gives us the opportunity to demonstrate JFD's competence, but it is also essential for the continual enhancement of our expertise and capability ensuring we remain at the forefront as global submarine rescue operations evolve rapidly.

There is a continued emphasis on safety, rapid response and international cooperation as submarine operating ranges and coverage areas expand. We remain dedicated to enhancing safety for those who work subsea, the practical experience and knowledge gained from these exercises is invaluable to continuously developing our capability."

Supporting the mobilisation and operation of a Submarine Rescue system is a significant endeavour with a wide number of logistical challenges. JFD has over 40 years operational experience and holds long term service contracts with some of the world's most notable systems including Australia, India and Singapore.

Dynamic Monarch follows Exercise Southern Sun, conducted in the South of France in May, which achieved a significant first with NSRS system mating to the newest French Navy SSN and mobilisation of the full system to vessel BSAD Jason.

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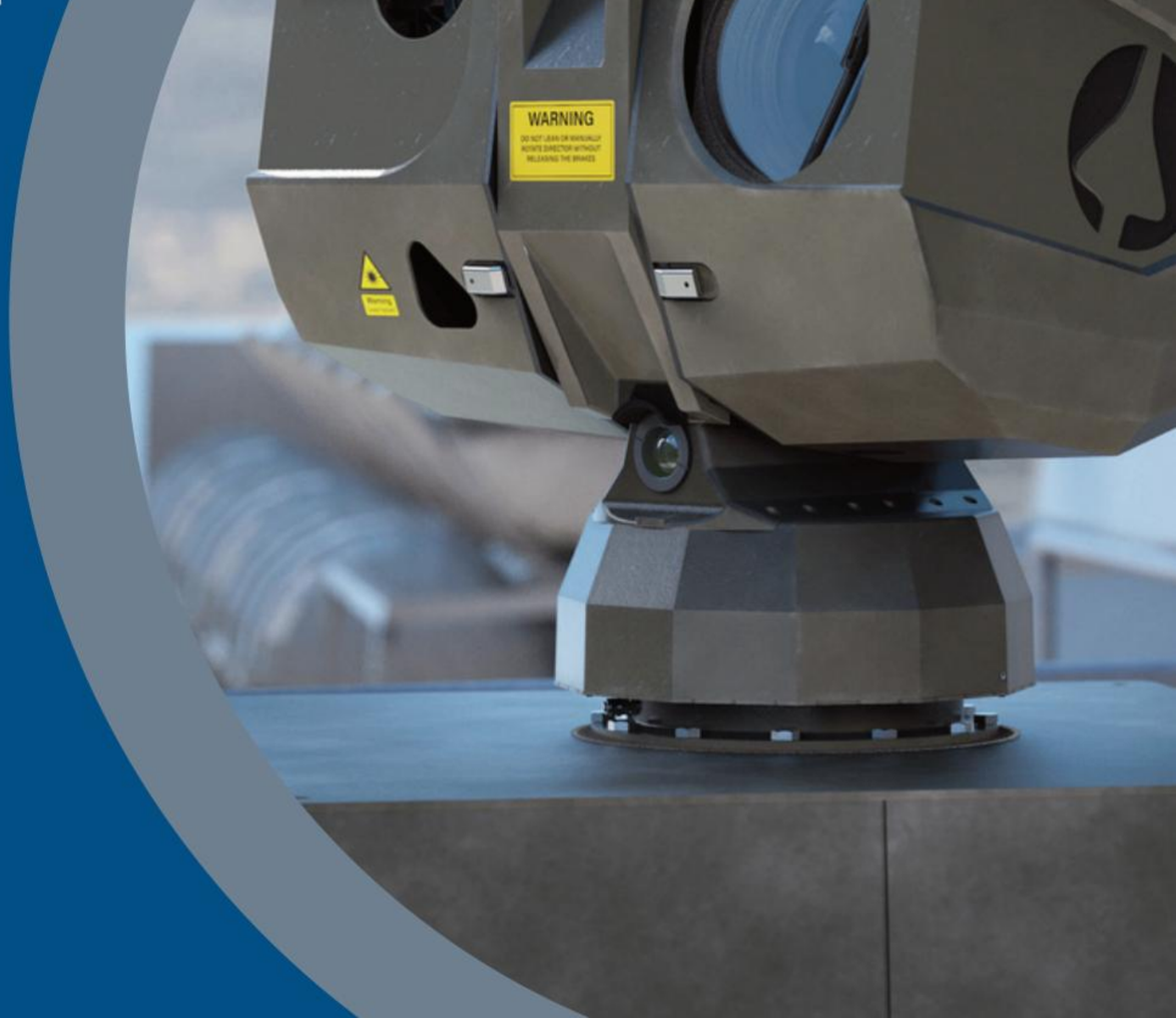


NAVIGATING THE WAVES:

The Crucial Role of Fire Control at Sea

Martin Read, Senior Naval Sales Manager, Chess Dynamics

In the vast expanse of ocean, where the horizon blurs into the sky and the only sounds are the rhythmic crashing of waves and the hum of a ship's engines, the stakes can be high… and precision paramount.

This marine environment can appear serene, but it is formidable, and this is where passive surveillance systems come into play, acting as the undetectable vigilant guardians of naval vessels. In a world where to radiate a surveillance radar is to give your position away, high quality long range optical surveillance is the solution. Add to that surveillance a fire control capability, then the first thing the enemy will know is the imminent arrival of high-speed steel.

At its core the fire control solution involves the detection, tracking, ballistics calculation, prediction and then the weapon direction and engagement of targets - whether they are enemy ships, aircraft, drones or incoming missiles.

Modern fire control systems are capable of processing the data in real-time to provide accurate multi-targeting information. They often integrate a pencil-beam fire control radar with optical systems that also offer visual target identification and confirmation. The fire control tracking radar offering improved tracking performance over optical systems in poor weather, and provides precise range measurements. The narrow beam of the fire control radar can makes it difficult to detect, especially if it is of low power it has a low probability of intercept (LPI). This in turn helps to protect the position of the surveilling and firing vessel.

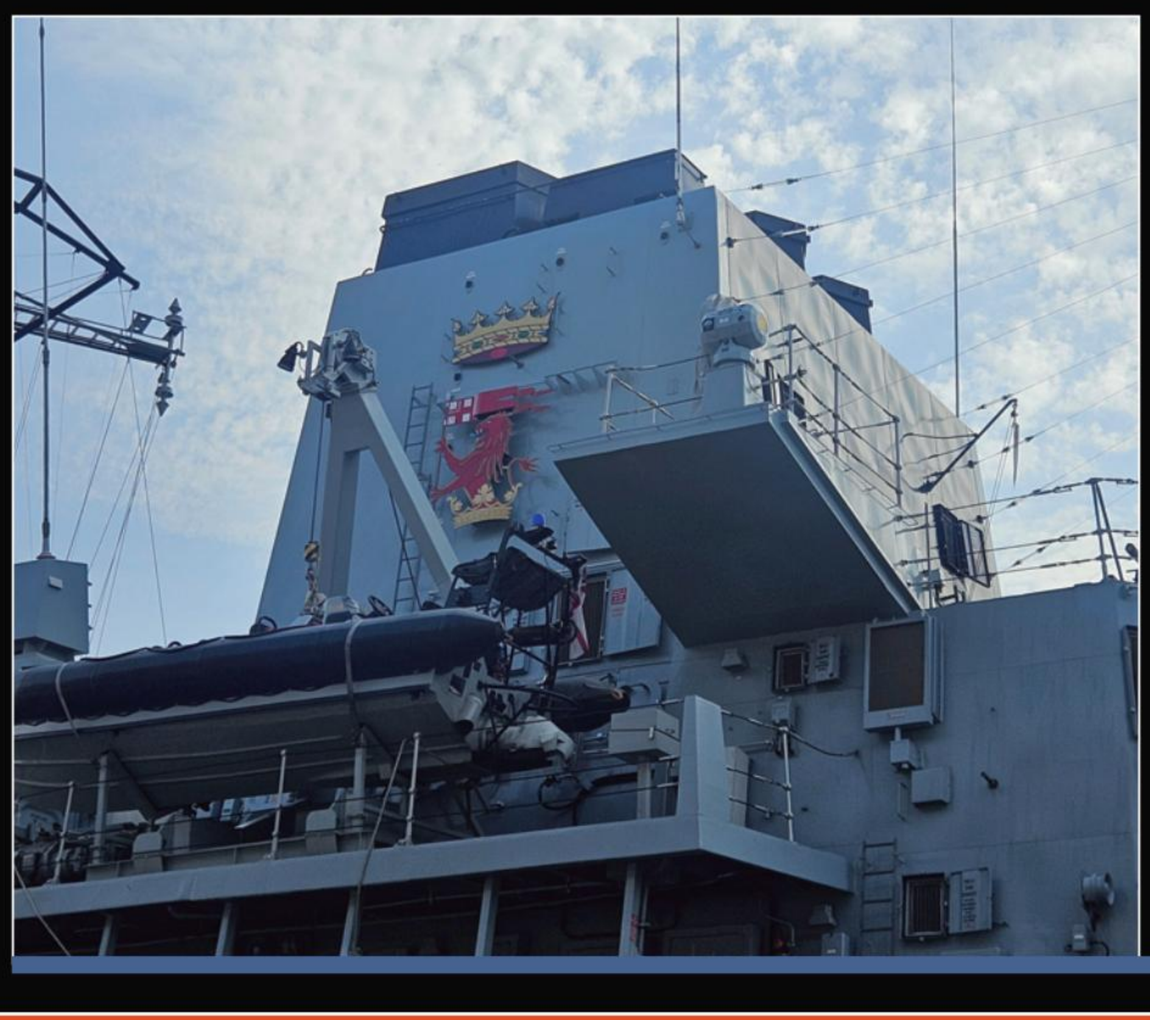
Safely navigating the vast and unpredictable oceans has always been a challenge for mariners. With satellite navigation they know where they are, but with increased levels of shipping, collision avoidance is also key. With the advent of radar and the development of optical surveillance, sailing is becoming safer. Drawing upon technology that can pierce through fog, rain, and darkness without transmitting whilst providing a clear view of the surroundings even in the most treacherous conditions, optical surveillance has come of age.

In the world of naval warfare, where a single mistake can have dire consequences, electro-optical fire control systems are the unsung heroes. They provide the edge needed to maintain superiority at sea, ensuring that naval forces can protect their interests and respond to threats with unmatched precision whilst remaining undetected.

FIRE CONTROL ELECTRO-OPTICAL APPLICATIONS IN MARITIME OPERATIONS

In the ever-evolving arena of maritime defence, precision and speed are critical. Accuracy saves ammunition and decreases collateral damage. Having to operate in a RF denied environment (radio silence) is becoming more common. Enter electro-optical fire control systems, an often over-looked component of modern naval warfare. These advanced systems blend cutting-edge optics, sensors, stabilisation, precise motion control and computing power to provide real-time targeting and tracking capabilities, transforming how naval forces detect, track, and engage threats.

They have become crucial components in modern maritime applications, enhancing the precision and effectiveness of naval operations.



Here are some key applications:

1. Target detection and tracking: Electro-optic systems can detect and track multiple targets simultaneously, including surface vessels, aircraft, and missiles. They use high-resolution cameras and thermal imaging to provide clear visuals in various weather conditions. Ket components include:

- ***Thermal imagers:*** *These devices provide 24-hour target identification by detecting infrared radiation, which is especially useful in low-visibility conditions.*
- ***Daylight TV cameras:*** *High-resolution cameras offer visual confirmation and tracking of targets during daylight operations.*
- ***Laser rangefinders:*** *These are used to measure the exact distance to a target, crucial for accurate targeting and engagement.*

2. Weapon control: These systems are integrated with naval guns and missile systems to provide accurate fire control solutions

3. Surveillance and reconnaissance: Electro-optical systems offer 24-hour surveillance capabilities, enabling continuous monitoring of maritime environments. They can automatically scan horizons or specific sectors, enhancing situational awareness

4. Search and rescue operations: These systems assist in search and rescue missions by providing detailed imagery and tracking capabilities, helping locate vessels or individuals in distress

5. Navigation and collision avoidance: Electro-optical systems aid in navigation by providing clear visuals of the surroundings, day and night, helping to navigate safely through congested or hazardous waters

6. Integration with combat management systems: These systems can be integrated into broader combat management and bridge systems, allowing for coordinated and efficient responses to threats.

Chess Dynamics's SeaEagle Fire Control Electro-Optical (FCEO) system, for example, is used by 11 navies around the world including the Royal Navy. It offers advanced features like automatic target acquisition and highly accurate tracking and fire control, high-resolution thermal and TV sensors, and a laser rangefinder.

CHESS DYNAMICS LTD - SEAEAGLE FCEO

Chess Dynamics' SeaEagle FCEO (Fire Control Electro Optical) solution is a stabilised electro-optical fire control system optimised for the control of naval weapons against air, surface and shore targets. Capable of controlling any in-service naval gun, the system provides 24-hour, detection, acquisition, tracking, identification and engagement of air and surface targets through its thermal and TV sensors with target range provided by a high repetition laser rangefinder.

'We are proud of our SeaEagle FCEO advanced surveillance and electro-optical fire control system. It's currently in service with 11 navies including the Royal Navy, on their Type 23 frigates and River-class Batch 2 offshore patrol vessels. In fact, the very first installation was on HMS Somerset in 2006'.

'It has proved to be highly reliable and only needs to be serviced every five or so years. But even that depends on what conditions it's working in as we have received some back for service still functional after 10 hard years at sea. Testament to its service, durability, and reliability'.

The FCEO can serve as a critical aid for security, search and rescue, navigation, and mine avoidance. It can automatically track multiple targets, providing real time accurate fire control solutions to direct numerous weapons and effectors.

Features / benefits

- 24-hour surveillance, high accuracy tracking and fire control
- Automatic slewing to radar, ECDIS, EW or other CMS contact target indications
- Automatic acquisition and tracking of multiple surface and air targets
- Gunfire control for ASuW, AAW and NGS engagements with multiple ammunition types
- Designed to operate via a dedicated stand-alone console or via multi-function consoles, fully integrated with a CMS or IBS
- Modular architecture and construction allowing use of almost any desired sensors
- Gyro-stablised
- Daylight (lowlight) TV camera, Thermal Imager and 10Hz Laser Range Finder (LRF)
- Camera wipers
- Low maintenance, high reliability, long service life, low cost of ownership.

The importance of persistent situational awareness, visual target tracking and weapon fire control has never been more essential in modern naval warfare. High resolution cameras provide far better performance than the human eye using binoculars, constantly, day and night. The integrated tracking, targeting and situational awareness are essential tools for target identification and engagement.

The Chess Dynamics SeaEagle FCEO-A is the established analogue version of the FCEO of which over 140 systems have been delivered. Using HSD-HD sensors it has remarkably low latency and has proved itself for accurate gun control.

The SeaEagle FCEO-D is the digital version of the FCEO. It sports all the key features of the FCEO-A, but with UHD sensors, full digital architecture and an ethernet interface.

FIRE CONTROL RADAR APPLICATIONS IN MARITIME OPERATIONS

Fire control radars play a crucial role in modern maritime operations, providing the precision needed for effective naval engagements. These systems often also integrate electro-optical systems with their radar to detect, track, and engage targets with high accuracy.

Here's an overview of their applications and significance:

Key components and technologies

1. **Fire Control Radar systems, in brief:**

- ***FMCW doppler radar:*** *Frequency-Modulated Continuous Wave (FMCW) Doppler radar is used for its ability to provide acquisition and precise tracking of multiple targets. It offers low probability of intercept and high resistance to electronic countermeasures (ECM) through very low transmitter power and frequency agility*
- ***Ku Band/ X Band radar:*** *Widely used for their ability to acquire and precisely track multiple targets at longer ranges, typically through higher transmitter power, more sensitive larger receiver antennas, coherence and pulse compression. Usually feature frequency agility*
- ***Phased array radar:*** *This higher cost technology allows for rapid* beam steering and multiple target tracking, enhancing the system's responsiveness and accuracy.

Applications in Maritime Operations

1. **Surface warfare (ASuW):**
   - *Fire control radar and/or and electro-optical system are essential for detecting and engaging surface threats. EO systems allow for positive identification.*
2. **Naval gunfire support (NGS):**
   - *Electro-optical systems and to a lesser extent, radar, are also employed in providing accurate naval gunfire support for ground forces. The ability to precisely target shore positions directly or indirectly from the sea is a critical capability for supporting amphibious operations and coastal bombardments.*
3. **Anti-air warfare (AAW):**
   - *The same systems can be optimised to track and engage aerial threats, including drones, aircraft and missiles. The integration of radar and optical sensors ensures that targets are detected and tracked accurately, even in challenging environments with the added bonus of being positively identified.*

Chess Dynamics has innovative systems that can control naval guns against air, surface, and shore targets, providing a versatile solution for various combat scenarios.

Technological Advancements

- **Automation and AI:** Modern fire control systems increasingly incorporate automation and artificial intelligence to reduce the workload on operators. These technologies enable automatic target identification, acquisition and tracking, improving response times and engagement success rates
- **Integration with combat systems:** Electro-optical fire control radar systems can be stand-alone systems but are usually integrated with combat management systems, allowing for seamless coordination between all sensors and weapons with the command. This integration ensures that all available data is used to make informed and timely targeting decisions.

Challenges and Countermeasures

- **Environmental factors:** The performance of electro-optics can be affected by weather conditions which in turn can reduce the surveillance range. In this case surveillance radars or other assets can be used
- **Electronic warfare:** Adversaries may use electronic countermeasures (jamming) to disrupt radar signals. Modern systems counter these threats with features like frequency agility and low probability of intercept transmissions. The electro-optical system is not affected by jamming.

Whilst a full phased array radar system can carry-out the function of a Fire control radar, they are exceptionally large, heavy and expensive. Furthermore a positive visual identification of the target is still required. An airborne asset may not be available or deployable to conduct such an identification, so an electro-optical surveillance system along with its precision, reliability and other capabilities and benefits becomes an indispensable tool in modern naval operations and engagement. With continuous advancements in technology and AI, these systems will only become more capable and integral to naval warfare.

SEAEAGLE FCRO

Chess Dynamics's SeaEagle FCRO (Fire Control Radar Optical) is a stabilised radar and electro-optical fire control system optimised for the control of naval weapons against air, surface and shore targets. Capable of controlling any in-service naval gun, the system provides 24-hour, detection, acquisition, tracking and engagement of air and surface targets using an advanced Ku-band radar with target identification provided by thermal imager and daylight TV camera.

Features / benefits

- Ku-Band Doppler radar provides acquisition and precise tracking of targets
- Low probability of intercept and high resistance to ECM through very low transmitter power and frequency agility
- 24-hour target identification by high performance IR and TV cameras
- Automatic slewing to search radar contact indications
- Automatic target acquisition and tracking in both radar and EO
- Gunfire control in ASuW, AAW and NGS engagements with multiple ammunition types
- Stand-alone or integrated with a combat management system.

SUMMARY

Fire control is not just the launching of missiles or firing of weapons; it is the fusion of precision and technology, combining radar with optical and weapon technologies to ensure that every shot counts.

Chess Dynamics will be showcasing scale models and interactive displays of its fire control maritime systems at several exhibitions over the coming months. It you'd like to arrange a meeting with one of our team of experts or find out more about our electro-optical surveillance and fire control portfolio, email **events@chess-dynamics.com**

www.chess-dynamics.com

CHESS DYNAMICS

A **COHORT PLC** COMPANY

G&H Strengthens Aerospace & Defence Capabilities

WITH THE ACQUISITION OF PHOENIX OPTICAL TECHNOLOGIES LTD.

Gooch & Housego (G&H), a global leader in advanced photonics solutions, is pleased to announce the acquisition of Phoenix Optical Technologies Ltd., a specialist in the manufacture of precision optics based in St. Asaph, Wales, UK.

This strategic acquisition strengthens G&H's Aerospace & Defence capabilities and expands the company's presence in the UK and European markets as a critical supplier to leading defence primes.

Phoenix Optical Technologies brings expertise in precision optics processes, including prisms, domes, specialist machining and Single Point Diamond Turning (SPDT). These capabilities will significantly bolster G&H's Optical Systems division, enhancing the company's ability to deliver cutting-edge optical systems solutions to its customers in Aerospace & Defence as well as Industrial and Life Sciences markets.

Charlie Peppiatt, CEO of G&H, commented, *"I am delighted to welcome Phoenix to the G&H Group. Phoenix is a highly capable, well-regarded British precision optics supplier with a strong portfolio of products and services. Together we will be able to better solve our customers' most complex optical systems requirements. The combination of the Phoenix and G&H teams brings together industry leading technology and know-how with efficient scalable operations that will support G&H to deliver an exceptional customer experience, become a first-choice optical systems solutions provider and make a better world with photonics."*

Tony Palframan, Founder and CEO of Phoenix Optical Technologies, shared his enthusiasm for the acquisition, stating, *"We are excited to join forces with G&H, a company that shares our commitment to precision, quality, and innovation. By combining our expertise with G&H's global scale and reach, we see tremendous opportunities to further develop our offerings and bring even more value to our customers."*

With this acquisition, G&H is well-positioned to accelerate growth, enhance its precision optics and optical systems capabilities, and solidify its position as a leading provider of optical and photonic solutions.

About Gooch & Housego

Gooch & Housego (G&H) is a world leader in optical design, testing and manufacturing. As experts in the technology of light, G&H works with customers to provide optical systems, assemblies, and components for demanding applications.

Headquartered in Ilminster Somerset, UK with eleven facilities in the UK and USA, G&H is recognised for the breadth of their acousto-optic, electro-optic, crystal-optic, fibre optic, and precision optic products. G&H is the preferred source of photonics capabilities for OEMs in the life sciences, industrial, and aerospace and defence industries, with a history of quality and excellence that dates back over seventy-five years.

About Phoenix Optical Technologies Ltd.

Phoenix Optical Technologies Ltd. (POTL), based in the heart of the North Wales optical manufacturing hub in St. Asaph, has been at the forefront of precision optics since its founding by Tony Palframan in 1991. Over the past three decades, POTL has continually adapted to meet the evolving technological demands of today's world, providing a comprehensive in-house service that spans the entire optical manufacturing process.

From raw glass materials to polished, coated finished optical parts, prisms, and assemblies, POTL offers an end-to-end solution for the most complex requirements. With advanced machinery, long-standing customer relationships, and highly skilled teams across four sites, POTL remains a trusted partner in precision optics as it embraces cutting-edge innovations in optical science.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Building the future soldier

Enhancing soldier gear through advanced connectors

The concept of the "future soldier" has evolved from the realm of science fiction to tangible reality.

As we move further into the 21st century, the demands placed on military personnel have never been higher, necessitating the development of advanced technologies that enhance a soldier's operational capabilities. At the forefront of this evolution is the integration of sophisticated gear, including helmets, vision glasses, vests, and body armor, all interconnected by high-performance connectors. Here, Ryan Humphreys, Sr. Associate Product Manager at connector specialist PEI-Genesis, discusses the role of connectors in the components of the future soldier's gear.

The Role of Advanced Connectors in Modern Soldier Gear

In today's combat environments, the effectiveness of a soldier is not only determined by their training and weaponry but also by the technology they carry. Modern soldier systems are designed to be modular and interoperable, enabling a seamless integration of various components such as communication devices, sensors, power systems, and protective gear. The key to this integration lies in advanced connectors, which ensure reliable, high-speed data transmission, power distribution, and durability under the harshest conditions.

These connectors are the unsung heroes that bind the complex web of modern soldier gear together. They must meet stringent requirements, including being lightweight, rugged, resistant to environmental factors like dust, moisture, and extreme temperatures, and capable of withstanding the mechanical stress of combat. Moreover, the growing use of digital systems in military operations demands connectors that support high-speed data transfer and low latency, enabling soldiers to maintain real-time communication and situational awareness.

Enhancing Helmets

One of the most critical components of a soldier's gear is the helmet, which has evolved from merely offering ballistic protection to becoming a hub for integrated technologies. Modern helmets often feature built-in communication systems, night vision devices, and augmented reality displays that provide soldiers with vital battlefield information.

To support these capabilities, connectors like Amphenol's 2M series are indispensable. The 2M series is renowned for its high-density, miniature connectors that offer robust performance while minimizing size and weight – a crucial factor for helmet-mounted systems. These connectors are designed to provide reliable data and power connections, ensuring that communication systems remain operational even in the most challenging environments.

Similarly, ITT Cannon's MKJ series connectors are widely used in helmet systems due to their compact size, high reliability, and durability. These connectors are designed to withstand shock and vibration, making them ideal for head-mounted displays and other helmet-integrated technologies. The MKJ series also supports high-speed data transfer, which is essential for real-time video feeds and augmented reality applications that are becoming increasingly common in modern helmets.

Vision Glasses: Precision and Clarity

Vision enhancement tools, such as night vision goggles and augmented reality glasses, are another critical component of the future soldier's gear. These devices provide soldiers with enhanced situational awareness,

allowing them to operate effectively in low-light conditions or navigate complex environments using augmented information overlays.

The Stingray 7 series of connectors by Amphenol is specifically designed for applications that require high precision and reliability, making them an ideal choice for vision enhancement tools. These connectors are compact and lightweight, reducing the burden on the soldier while ensuring that the connection remains stable and secure even during rapid movements.

Stingray 7 connectors are also known for their ease of use, featuring a quick disconnect mechanism that allows soldiers to quickly attach or detach their vision glasses as needed. This flexibility is crucial in combat scenarios where time is of the essence. Additionally, these connectors are sealed to protect against environmental contaminants, ensuring that the vision systems remain functional in dust, rain, or extreme temperatures.

Vests and Body Armor: Powering Protection

Vests and body armor are fundamental to a soldier's protection, but they have evolved far beyond mere ballistic protection. Modern body armor systems often include integrated electronics for monitoring vital signs, power distribution for other gear, and communication systems. This transformation necessitates the use of reliable, low-profile connectors that do not compromise the protective capabilities of the vest.

Amphenol's Terrapin series connectors are particularly well-suited for these applications. The Terrapin connectors are ultra-rugged and designed to withstand extreme conditions, including exposure to chemicals, abrasion, and high impacts. Their low-profile design ensures that they do not add unnecessary bulk to the vest, maintaining the soldier's mobility and comfort. Furthermore, Terrapin connectors are equipped with a push-pull locking mechanism that allows for quick and secure connections, which is vital in high-pressure situations.

Similarly, ITT Cannon's MKJ series is also utilized in modern vests and body armor. These connectors provide reliable power and data connections to the various electronic systems integrated into the vest. The MKJ series is particularly noted for its durability and ability to function in harsh conditions, ensuring that the electronics within the vest remain operational even in the most demanding environments.

The Future of Soldier Gear: Integration and Innovation

The evolution of soldier gear is driven by the need for greater integration, where every component works in harmony to enhance the soldier's capabilities. Advanced connectors like Amphenol's 2M, Stingray 7, and Terrapin series, along with ITT Cannon's MKJ series, are at the heart of this integration. They provide the critical links that enable the seamless operation of the various systems that soldiers rely on, from communication and vision enhancement to protection and power management.

As we look to the future, the importance of these connectors will only grow. The next generation of soldier gear will likely incorporate even more advanced technologies, such as artificial intelligence, wearable sensors, and more sophisticated communication systems. These advancements will require connectors that are not only durable and reliable but also capable of handling the increased data and power demands of these systems.

In conclusion, the future soldier will be a highly connected, technologically enhanced warrior, and the connectors that link their gear together will play a pivotal role in their effectiveness on the battlefield. By investing in and developing these advanced connectors, connector manufacturers like Amphenol and ITT Cannon are ensuring that soldiers are equipped with the tools they need to succeed in the complex and demanding environments of modern warfare. To find out more about PEI-Genesis' ranges of military-grade connectors visit www.pei-genesis.com.

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Are we forgetting CBRN Defence and Skills.

LUTRA ASSOCIATES

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www.lutra-associates.com

A lifetime in the defence and security world is enough to convince one that it is the unattended things that cause the problems.

All too frequently we play fast and loose with the unsexy things in defence because politicians see no votes in them, ignore threats and make decisions to take risks. They then hide behind mealy-mouthed phrases such as “It is what the scientists/senior officers/advisers/the mob/press/party/polls* (delete if not appropriate) told us. We were simply following the advice (whilst trying to stay in power)” and concepts such as “collective responsibly” (not me guv) when reality strikes. One only has to look at the desperate efforts of people and institutions; politicians, officials and ministries in particular, at the Covid Inquiry trying to wriggle off the hook to see the validity of this contention.

One can put together a list longer than this article to confirm the contention, but the issues are legion. Sacrificing ships’ designed damage control measures, which nearly did for the Falklands Task Force, ignoring the rise of Japanese Militarism in the 1920s and 30s, paying insufficient heed to the rise in unconventional threats utilizing simple mechanisms, electronics and deployed by those with unfamiliar political or religious doctrine, egged on by direct opponents as part of hybrid warfare and the problems this all causes developed/democratic nations, not paying sufficient attention to electronic warfare, now fashionably called Cyber Warfare, as if it’s something new, are just a few examples of threats ignored on a macro scale to add to CBRN.

Some countries have sacrificed their CBRN capability in recent decades, as the UK and many other countries, understandably, did to deal with the CIED threat from unexpected foes. However not to rebuilt it afterwards is inexcusable. Lost skills are always difficult and time consuming to regain but its ten years since the withdrawal. Work that has come Lutra’ way in that decade has shown that most of those other countries are rebuilding their capability at pace. They recognize the issues and threats CBRN poses. Lutra’s work has shown that it’s a threat other see as being pervasive, persistent and penetrating. It gets into every aspect of defence. It is strange the UK does not seem to have woken up to the threat or at best is trying to hide under the covers because it has more experience of the bogey man’s presence than those other countries.

In peacetime UK has suffered a number of CBRN Incidents which seemingly have had little impact on government perceptions or thinking but which illustrate the ease of delivery, the comprehensive nature, spread and ubiquity of the threats. The lessons of two world wars also seem to seem to be being ignored.

However modern threats and incidents should not be ignored. When the Chernobyl nuclear power plant exploded the resulting radioactive cloud passed over the UK twice. The rain at the time has caused some areas to still be contaminated today. In 1978 Georgi Markov a Bulgarian Dissident was assassinated using Ricin, a biological weapon. In 2018 Novichok was used to try to kill the Skripals, father and daughter, and killed two innocent individuals (the inquiry is really only just happening so the bed clothes must have been both thick and copious).

Add the assassination of Litvinenko using a radiation weapon and repeated attempts by non-states parties to acquire CBRN capability, castor beans and Ricin are particular favourites, and no one can claim the signals are not there. Recent history shows there are plenty of international actors of all stripes quite prepared to use CBRN.

Pandemics and epidemics, and there have been enough of them of late, show you don’t need a deliberate release for the genie to get out of the bottle either. Not a pandemic but in Novichok’s case literally and its was expensive. In all of these incidents the costs have been horrendous and dwarf cybercrime.

Some of the work Lutra has undertaken for four countries across four different domains: land, sea, air and terrorist has shown that the CBRN threat is pervasive, persistent and penetrating and the defence has to match it to be effective. It also shows that whilst the basics are the same the practicalities of each domain mean they are each specialist subjects. One size does not fit all. It all has to be fully developed and encompassing and despite treaties and legislation given man’s ingenuity and ambition to harm other people there are no short cuts or get out of jail cards available.

In addition, convenient conceptual fudges have disappeared. As examples: many warships do not have citadels because “the ocean is a

big place, and we will simply sail away". Most wars, and naval operations, are now combined littoral operations and sailing away is not an option. Similarly, the claims that: there is no need for counter CBRN systems in vehicles, or, we can reduce the level of protection afforded by respirators in land operations are at best spurious and at worst murderous. Reality is you cannot afford to run away or have your force reduced in numbers or, critically, when it is small as the UK's are, effect by the threat or the use of a CBRN attack launched by just a few people. The ground war in Ukraine would have been different and had different outcomes has the Ukrainians run away when the Russians crossed the border. The effect of a full CBRN defensive posture in deterring CBRN's use are legion. Equally the absence of effective defence facilitating and encouraging CBRN use is just as well documented. Unprotected people and facilities are simply casualty statistics waiting to happen.

A frequent analogy for CBRN defence is a chain. One weak link and you don't have a strong enough chain that stretches far enough. Too many links have been taken away or weakened and not enough has been done to get new links or a new chain. There are some interesting excuses put forward for this. Some say war gaming, "operational analysis" or "operational research" show that there is a reduced need for all pervasive or protecting counter CBRN defence. Similar, convenient, fig leaves have been disastrous in the past. It is worth remembering that the Argentinians opted to invade the Falkland Islands on the basis that they perceived UK was weak willed and had a reduced military capability illustrated by the decisions to get rid of aircraft carriers based on operational reasons and the Ice Patrol Ship HMS Endurance for financial reasons. Both decisions based on the results of mathematically modelled computer aided war games, "operational analysis" and "operational research".

The fundamental flaw in these quasi-scientific studies was that the wrong assumptions were fed into the system, in the aircraft carrier decision deliberately by the politicians, from the outset. This is rather like computers and "garbage in garbage out". If the assumptions are wrong, then the output is wrong. The bible had it right with houses of straw built on sand. If you are a politician and you are not convinced about this then just check how many opinion polls have been proven wrong come real polls. Mathematical models are merely paper made electronic and these days they are even more fragile than before because they have the veneer of truth sprayed on by computers.

So what are the solutions and options. There is always controversy about what needs to be done but some fundamentals are:

- ***Decide to provide as full a protective CBRN shield as possible.***
- ***Do it as fast as possible recognizing that an initial capability will cost money, probably a lot, but the cost of political, strategic or tactical defeat will be greater and longer lasting and cost many unnecessary deaths and injuries.***
- ***It is probable that this initial procurement will have to be done through some form of rapid procurement or UORs avoiding the usual Treasury delays.***
- ***Once an initial capability is in place set about upgrading the basic defence coverage and posture. More money but having bought time with an initial capability spend that time wisely doing the upgrade thoroughly.***
- ***Talk to industry, especially SMEs who have lots of innovative ideas to help. rather than big behemoths motivated by large shareholder returns.***
- ***Recognise it is not just money required to rebuild capability. Blood, sweat and tears are required too.***
- ***Inculcate the CBRN threat into all aspects of defence and security planning and activity, including public perception. Don't be worried if the public wake up to the threat unless you have done nothing about it. Be open and honest. The public are robust, they will understand but they won't forgive platitudinous capability proven to be the straw house built on sand.***
- ***The strategic deterrent is one strong link in the chain. It needs to be surrounded by, many, other links.***
- ***Understand defence is a higher priority than other budget priorities. Don't shy away from it. Other countries recognise that is it's better to spend less government money on issues such as health, which can be financed by other means, and spend the savings on defence.***

Solutions^3

When a customer asked Greenray engineers to design and manufacture a frequency reference source that provided very low acceleration sensitivity, tight stability performance, a rugged and compact package and low power consumption, they didn't have far to look for proven, expert partners.

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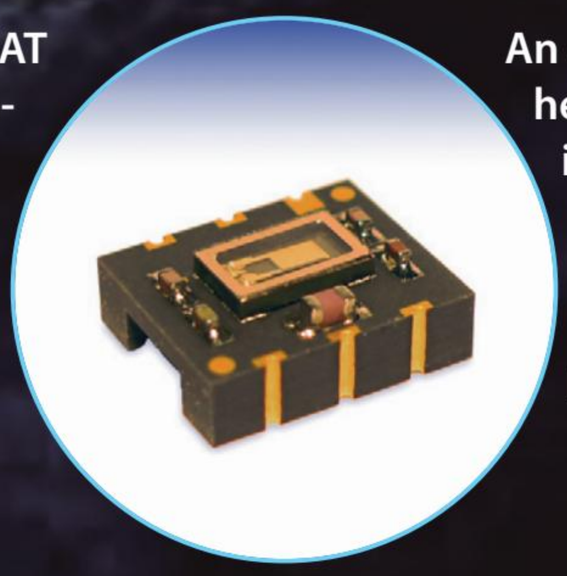

An AdTech Ceramics, Surface Mount, hermetic package protects the active integrated circuitry for the T1308 and makes it possible to ensure repeatable low aging performance, less than 1ppm/year, and projecting to less than 3ppm for 10 years.

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Since 1961, Greenray Industries has been a preferred provider of precision quartz crystal oscillators to many of the world's leading military, defense and industrial manufacturers.

In 1970, Statek Corporation pioneered the use of multiple semiconductor technologies to manufacture quartz resonators in wafer form. Today, Statek remains at the forefront of the design and manufacturing of ultra-miniature, quartz-based frequency control products.

AdTech Ceramics offers over 45 years of material science, engineering, tooling design and manufacturing expertise, all focused on perfecting multilayer ceramic processes and advanced materials innovation and technology.

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Air Target's MDI solutions are highly adaptable, supporting a wide range of applications from ground forces and law enforcement to large-scale aerial systems, including armored vehicles, helicopters, and fighter jets.

The immediate feedback from the scoring station enhances training efficiency, enabling more effective sessions. Air Target is committed to delivering equipment that facilitates training with a focus on realistic scenarios and a priority on quality over quantity.

DRONE TARGET

The Miss Distance Indicator is intended for installation in quadcopters or mini drones. The MDI detects the shock wave generated by the passing supersonic projectile acoustically.

The amplitude of the shock wave determines the miss distance, while the angular position (sector) is determined from the hit order between the indicator´s different pressure sensors.

The miss distance and sector of the projectiles are measured in real time and transmitted as raw data via the transmitter to the scoring station

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Detects fire being directed at the target coming from any direction.

- ***The operator can change the target course during the mission***
- ***The system calculates the angular position and shortest distance between the target and projectile***
- ***The scoring station can receive scoring data from up to six targets simultaneously***
- ***The MDI system can handle up to 6000 projectiles/min from a full range of weaponry***
- ***5.56 small to large calibre shells***

AS-136

The AS-136 is designed to be installed in target drones, UAVs or hard targets. The universal MDI can very easily be modified to fit all target drones or hard targets available on the market.

The MDI is intended for all target courses, i.e. it is possible to fire at a target coming from any direction. The MDI measures the miss distance and angular position in 12-sectors of a passing supersonic projectile.

UAV Towed Target

The UAV Towed Target is intended to be towed behind a target drone/UAV. The target can have up to 2 IR flares or smoke attached to the target body (the flares are consumables and shall be ordered separately). The target includes MDI AS-136/12U, which is a high-performance Acoustic Miss Distance Indicator. The MDI scores supersonic projectiles as well as supersonic missiles by detecting their shockwave. Please note that projectiles and missiles must travel faster than the speed of sound through the air when passing the target to be scored.

www.airtarget.com

Enhancing Military Readiness with NANUK-R: The Future of Sustainable and Efficient Operations

As the world grapples with the realities of climate change and environmental degradation, military forces around the globe are increasingly recognizing the importance of sustainability in their operations. NANUK-R, an innovative and eco-friendly protective case collection, offers substantial benefits to military personnel, aligning with both environmental goals and operational needs. Here, we explore how NANUK-R, rooted in sustainability, can elevate military readiness across four key pillars:

1. Commitment to Sustainability: Protecting the Planet

The military operates in a wide range of environments—forests, deserts, mountains, and coastal regions—and these ecosystems are often sensitive to human activity. That's where NANUK-R comes in. It's made from post-consumer recycled resin, significantly reducing the demand for new resins and help divert waste from landfills, making a positive impact on environmental pollution. By using this collection, you're helping preserve the environments where you operate, ensuring they remain healthy for future generations.

Sustainability isn't just a trend. It's about making smart choices today to protect the planet tomorrow. By adopting sustainable products, the military shows that it's not only prepared for any mission but also committed to reducing its impact on the Earth.

2. Proven Performance: Tough, Reliable, and Eco-Friendly

Sustainability doesn't mean sacrificing performance. We are committed to reducing our carbon footprint while maintaining the same protection, durability, and functionality our customers expect. NANUK-R is built to withstand the harshest conditions—extreme temperatures, rough terrain, and high-impact situations. Whether you're deploying to hot, dry deserts or freezing cold tundras, NANUK-R won't let you down.

3. Public Image and Trust: Strengthening Community Support

In today's world, public opinion matters more than ever. As military agencies around the globe shift towards more sustainable practices, using eco-friendly products demonstrates a commitment to both national defense and environmental protection. It shows the public that the military is not only ready to protect the nation, but also to take steps in protecting the planet.

This commitment can help improve trust and build stronger relationships with the communities you serve. It also aligns with global movements toward sustainability, showing that your unit is forward-thinking and responsible. A good reputation goes a long way in recruitment, public support, and international relations, and adopting sustainable solutions like NANUK-R can enhance that image.

4. Regulatory Compliance: Staying Ahead of the Curve

Environmental laws and regulations are tightening across the world. For military agencies, non-compliance could result in costly fines, legal issues, and reputational damage. That's why opting for sustainable products is more than just the right thing to do—it's necessary.

By choosing materials that meet strict sustainability criteria, you're ensuring that your operations stay ahead of evolving regulations. Many governments are prioritizing sustainable procurement policies, so using products like NANUK-R helps your agency stay compliant with both local and international laws, avoiding potential legal and financial risks.

Adopting NANUK-R isn't just about choosing a protective case—it's about making a strategic decision for both mission success and environmental responsibility. It's a durable, high-performance material that helps reduce environmental impact, streamlines waste management, and keeps your operations legally compliant.
By integrating NANUK-R into your operations, you're not just investing in superior gear for your personnel. You're also making a long-term commitment to sustainability, improved performance, and a better public image. It's a choice that supports mission success while contributing to a healthier, more sustainable world for generations to come.

FAUN Trackway Limited, a leader in ground mobility solutions, continues its success with their Heavy Ground Mobility System.

With a proven track record of reliability and performance, the system has become an essential asset for militaries worldwide requiring robust and efficient mobility in challenging environments. For over 75 years, FAUN Trackway® have been pushing boundaries and surpassing expectations, solidifying their place as the ultimate solution for tackling the harshest of environments.

When lives depend on mobility and speed, militaries rely on FAUN Trackway®'s Heavy Ground Mobility System. Designed to provide unmatched durability, versatility and performance in harsh environments, it ensures that military personnel can operate in the most challenging situations — from rugged terrains to complex battlefields — without compromise.

M150 Trackway® allows repeated passes of vehicles of up to 150 tons. It is designed to be reused for multi-puprose operations, allowing it to be used as part of Rapid Runway Repair, ensuring it supports all types of vehicles and aircraft.

Tried, tested, and trusted by global operators to navigate the harshest environments with ease, speed, and power, we can see why it's in high demand.

The team will be attending Mileng Coe's Industry Day, which is held on December 4th, in Ingolstadt. This event, which brings together top industry experts, decision-makers, and innovators, will provide FAUN Trackway® with the opportunity to showcase its expertise and discuss the future of ground stabilisation.

The Heavy Ground Mobility System will be on display at the event, demonstrating its capability as ingress and egress for bridging, provide stability for vehicles and personnel, and protect the surrounding environments.

For more information about FAUN Trackway Limited and its Heavy Ground Mobility System, please visit:
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LAUNCH OF NEW FACILITY

DEDICATED TO MILITARY TECHNOLOGY

From ruggedised computing systems and secure communications to advanced surveillance and autonomous systems, military technology plays a crucial role in enhancing situational awareness, operational efficiency, and strategic decision-making.

As global security challenges evolve, so too does the demand for robust, resilient computing that can withstand harsh environments, ensure reliable data security, and enable real-time coordination. The tech industry continues to push boundaries, delivering solutions that empower defence forces to meet complex missions with agility, precision, and safety.

Steatite has been designing and manufacturing rugged military-grade computer systems for decades and are trusted suppliers to most prime contractors and many tier 1s. We're rising to the expanding requirements of the Defence sector by launching a new operation in Ashchurch, Gloucestershire (UK) – Steatite Integrated Systems.

The team here specialise in the design and manufacture of military-grade operator consoles and 19" Rack Cabinets, providing complex integrated solutions that span the entire lifecycle of projects. Engineering capabilities include full system design, development and qualification. The Ashchurch facility is staffed with security-cleared personnel and ensures the highest levels of physical and electronic security.

Managing Director, Alastair Wallace, explains that "the facility has the manufacturing capability and experience necessary to meet the demanding budgets and timescales required by our military customers for equipment that is designed and engineered to operate in the most challenging environments. We have a wealth of experience in Naval and Land systems, working with the major Defence Prime Contractors and the MoD."

Steatite leverage Commercial Off-The-Shelf (COTS) components to accelerate development and reduce costs, while customising these systems to meet the stringent requirements of naval and military hardware. Our deep domain expertise in the areas of computing, displays, power, communications, and electronics design allows us to offer adaptable and future-proofed

solutions, where reliability and longevity of supply are critical.

DEF STANs and MIL STDs for EMC, shock, vibration, temperature, electrical safety, and more, are very familiar to us. We use our in-house facilities to carry out significant pre-compliance EMC, electrical safety, temperature, shock, and vibration testing on the hardware that we build, helping to reduce risk, and to save time and money. We also build and test systems to meet TEMPEST requirements.

Multifunction Operator Consoles

Multifunction Operator Consoles (MFOCs) are highly specialised workstations used in military applications to provide operators with centralised control over complex systems, from surveillance and radar to communications and weapons management. These consoles are designed to consolidate multiple operational functions into a single interface, improving situational awareness, decision-making, and mission coordination.

Steatite Integrated Systems offers both the ground-up design of new operator consoles, and the refresh of existing consoles via the design and integration of upgrade kits.

Primarily used on surface ships and submarines, Steatite supply operator consoles for use as part of a combat management system, integrated bridge system, communications system, or platform management system.

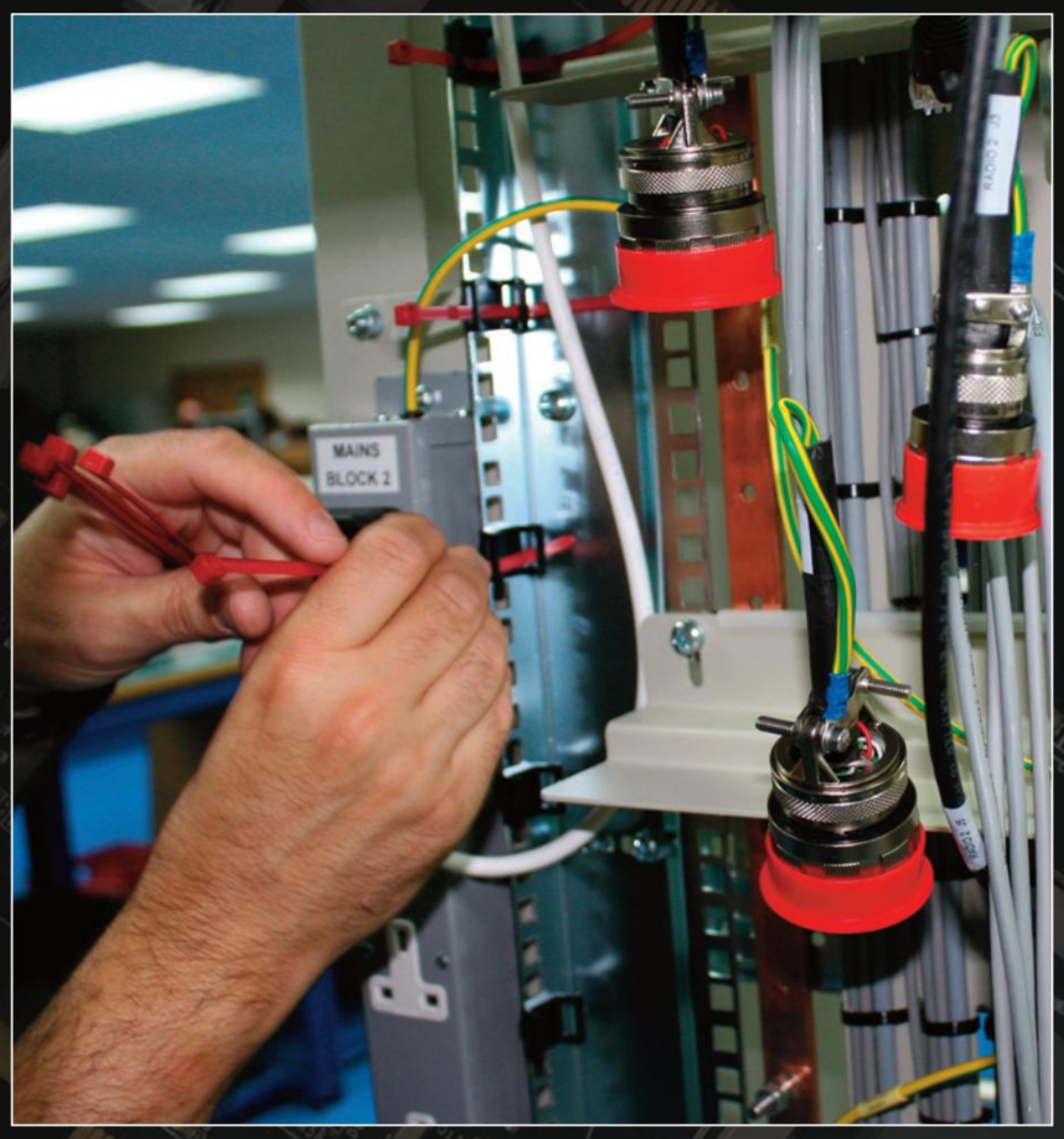
Single or multi-display, horizonal or vertical, sit-down or stand-up, with integrated touch or KVM, the configuration options available suit a wide range of applications and installation environments.
For new builds, optimising the design to minimise the space used is always a key consideration during the design phase, and with our access to a wealth of third party hardware, we may even be able to achieve the brief in a smaller and lighter package.

Once implemented, most naval platforms have a decades-long service life, and the technology on these ships and boats needs to be refreshed periodically to ensure their capabilities remain current. To help do this in a cost-effective manner, we design upgrade kits for existing consoles that will reuse the current enclosure, therefore retaining the same “form” and “fit” while improving the “function”.

The design and build of Multifunction Operator Consoles is only part of the story, as most military programs require significant support services. This includes elements such as through-life support, human factors, obsolescence management, technical publications, all of which Steatite can help with.

Rugged Rack Cabinets

Rugged rack computers for military applications are designed to operate reliably under extreme conditions, meeting the strict



demands of defence environments. These systems are housed in reinforced enclosures that resist shock, vibration, dust, moisture, and extreme temperatures, making them ideal for deployment in field operations, armoured vehicles, aircraft, and naval ships. They often meet military standards, such as MIL-STD-810G and DEF STAN 00-35 (for environmental durability) MIL-STD-461 and DEF STAN 59-411 (for electromagnetic interference shielding), ensuring performance in high-impact and extreme situations.

When designing new cabinets, depending on the project requirements, Steatite either utilise an existing COTS cabinet design to reduce cost, minimise risk, and save time, or our mechanical engineers can create a customised enclosure from the ground up.

A holistic approach is taken to ensure that the cabinet and electronics can meet the environmental and EMI/EMC demands required by the relevant MIL-STDs and DEF STANs, while also being well organised and simple to maintain.

Additionally, we design, manufacture, and supply hardware that is required for integration into cabinets. This includes military-grade computers, displays, timing systems, rugged laptops, KVMs, networking hardware, and more. We will always try to use these existing COTS products where possible, but we can also customise hardware, design our own electronics modules, or use third party solutions as required.

The full integration process is carried out in house by Steatite staff at our Ashchurch facility. The large production area means that we have the capacity to have dozens of cabinets or consoles in build at any given time. Detailed documentation is

created ahead of building the first unit and optimised and updated during the build stages. Combined with our strict engineering controls, this ensures all future units are built to the exact same standard, regardless of who builds them.

High-Speed Electronics

Military systems require powerful processors, including multi-core CPUs and GPUs, to handle complex data processing and real-time video analysis for tactical decision making. They may support mission-critical software and high-performance applications for tasks such as radar processing, communication systems, and cybersecurity operations.

For these demanding requirements, where no COTS option is available, Steatite has extensive in-house high-speed electronics design capability.

This covers anything from COM Express and COM HPC carrier boards (custom motherboards that utilise pluggable modules for x86 processing), backplanes and mezzanines right through to custom interface cards.

Through-Life Support Services

Mentioned above, our team supports the end user from project start to finish, and beyond.

We offer proactive obsolescence management services tailored to the requirements of a given project because it's better to find out a component is going EOL before it is discontinued rather than just after! The BOMs for complex systems often contain several hundred or even thousands of items. If any of these components is discontinued, it could have a significant knock-on effect on the manufacturability and supportability of the system.

Tech refreshes and system maintenance also fall within the team's remit, and reliability modelling is used to help plan spares stock holding for the duration of the program. Steatite also offers extended warranties and other services to ensure any repairs are carried out in a cost-effective and timely manner. Consoles and cabinets are made up of a number of individual LRUs that can be replaced in the field by suitably trained and security-cleared personnel.

Innovating the industry

The launch of Steatite Integrated Systems marks a significant step forward in our commitment to serving the needs of the Defence sector. By focusing on the development of advanced, resilient systems tailored to the unique demands of military operations, we are better equipped to support national security efforts and enhance operational capabilities. As technology continues to evolve, such dedicated facilities will play a vital role in delivering the cutting-edge tools and equipment that today's defence forces rely on to navigate an increasingly complex security landscape.

Find out more on our website:
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cpcases

The difference between mission success and failure can depend on how well comms equipment can function.

Tactical comms equipment ranging from servers and secure computers for field-based command centres to satellite, radio and mobile electronics can be notoriously sensitive to moisture, dust, heat and heavy handling. Our defence forces must be prepared for anything, including hostile environments with challenging terrain and weather. Fit-for-purpose case protection can be critical to mission success.

With manufacturing facilities in the UK and the USA, CP Cases design and manufacture protective cases and electronics racks that are often as innovative and sophisticated as the equipment they protect. We're the preferred supplier of MIL STD solutions for military forces and defence contractors in the US and Europe, including NATO members, Asia-Pacific and more.

Protection from dust and water ingress

Our rotomoulded Amazon range of protective cases, our ruggedised lightweight aluminium cases and 19-inch electronics racks are accredited to MIL-STD-810F, DEF STAN 00-35, and IP65. They're RoHS compliant and carry NATO stock numbers.

In both our ML STD Amazon Cases and ERV3 lightweight aluminium 19" racks, a waterproof skinned silicon gasket provides an excellent seal to minimise water and dust ingress. It engages positively with the body and helps to reduce and eliminate lid displacement when subjected to sideways force.

Protection from heat and cold

Temperature is a key element in the performance of electronic systems. Temperatures in excess of 30˚C can lead to thermal shutdown or malfunction. In addition to the wild heat generated by any single electronic device (server, encryption, UPS etc), additional heat build-up can also be generated by adjacent equipment, high ambient temperatures and solar loads.

Temperature management is a customisable feature we can add to all of our ruggedised cases and 19" racks. This includes robust, portable air conditioning units that attach to our electronics racks and are manufactured be used in the field. This means you can keep electronics cool, no matter the ambient temperature, during transit, storage and operation.

Designed to maintain optimal operating conditions, our COOL VCC2 A/C units include thermoelectric options to support heating as well as cooling. Our cases can also be fitted with ventilation systems including axial fans with filters and protective louvre panels.

Protection from electromagnetic interference

Electromagnetic warfare is increasingly used to disrupt military communications and can feature radio and radar jamming. We employ the Faraday cage principle in our ERV3 Eracks to protect sensitive communications equipment from electromagnetic interference. These protective enclosures meet the latest Electromagnetic Compatibility (EMC) Directive and the UK defence standard for EMC, DEF STAN 59-41.

Protection from drop, shock and vibration

Any equipment that is regularly moved around is susceptible to being dropped. In fact, this is one the greatest hazards facing field communications equipment. All CP Cases 19” racks are fitted with a tailored calibrated suspension system to minimise the hazards of equipment damage by physical misuse.

Our 19” racks can be fitted with elastomeric anti-vibration mounts or WRM (wire rope mounts) to protect electronics equipment from drop, shock and vibration. With a choice of Shore hardness grades, these anti vibration mounts are angled towards the centre of gravity of the 19” chassis to provide optimised shock protection in all orientations.

Protecting electronics in the tightest of spaces

Space can be a premium commodity when transporting equipment to the frontline, or any field-based environment. Size can be an important factor when creating an agile solution, with electronics equipment often competing for space with personnel and other equipment. When challenged by a fast jet defence customer to provide the smallest rack on the market for standard 19” electronics servers, we developed the RCZ MiniRack.

Exceptionally small, it is more than 25% lighter than equivalent competitors, while retaining immense strength and rigidity. An innovative crush fold 19” suspended chassis minimises vibration and drop shock while providing excellent levels of protection with U-heights ranging from 2U to 8U.

Our RCZ MiniRack can multistack (rack on rack) and securely interlock together with quick release captive threaded thumb screws.

Check our website to learn more about the MIL-STD cases and racks providing protection for electronics and communications equipment during transport, storage and use around the world.

www.cpcases.com

YOU TRANSPORT, WE PROTECT.

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CP Cases, protecting equipment since 1971.
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Oxley Earns Prestigious Gold Membership in The 5% Club

Oxley Group has been awarded Gold accredited membership as part of The 5% Club's prestigious 2024-25 Employer Audit Scheme.

OXLEY

www.oxleygroup.com

This accolade highlights Oxley's unwavering commitment to developing employees through 'earn & learn' initiatives such as Apprenticeships and Student Placements.

Achieving Gold status is a testament to Oxley's dedication to nurturing the growth and development of the workforce. The Oxley leadership team believes that investment in people is the cornerstone of success. Oxley offers structured programmes that offer hands-on learning, alongside academic qualifications, creating pathways for professional growth and equipping staff with the skills and confidence they need to thrive.

Oxley currently employs 21 apprentices in the business, by achieving Gold membership of The 5% Club, Oxley proudly stands alongside 1,100 forward-thinking employers who are dedicated to driving positive change. The 5% Club represents a powerful movement of companies working

together to make workplace training more inclusive, diverse, and accessible. Collectively, members support 1.9 million employees, with more than 108,000 individuals participating in 'earn and learn' schemes. The Employer Audit rigorously assesses efforts, future ambitions, and commitment to social mobility, diversity, and inclusion.

Darren Cavan, Oxley Group CEO commented; *"Oxley is operating in a competitive marketplace for skills, in order to expand we need to grow our own future talent. We are committed to developing a skills pipeline, ensuring local young people receive 'best in class' learning and support during their apprenticeships and placements with Oxley. It's so rewarding to see our apprentices flourish within the business, we're delighted to have our commitment recognised through membership of The 5% Club and for us, as an SME, to receive a Gold standard is a proud day and is a testament to the work of the whole team."*

Mark Cameron OBE, Chief Executive at The 5% Club, added; *"We are incredibly proud of the outstanding employers, like Oxley, who have gone above and beyond to invest in the future of their workforce through 'earn and learn' initiatives. By achieving Gold membership, Oxley has shown an exceptional commitment to shaping the skills of tomorrow, contributing not only to their business but to the wider economy."*

OXLEY

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AIRCRAFT LIGHTING

Oxley designs and manufactures LED lighting and night vision solutions for use on military operations. LED technology offers cost, weight, and energy savings along with improved reliability, resulting in a higher MTBF over existing technology.

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- Bespoke lighting solutions
- Internal and external options
- Designed, manufactured, tested and dispatched in house
- Resistant to shock and vibration

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+ 6 drawers in the base case: 2 small drawers with a shared locking hasp, 2 medium drawers for Pendaflex folders and 2 large drawers for Pendaflex folders
+ The desk easily folds into one shipping container
+ Designed to meet military standards STANAG 4280 and DEF-STAN 81-41

EMS THREATS & LIGHTWEIGHT TACTICAL SOLUTIONS FOR E2S

From the Battle of Marathon to the Battle of Bakhmut, the military's goal has not changed.

Find. Fix. Finish.

The electromagnetic spectrum (EMS), however, has transformed the battlespace. Used in World War II and recognized as important during the Cold War, the EMS has only recently been violently contested and heavily congested in the air above Ukrainian land. If Admiral Sergei Gorshkov wrote his famous maxim today, it would probably read: Whoever does not have spectrum superiority will not last the battle.

CRFS has spent the past year reflecting on this doctrine, applying our expert understanding of the EMS to help address the warfighter's greatest challenge: kill without getting killed. CRFS' lightweight, tactical solutions empower warfighters to locate the enemy, helping them address threats and achieve electromagnetic superiority and supremacy (E2S).

E3 THREATS IN THE EMS

Enemy communication

Radio communication is the backbone of military operations, enabling command and control (C2), situational awareness, and a tactical advantage. It is also a critical enabler for effectively executing Tactics, Techniques, and Procedures (TTP) during operations.

Despite modern waveform manipulation techniques such as chirp signals, LPI/LPD signals, Frequency Hopping Spread Spectrum, and Direct Sequence Spread Spectrum, any transmission has the potential to give away your—or the enemy's—position. Ensuring robust emissions control (EMCON) by constantly monitoring the EMS and baselining allows forces to sense, capture, and geolocate RF signals—providing critical intelligence for defensive or offensive maneuvers.

Enemy jamming

Adversaries' EW systems serve as force enablers and multipliers, disrupting and degrading allied capabilities. These systems can be either large military vehicles, such as the Murmansk BN, designed to eliminate High Frequency (HF) broadcasts from NATO forces, or small drones with EW payloads, such as the Eleron-3 UAV with a jammer payload.

Jamming critical frequencies degrades the effectiveness of communications and RF-dependent weapon systems and jeopardizes spectrum dominance.

Forces need to be able to continue operating in high-jamming environments and address the source of the jamming. The former can be achieved with cutting-edge anti-jamming technology. The latter can be achieved by continuously monitoring the spectrum with a network of RF sensors, which works with software to rapidly identify and geolocate any high-power transmitter causing interference.

Enemy drones

Drones have radically changed the dynamics of modern warfare; cheap COTS drones now offer tactical advantages over large, expensive systems procured through a Program of Record. However, neutralizing these drones can be costly; for example, in 2024, the US Air Force downed Houthi drones with AIM-9X Sidewinder air-to-air missiles, costing $472,000 per missile.

To address these threats efficiently, counter-drone technology requires a clear picture of the EMS, requiring a multi-sensor solution. The RF component should be able to detect every type of drone that emits an RF signal using signal detectors. Some systems only recognize the kind of drone, but it will not be detected if it is not in the library.

Identifying a drone's RF emissions offers enhanced precision, and upon detecting a specific signal, the system instantly runs a 3D geolocation, delivering real-time intelligence of the target's precise location over time.

ENABLED BY

- RFeye Node 100-18 LW (Lightweight)
- RFeye V-Track SR18c, N18, A150
- RFeye direction finding head (DFH300) system
- N18 tactical surveillance system

ADDRESSING THREATS IN THE EMS

Addressing threats in the EMS involves three critical components: creating a network of highly sensitive RF sensors across multiple domains, interpreting a huge amount of data in real time, and geolocating signals of interest. Together, these elements will facilitate quick decision-making and immediate countermeasures by making command-and-control more effective and providing intelligence directly to the warfighter.

Rapidly deployable tactical surveillance systems for enhanced ISTAR

Threats in the EMS, such as jamming, spoofing, and hostile signal transmissions, can quickly leave friendly forces vulnerable by disrupting communications, navigation, and situational awareness. Traditional systems like fixed infrastructure or man-portable systems are either inconvenient or too dangerous to deploy on the forward edge of battle area (FEBA), meaning that threats are not identified in real-time.

An alternative is to deploy a network of rapidly deployable tactical surveillance systems on the FEBA when there is the least risk to life. This network can detect threats, process data on the edge, and backhaul the data to a command-and-control (C2) center located outside the immediate combat zone. If individual sensors are destroyed during combat, there is no risk to life, and—as long as there are enough sensors—the network will remain operational.

Lightweight RF sensors (<2kg) for integration onto any unmanned system

When preparing the Intelligence Preparation of the Battlefield (IPB), understanding the electromagnetic space is vital. In complex environments, as traditional ISR platforms can be expensive, inflexible, and vulnerable, unmanned systems equipped with RF sensors provide a cost-effective and agile solution for monitoring and analyzing the spectrum, enabling real-time intelligence gathering and adaptive responses to dynamic threats.

Due to the increased line-of-sight they afford, unmanned aerial vehicles (UAVs) have proved adept at conducting ISR missions. However, their relatively light Maximum Takeoff Weight (MTOW) means that integrating RF sensors (traditionally weighing over 6kg) has not been possible. A new generation of RF sensors weighing less than 2kg is changing this, allowing forces to monitor the spectrum at greater altitudes, meaning the assets are further away from active combat zones.

Combining air and unmanned ground units allows units to create an adaptable multidomain network of receivers for advanced passive ISR over huge areas.

Super-fast RF sensors for enhanced edge processing and signal detection and capture

The EMS is contested and congested: Contested due to jamming, spoofing, and low-power or covert signals to disrupt communications and gain tactical advantages and congested due to the proliferation of RF-emitting systems—ranging from military radars and communication networks to civilian devices in urban areas.

Traditional RF sensors struggle in this environment: Centralized processing makes latency a problem, which limits real-time decision-making. Complex signals like frequency-hopping and low-probability-of-intercept (LPI) signals can evade detection. An overwhelming amount of data requires significant computational power and human intervention.

Super-fast RF sensors significantly reduce latency, enabling real-time decision-making. Their ability to handle complex signals enhances Probability of Intercept (POI) and ensures that adaptive threats are identified. By incorporating edge processing, these systems operate autonomously in disconnected or remote environments, analyzing data without relying on centralized systems. These sensors shorten the Sensor-to-Shooter (S2S) cycle, by delivering immediate, actionable intelligence ensuring a tactical advantage in contested environments.

Rapidly find signals of interest in huge datasets

The vast number of highly complex signals on the battlefield poses several challenges—understanding what the threat is and where it is before targeting and neutralizing it. To compound the issue, the pace of change is relentless: the enemy's strategy today will not be the same as it was yesterday, and it will change again tomorrow.

While AI has been touted as a panacea, many RF experts agree with Al Bowman, who says that "prioritizing the use of AI over fully understanding the problem to be solved leads to inevitable complications and deficiencies." Instead of relying on AI as a universal solution, highly skilled RF engineers often need a flexible and configurable way to hunt for complex signals in huge datasets before classifying and geolocating them. This solution combines expert experience with the power to identify anomalies that reveal signals of interest rapidly.

Geolocation software for BMS—providing every warfighter with EW capabilities

Not getting the right EW data to the right person in the right place at the right time deteriorates outcomes and puts lives at risk. Conversely, exporting data from spectrum monitoring and geolocation software directly to a battlefield management system (BMS) displayed on the warfighter's chest provides actionable intelligence in real time.

A TAK system or similar connected to geolocation software increases the dismounted soldier's awareness by allowing them to identify and locate enemy forces' RF emissions and analyze the electromagnetic space.

CONCLUSION

On a battlefield where soldiers are walking IoT devices, missiles are guided by GNSS-reliant systems, and militaries must share spectrum with civilians, the electromagnetic spectrum is both a weapon and a vulnerability. Whoever creates networks of lightweight, rapidly deployable RF sensors with edge processing capabilities will gain a decisive advantage in achieving ES2. The culture of electronic warfare is deeply engrained into enemy military doctrine, now, in the words of Colonel Nicole Petrucci, "we need to exercise some different tactics."

ENABLING ELECTROMAGNETIC SUPERIORITY & SUPREMACY

WITH LIGHTWEIGHT TACTICAL SOLUTIONS

TRIMITE

GLOBAL COATINGS

THE GOLD STANDARD IN DEFENCE COATINGS:

How Trimite Global Coatings is Setting the Benchmark for Military-Grade Protection

In the technical world of defence coatings, where durability, regulatory compliance and top-notch performance are essential, Trimite Global Coatings has long stood as a leader.

A testament to its commitment to excellence, the company's DEF STAN 80-225 compliant coating system has set new standards in the industry, merging high-performance military coatings with rugged durability and the aesthetic precision that modern defence demands. At the core of this Specification is a series of advanced paint systems D00383 Polyurethane Primer and D00294 NATO Green Polyurethane Topcoat. The system is a Chemical Agent Resistant Coating (CARC) and Infrared Reflective Technology (IRR), specifically designed to withstand chemical agent warfare and reflect infrared radiation. It can handle the most demanding military environments, with the NATO Green leading Trimites defence colour lineup, revered for its performance and iconic look.

DEF STAN 80-225: A Rigorous Standard for Military Coatings

The DEF STAN 80-225 standard, developed by the UK Ministry of Defence, is among the most stringent benchmarks in the world for military coatings. This standard demands not just protection against wear but resilience under extreme conditions, ranging from the sweltering Middle Eastern deserts to the frigid Arctic. Trimites DEF STAN 80-225 compliant systems deliver unmatched durability and protection, passing the comprehensive testing for CARC products by the UK's Defence Science and Technology Laboratories (DSTL) at Porton Down, reinforcing their reliability.

For Trimite, DEF STAN 80-225 compliance symbolises a significant milestone, but also a continuous pursuit of innovation. As the challenges faced by military equipment evolve, Trimite remains at the forefront of coating technology, advancing formulations that not only meet the current standards but anticipate future needs. Their DEF STAN 80-225 compliant systems stand as a testament to their reputation for excellence in the field of military coatings—a reputation built on decades of research, development, and collaboration with industry partners.

In a sector where the stakes are high and performance is paramount, DEF STAN 80-225 compliance is more than a certificate of quality: it's a mark of trust. Trimites unwavering dedication to meeting this standard underscores its role as a leading partner for the defence industry, ensuring that critical assets are protected, reliable, and ready for the challenges of modern military operations.

A System Built for Defence

Trimites DEF STAN 80-225 compliant system is specifically designed

to meet the rigorous standards required by the UK Ministry of Defence. This system not only provides protection but ensures equipment durability in extreme environments—from corrosive saltwater regions to the UV-intense deserts of the Middle East. Each component of this system plays a critical role in creating a robust, high-performance finish.

SurTec 650 Pretreatment:

At the foundation of this system lies SurTec 650, a state-of-the-art chemical pretreatment for aluminium and other metals. It ensures exceptional adhesion and corrosion resistance, serving as the perfect base for subsequent coatings. With its compliance with REACH and RoHS regulations, SurTec 650 is an environmentally responsible solution that offers outstanding protection against harsh environmental stressors, particularly in marine and aerospace applications.

HP20 Etch Primer:

The next layer is HP20 Etch Primer, a high-performance primer designed to create a strong bond between the pretreatment and topcoat. HP20 is ideal for aluminium and ferrous substrates, offering excellent adhesion, flexibility, and corrosion resistance. It enhances the durability of the overall coating system, ensuring long-term protection and performance even in highly demanding conditions.

D00383 Polyurethane Primer:

Trimite D00383, the ultimate polyurethane primer designed for excellence. Engineered with cutting-edge technology, this innovative product delivers unmatched durability, performance, and versatility. Offering superior protection, Trimite D00383 provides exceptional resistance against corrosion, abrasions, and environmental damage, ensuring long-lasting performance even in the harshest conditions. Designed for efficiency, it features smooth application, reliable adhesion, and a premium finish, ensuring optimal results with minimal effort. Manufactured to meet stringent industry standards, it is also suitable for use with CARC (Chemical Agent Resistant Coating) finishes, further expanding its utility in specialised environments. Developed for defence applications, D00383 enhances the protective capabilities of the overall system, making it indispensable for mission-critical equipment.

D00294 NATO Green Topcoat:

Crowning the system is the D00294 NATO Green topcoat, a DEF STAN 80-225 compliant polyurethane finish renowned for its versatility and resilience. This topcoat delivers outstanding UV stability, chemical resistance, and durability, making it a preferred choice for military vehicles and equipment. Its iconic NATO Green shade is not only effective for camouflage in woodland and temperate environments but also exhibits exceptional resistance to fading and environmental degradation.

Together, these three components form a robust defence solution that ensures superior protection, performance, and compliance with stringent military standards

The Flagship NATO Green: Iconic and Engineered for Excellence

A cornerstone of Trimites defence coatings range is NATO Green. Used extensively for its effective camouflage capabilities, NATO Green is ideal for woodland and temperate environments. Trimite has maintained exceptional consistency with this colour, meeting the military's precise demands for durability and resistance to | fading over time.

The manufacturing consistency of NATO Green, across all production batches, displays Trimites expertise in quality control and advanced manufacturing processes, ensuring this iconic shade meets defence-grade durability standards with every application.

A Legacy of Innovation and Dependability in Defence Coatings

With over eight decades of experience, Trimite Global Coatings has established itself as a trusted partner in the defence industry. Trimites name is synonymous with reliability, innovation, and high standards, with products that meet the demanding DEF STAN 80-225 compliance requirements and exceed client expectations. By working closely with Original Equipment Manufacturers (OEMs), Trimite supports the development of military equipment that is ready for the challenges of the modern battlefield.

This commitment to quality is further evidenced by Trimites active participation in the British Coatings Federation (BCF) and Made in Britain programs, which highlight their dedication to British manufacturing excellence and their leadership within the global defence sector.

The Pinnacle of Reliability in Defence Coatings

With its DEF STAN 80-225 compliant system, Trimite has set the bar for excellence in defence coatings. Trusted by defence organisations worldwide, Trimite continues to provide the advanced coatings that OEMs rely on to produce military equipment that can withstand the test of time, no matter the environment.

In a field where reliability is essential and stakes are high, Trimites coatings stand as a guarantee of quality, protection, and performance. Trimite remains a leader in military coatings, committed to advancing technology that safeguards and supports, ensuring that every application is a testament to innovation, durability, and an unwavering commitment to excellence.

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A RECORD YEAR

for NP Aerospace at DVD 2024

NP Aerospace had a record year at the 2024 Defence Vehicle Dynamics (DVD) show, held at UTAC Millbrook Bedfordshire, in September.

The team presented the latest vehicle integration and armour developments and announced the new £71 million Conventional Vehicle Systems Spares and Post Design Services (CVSSP) contract with the UK MOD which covers Land Rover, Pinzgauer and RWMIK fleets.

NP Aerospace built and integrated seven vehicles for DVD showcasing collaborations with GM Defense, NMS UK, MOOG, Ultra PCS, Leonardo, Babcock and Exail.

New Spiral Development

The flagship vehicle showcase was the Ridgback XC spiral development which featured the new Slimline Integration Capability Kit. This included an upgraded stowage solution to reduce platform width and weight and a new modular powerpack for improved operational performance and reduced through life costs. New glazing, digital mirror systems and bumper designs add further aesthetics and capability benefits.

In order to highlight NP Aerospace's system integration capabilities, the Ridgback XC was fitted with the RIwP turret system from MOOG and the UltraEAK Generic Vehicle Architecture (GVA) system from Ultra PCS which offers a universal approach to centralized command systems.

The Mastiff XC was also upgraded with the new Slimline Integration Capability Kit and presented on the Leonardo booth to highlight integration of the Falcon Shield Counter UAV concept. Multiple defence systems can be integrated onto both the

Ridgback and Mastiff platforms via the new GVA electrical architecture system, enabling Counter UAS (SHORAD) capabilities to be rapidly developed and deployed.

Ride and Drive Experience

NP Aerospace facilitated a successful Ride and Drive which saw more than 200 DVD guests experience the Mastiff XC overcoming obstacles on the off-road track, now with improved performance due to the new power take off system. The GM Defense Team, also located on the offroad area, showed the Infantry Squad vehicle which included an environmental enclosure designed by the NP Team. NMS UK showed a battlefield ambulance variant of the Dragon vehicle designed in conjunction with the NP Aerospace engineering team and the Exail team showcased the Advans Inertial Navigation Series.

Technology Innovations

The NP Aerospace Vehicle Engineering Team are focused on developing and enhancing current and future capabilities and delivering new innovations that deliver significant operational benefits. Members of the team provided an update on the TAMPA 3D printing initiative during a working group highlighting the capability to print rapidly deploy spare parts in the field.

The NP Aerospace Composites and Armour Systems team were at the show presenting vehicle armour and survivability solution projects, such as armoured truck cabs, civilian armoured vehicles, blast seating, add-on armour systems and composite pod solutions. Soldier system developments included the latest helmet shell technology, new bomb disposal suit innovations and lightweight body armour. Logistik Unicorp also showcased their new soldier system and exoskeleton which improves operational manoeuvrability by reducing the load for the wearer

Growth from SME to Mid Tier

CEO of NP Aerospace James Kempston was selected by DVD organisers to deliver a speaker session in the main conference on safeguarding supply chain resilience and the company's move from SME to mid-tier. The content generated significant interest across delegates keen to understand more about the company's expansion into new markets and vehicle agnostic approach to platform development.

The NP Aerospace team are busy planning attendance at events in 2025. Watch this space.

npaerospace.com

NP Aerospace

ComEth4420e

3U VPX Dual-Plane Gen3/4 PCIe & 40 Gigabit Ethernet Switch

- *3U VPX*
- *Managed Layer 2+/3 switch*
- *VITA 65.0 SLT3-SWH-6F8U-14.4.15/6F6U-14.4.1*
- *Up to 11 Eth. ports and up to 12 PCIe ports*
- *1GBASE-KX/10GBASE-KR/40GBASE-KR4, 1GBASE-T (rear)*
- *10GBASE-T, QSFP+ (front)*
- *Aligned with the SOSA™ Technical Standard*

Overview

The ComEth4420e is a cutting-edge hybrid managed switch combining PCIe Gen3/4 and 10/40 Gbs Ethernet technologies. It has been developed in alignment with the SOSA™ (Sensor Open Systems Architecture) Technical Standard.

Description

The ComEth4420e Expansion/Data Plane PCIe lanes are generated by a high-performance non-blocking switch offering Non-Transparent capability on each port.

Supporting modes such as partitioning, Upstream, Downstream and Non-Transparent port modes, the ComEth4420e is the ideal switch for integrators who are looking for control of rapid data flows in a centralized architecture including multiple NT endpoints.

The ComEth4420e Control Plane is based on the same technology as the ComEth4000e range using Marvell's highly integrated System-on-Chip (SoC) with programmable packet processors. The SoC delivers a combination of 1, 10 & 40 Gigabit Ethernet interfaces to the board.

The ComEth4420e is managed by Switchware, our field-proven network management application.

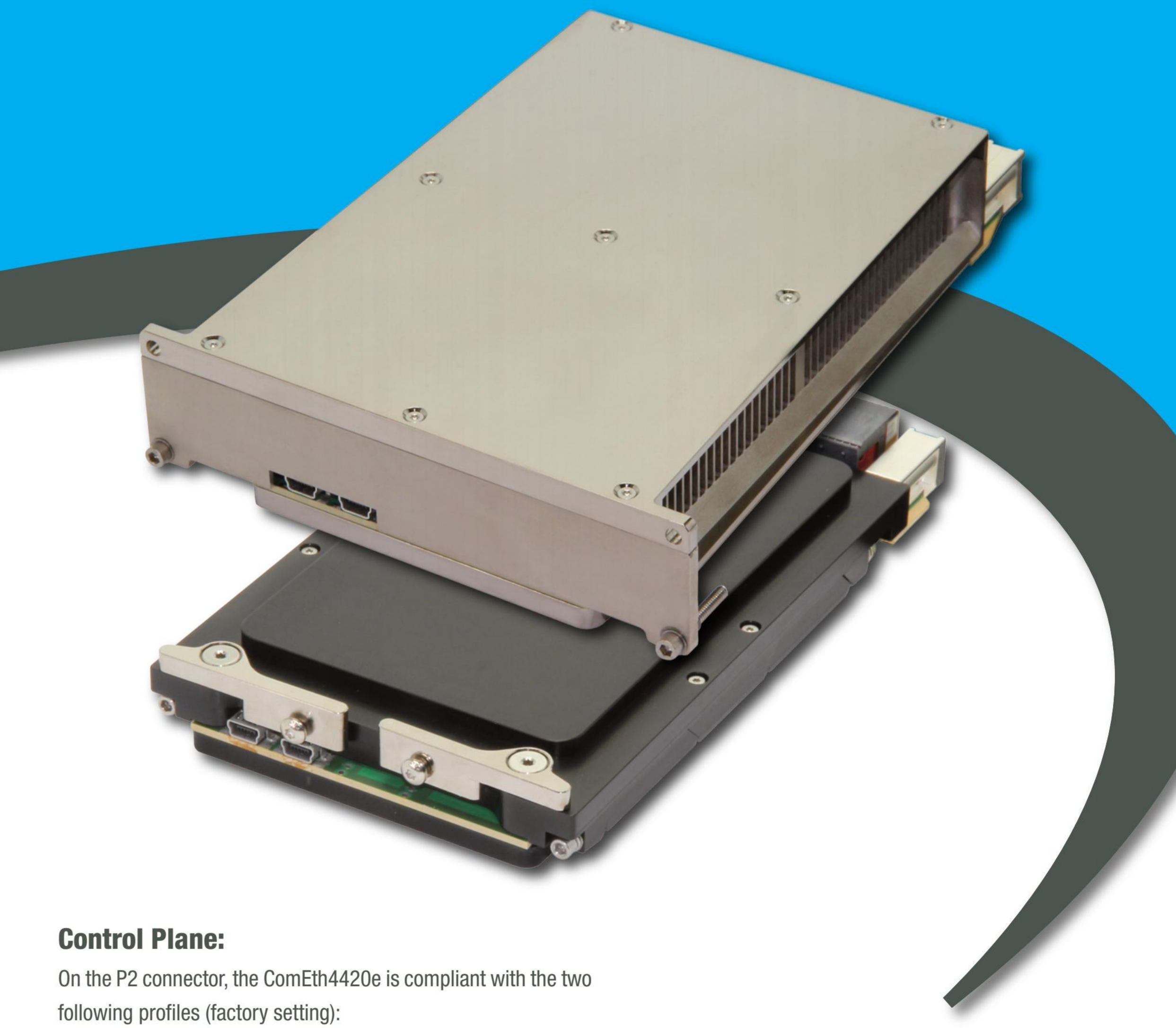
The ComEth4420e is compliant with the VITA 46.11 Chassis Management specification and includes an IPMI controller chip. It supports IEEE 1588 PTP (Precision Time Protocol) for precise network timing and includes protection for non-volatile memory (NVMRO).

Interfaces

Data Plane:

- **4 * PCIe 4-lane ports Gen1/2/3/4**
- **splittable into 2 * 2-lane ports or**
- **mergeable into 2 * 8-lane or 1 *16-lane ports**
- **2 * PCIe 4-lane ports Gen1/2/3/4**
- **splittable into 2 * 2-lane ports or**
- **mergeable into 1 * 8-lane port**

Various PCIe lanes' combinations and modes are available. However, they require specific configurations files to be built by Interface Concept on request. Please consult us.



Control Plane:

On the P2 connector, the ComEth4420e is compliant with the two following profiles (factory setting):

- **VITA 65.0 SLT3-SWH-6F8U-14.4.15**
  - **8 * 1000BASE-KX/10GBASE-KR**
  - **1 * 1000BASE-T**

- **VITA 65.0 SLT3-SWH-6F6U-14.4.1**
  - **6 * 1000BASE-KX/10GBASE-KR**
  - **2 * 1000BASE-T**

- **on the front panel**
  - **1 * QSFP+ (4 * 10G/1 * 40G)**
  - **1 * 10M/100M/1G/2.5G/5G/10GBASE-T (RJ45)**

The ComEth4420e is available in air-cooled, conduction-cooled and Air-Flow-Through (AFT) versions.

For more information, please contact:

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Fax. +33 (0)2 98 57 30 00
info@interfaceconcept.com

INTERFACE CONCEPT
ADVANCED ELECTRONIC SOLUTIONS

BETTER DATA, BETTER DECISIONS

Radiation-detection equipment remains a critical component of modern military operations, and its importance continues to rise.

The outstanding threats of attacks on nuclear infrastructure, use of radiological weapons such as dirty bombs and illicit nuclear materials being smuggled across borders, never truly disappeared.

They are now more prominent than ever, with current conflicts, remarkably high geopolitical tension and technological advancements bringing new destructive devices to the battlefield and borders. Thus, rapid, reliable and far-reaching radiological detection and identification capabilities are non-negotiable, and essential for staying one step-ahead.

Collaborating with significant government departments such as the UK Home Office and MOD, and the US Departments of Homeland Security, Defense and DARPA, Kromek develops radiological and biological detection and identification solutions that significantly enhance CBRN early warning systems and facilitate rapid, appropriate hazard responses for defence forces. The small form factor, light weight, instant alarms and accurate spectroscopic data of devices such as Kromek's D3S ID and D5 RIID, deliver extensive operational flexibility to those on the ground and distanced decision-makers. This aids maneuverability, potentially all at range, and supports the protection of military and civilians against CBRN threats, in diverse scenarios.

A ROBUST FIRST-LINE OF DEFENCE

Ports, airfields, borders, command posts, crowded spaces (sports stadiums and commercial centers) and key nuclear infrastructure are key targets for the use of radiological and nuclear threats to disrupt operations. To secure these sites and the safety of the people there, instant data is essential to facilitate rapid action. The continuous radiation monitoring capability of the small, wearable D3S ID immediately alerts users to gamma and neutron-emitting radiological hazards in their environment as soon as they arise. The high sensitivity of the device ensures even the lowest levels of radioactivity don't go undetected.

Specific threats also require specific responses. The rapid and discreet delivery of isotope ID to the Kromek ID app on a paired phone enables responders and officials to take appropriate action in response to the specific radiological threat, maximising the safety of entire units and safeguarding critical infrastructure.

THE D3S ID IN ACTION

At present, a number of dogs equipped with D3S IDs are deployed in Ukraine. The D3S ID detectors supply troops with key early warning capabilities in radiation detection and identification at a distance. The real-time isotope ID and gamma and neutron alerts delivered to the paired phone with Kromek ID allow handlers and their canine companions to respond rapidly to the radiological or nuclear threat at hand and keep themselves safe in high-risk environments.

RELIABLE SECONDARY ADJUDICATIONS

The medium resolution and high sensitivity of the ruggedised, portable D5 RIID supplies CBRN specialist teams with high-quality adjudication spectra and a more definitive confirmation of which radioisotopes are present. More informed and timely decisions can be made as a result, even in the most complex and demanding situations. Mixed, weak, shielded and heavily masked sources are all quickly located and accurately identified with clearly defined spectral peaks, reducing the risk of false negatives and ensuring illicit material can be seized with speed and precision. The D5 RIID is built to withstand the harshest environments, meeting British and US DEF-STAN and MIL-STD requirements.

As the world's smallest and lightest RIID, the D5 RIID supplies the user with a high-quality radiometric performance without adding significant weight to everyday equipment. The critical capabilities of the D5 RIID are reliable and cost-effective in the long-term, with the longevity and stability of the device facilitating a low lifetime operational cost.

HIGH-QUALITY SPECTRA FAR AND WIDE

Now TAK-compliant, the D5 RIID further expands widespread, real-time situational awareness. The ability to integrate the device into the TAK communications application enables extensive data sharing and allows better-coordinated threat responses in the battlefield as a result.

SEND THE D5 RIID IN FIRST

Functional as a handheld device but also able to be mounted on patrol vehicles, tanks, boats, armored personnel carriers or any UGV model, the D5 RIID further enhances operator safety through remote detection. The Remote Mode of the D5 RIID allows large areas to surveyed and essential spectral data collected in high-risk environments without putting troops in unnecessary danger. Rapid emergency responses can be initiated and coordinated effectively with the rapid delivery of data from the D5 RIID. Agnostic data is delivered in real-time to the remote operator via a wired or wirelessly connected device, whilst ANSI N42.42 data files can be sent to remote technical authorities for secondary adjudications.

SCALING UP EMERGENCY RESPONSES WITH NETWORKABILITY

To plan, prepare for, respond to and mitigate radiological and nuclear threats effectively at a large-scale, high-quality data must be widely accessible: to units in the battlefield as well as to national and international command centres. Both the D3S ID and D5 RIID seamlessly integrate into existing alarm networks and communications systems. As a result, widespread protection networks can be established. Data from various specialist detectors from large target areas can be viewed simultaneously by decision-makers, and informed, strategic decisions made in the appropriate timeframe for effective preparation and responses to attacks and better protection of troops, civilians and infrastructure.

MAKE SAFETY A CHALLENGE THAT CAN BE MET ON ANY MISSION

With established networks of robust radiation detectors with operational flexibility, reliable radiological data is far-reaching and accessible in an instant. Consequently, the situational awareness and decision-making of those either situated remotely or positioned in the battlefield, is significantly elevated. Constant monitoring aids planning and preparation and prioritises preventative action. With the risk of radiological and nuclear threats escalating, such capabilities are paramount for better navigating R&N threats in armed and hybrid conflicts and deploying the appropriate countermeasures to maintain the safety of military and civilian populations.

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