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We welcome you to the second edition of 2024.

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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... & much more



Revolutionizing the Battlefield:

THE EVOLUTION OF RUGGED MINIATURE CONNECTORS

In the rapidly evolving theater of modern warfare, the electronic systems integral to soldier operations are transforming at an unprecedented rate.

The demand for devices that are not only compact and lightweight but also capable of high-speed, rugged performance is soaring. These advancements hinge critically on one often overlooked component: the interconnect technology. As the nexus between critical systems, ruggedized miniature connectors have emerged as a pivotal innovation in maintaining the integrity and reliability of portable electronic systems on the battlefield.

The Challenge of Integration in Modern Soldier Systems:

The modern soldier navigates an increasingly digital battlefield, necessitating electronic systems that balance portability with top-

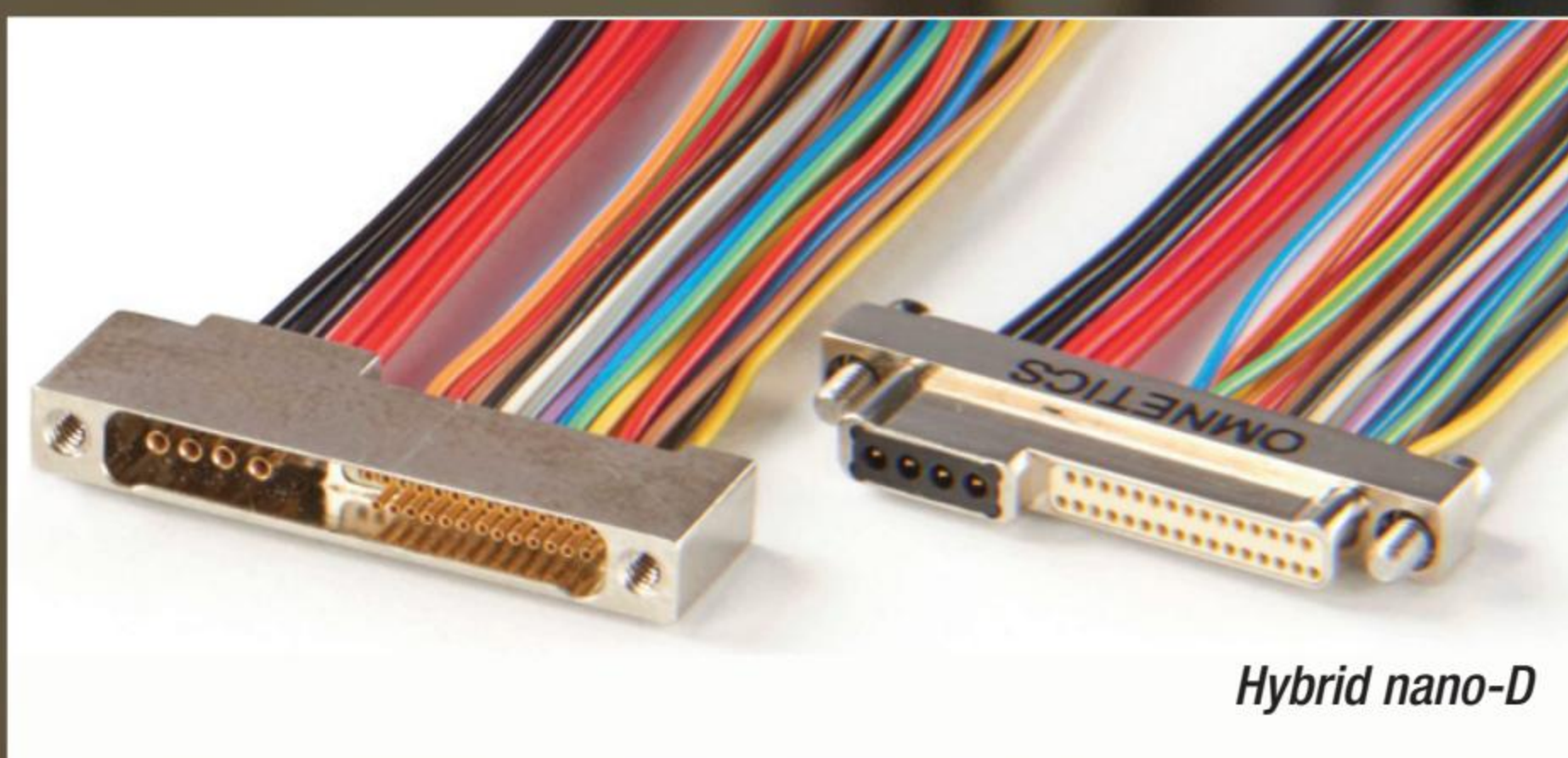
tier performance. Achieving this blend of high-speed electronics with durability requires sophisticated engineering, particularly within the interconnection units. These units must withstand harsh environments while maintaining consistent signal quality, a challenge that has led to the evolution of ruggedized connectors. These components, often customized to specific applications, are vital in bridging advanced electronic functionalities with the practical demands of field operations.

Customization and Collaboration in Connector Design

When off-the-shelf solutions fall short, custom connector designs become necessary. This process is collaborative, often involving direct coordination between connector designers and system engineers to modify and optimize interconnects for specific operational requirements. Utilizing components from certified and military-tested connectors ensures reliability, while new formats are developed with speed and efficiency for field testing. This synergy between connector manufacturers and military technologists is the driving force behind the quick, effective evolution of soldier systems.

Assuring Signal Integrity Amidst Advancing Technologies

As military technology advances, maintaining signal integrity in field operations becomes paramount. This is particularly evident in the integration of vision systems and biosensors, where high-speed data processing is crucial. Specialized cable and connector systems, such as those capable of Gigabit signal processing, are



Hybrid nano-D

OMNETICS

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being developed to match the impedance requirements of sophisticated electronic circuits, ensuring minimal signal loss and reliable performance, even under the strenuous conditions of the battlefield.

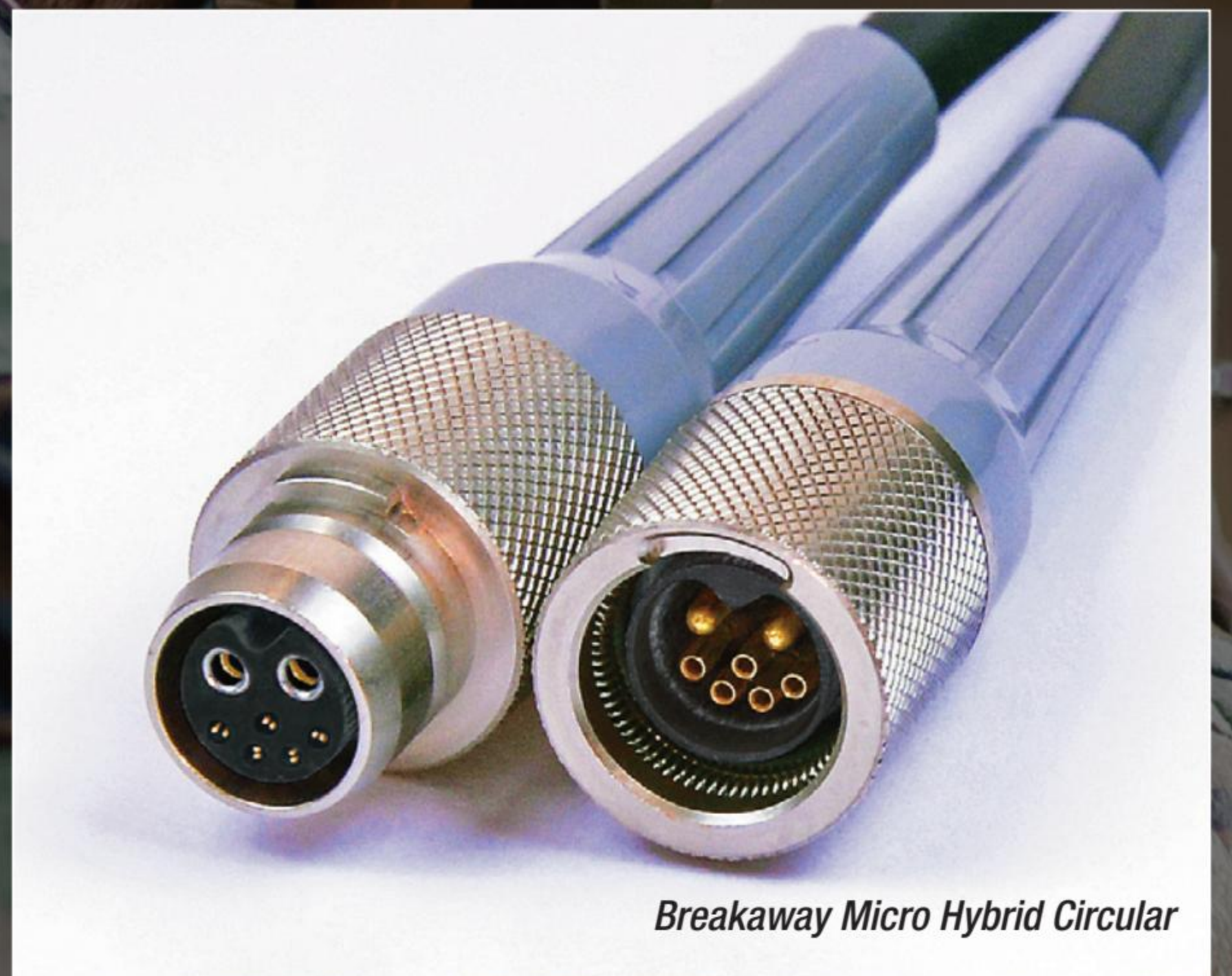
Stealth and Shielding in Electronic Warfare

The digital battlefield is fraught with electronic and cyber threats, making electronic invisibility a new requisite for survival. Advanced shielding techniques in cable and connector systems are being employed to safeguard signals from EMI interference and cyber threats. These innovations, including fully shielded cables and full-metal back shells, ensure soldiers can rely on their electronic systems while remaining undetected in hostile environments.

Beyond the Battlefield: Innovations in Unmanned Systems

The scope of advanced interconnect technology extends beyond the soldier to encompass unmanned aerial vehicles (UAVs) and other autonomous systems. Lightweight, rugged connectors are integral to these applications, ensuring reliable signal processing amidst the vibration and rigors typical of UAVs. Hybrid connectors, combining power and signal capabilities, are emerging as standard solutions, catering to a spectrum of military applications from surveillance to direct combat support.

The landscape of military technology is one of constant, rapid change, driven by the imperative of operational efficiency and survival in the field. Central to this evolution is the role of ruggedized miniature connectors, a field where innovation is as



Breakaway Micro Hybrid Circular

much a product of engineering prowess as it is of close collaboration with military stakeholders. As we look to the future, the continued advancement of connector technology will remain crucial in shaping the efficacy and versatility of global military forces. In this endeavor, the commitment to reliability, customization, and cutting-edge technological adaptation will continue to be the guiding principles propelling this critical component of modern warfare technology forward.

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HMG Defence Coatings



RETURNS TO DVD 2024

HMG Paints, a leading manufacturer of paints and coatings, is pleased to announce its participation in the upcoming DVD Show, scheduled for September 18th - 19th 2024, at UTAC Millbrook in Bedfordshire.

As one of the premier events in the defence industry, the DVD Show provides a platform for showcasing cutting-edge technologies and solutions. HMG Paints will be prominently featured at stand C3-819, where the company's team of experts will be available to offer insights into their extensive range of paints and coatings, including CARC and IRR coatings.

Attendees can expect to receive personalized technical advice tailored to their specific requirements, as well as gain valuable insights into the latest trends and advancements in the field of coatings technology.

"We are excited to participate in the DVD Show once again and to engage with industry professionals to discuss their upcoming projects and our latest innovations in paints and coatings," said Alan Sharples, Defence Sales Manager at HMG Paints. "Our team looks forward to sharing our expertise and assisting attendees in finding solutions to their unique paint and coating challenges."

Don't miss the opportunity to connect with HMG Paints at stand C3-819 during the DVD Show 2024 and discover how their products and services can benefit your projects. To book in a meeting in advance at the show you can email the team at defence@hmgpaint.com.
Made in Britain

As a British based manufacturer HMG can provide fast delivery across its entire range, something which the company believes can benefit businesses who use JOSCAR and other OEMs and refinishers. One of the many products the team is sure to be discussing is their new 2 pack Polyurethane primer system which surpasses the requirements of Def Stan 80 – 225 for land based military equipment. The DEF2301001 Light Grey Polyurethane Primer boasts an impressive capability to endure over 2,000 hours in BS EN ISO 9227 salt spray conditions, making it a standout performer in demanding, high-stress environments.

HMG's product range is suitable for equipment such as containers, trailers, vehicles, bridges and armour. HMG are renowned for their innovative approach to coatings including corrosion resistant primers, functional topcoats approved to UK defence standards and if you can't find the perfect product in their existing portfolio the company is also able to offer bespoke formulation development to solve those tricky paints and coatings problems.

HMG is also JOSCAR certified which means Primes can speed up their access to HMG's defence portfolio, and all products are also Made in Britain certified. The HMG Defence range offers products which are



free from Chrome VI, meet low VOC requirements, IRR and CARC paints and includes military standards such as 80-225. Alongside Defence Standard products, HMG produce a wide range of approved high-quality coatings for practically every purpose for the defence industry. You can find out more about HMG's range of Def Stan products and bespoke coatings development service at www.hmgpaint.com/products/landing/Defence.

If you require further information on the press release, please contact: Stephen Dyson, HMG Paints Communications
sdyson@hmgpaint.com | 0161 205 7631

HMG Paints Ltd is the UK's leading independent Paint Manufacturer and a proud, family-owned business situated in Manchester. Working alongside new and long-term customers, HMG are committed to sustainability, innovation and customer satisfaction. With over 90 years' experience in developing innovative coatings, HMG's portfolio of wet paint and aerosols cover virtually every type of surface imaginable across a whole host of industries including industrial, commercial vehicle, decorative, automotive, protective coatings, defence, toll manufacturing, wood finish and arts & craft. HMG have a drive to set the standards for the industry not just meet them.

For more information, please visit www.hmgpaint.com or visit www.shop.hmgpaint.com to discover decorative paint and inspiration.

Connect with HMG Paints on Facebook, Instagram, Twitter and LinkedIn.

www.hmgpaint.com



Designed with the driver in mind:

performance and state-of-the-art customization of the Embedded Image Periscope for Challenger 3 tanks



Challenging times call for strongly innovative solutions.

In search of the next-generation armored fighter vehicle to complete the Main Battle Tank (MBT) request of the British Army, Rheinmetall Electronics UK (REUK) initiated a collaboration with G&H, to work on an integrated sighting system that excels at reconnaissance, surveillance, driver safety, and target acquisition. The optics and photonics industry leader has been awarded a £4.1M Challenger 3 contract to deliver a generational upgrade to the Embedded Image Periscope (EIP) system, which would integrate with the rest of the planned high-tech improvements. This would prove to be a bold project aimed at matching the overall strategic and technological leap planned for this British MBT.

Dubbed “the eyes of the British Challenger 3”, the new EIP, developed and manufactured by UK-based G&H | Kent, integrates a combination of classic glass and digital display electronic periscope design. This fusion allows for a wider selection of views for the driver, eliminating

unnecessary head position movements and periscope swapping. Equipped with “standalone” and “leave alone” day and night options, as well as a relaxed-view biocular for eye relief, the versatility of the EIP is expressed through its modular build. Respecting the high-precision environment in which the periscope technology needs to perform, its adaptability has been maximized to fit any necessary requirements from the crew.

A game-changing element brought in by the G&H team in the product design process represents the EIP’s reversionary mode. A strong feature according to the feedback retrieved from various UK MoD trials, this functionality addresses high-risk cases, as explained by Peter Kean, G&H’s Innovation Unit Director of Optics & Photonics:

“In the event that a vehicle loses all its power, you can’t use your displays or your situational awareness cameras that feed into this system. But the driver still needs to be able to see, to exit the threat in the environment. Through this system, a combined glass and electronic periscope, with the flick of a switch, you are just looking out of a glass periscope. So, in that ultra-threat scenario, you just flick the switch and drive.”



Another key feature in the design of Challenger 3 is its immersive and immediate communication capability. As stated by former UK defense secretary Ben Wallace, ***“what you will see is a far more integrated vehicle”***.¹ G&H’s approach to the technological development of the EIP is aiming to enhance precisely this quality of the new MBT through its digital connectivity with the Spectre camera system. This electronic feature includes both a day and a thermal imaging camera, plus an overlay of the two. As such, crew members save precious seconds in reaction time when needing to secure a mission.

The focus placed on EIP solutions for armored fighting vehicles (AFVs) has to be translated into battlefield fluency. In this case, the new Challenger 3 periscope underwent a set of customization stages in order to respond seamlessly within REUK’s Trailblazer Driver Vision System. Richard Streeter, REUK’s Managing Director, appreciated the end result:

“We are very pleased to have G&H on-board, delivering this important component into the Challenger 3 program. The display system is critical; delivering front and rear views from the Trailblazer camera modules, enabling the driver to carry out the platform mission. The G&H solution allows a comfortable

operating view suitable for long mission periods, while minimizing the driver’s eye strain. The G&H technology is unique and the team at St. Asaph and Ilminster are experts in delivering complex electro-optic solutions.”

When envisioning the tank that would represent the United Kingdom’s armored capability, the expectations were set very high. These bold plans included the field vision aspect of the vehicle. A more comprehensive outlook of the battlefield facilitated by a digital state-of-the-art, fusion concept is exactly what the periscope team at G&H delivered through the EIPs, following MoD mandates and requirements. As such, in 2030, the British Army will be ready to roll out its most digitally savvy AFV to date, “the most lethal tank in NATO”.

gandh.com

¹ Source: Force News - “Army Unveils The NEW CHALLENGER 3 Main Battle Tank!” (<https://www.youtube.com/watch?v=7HzhqGa2Mac>)

² Source: Force News - “Army Unveils The NEW CHALLENGER 3 Main Battle Tank!” (<https://www.youtube.com/watch?v=7HzhqGa2Mac>)



DEFENSE



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GM Defense satisfies a critical need to deliver armor protected vehicles for global defense and government customers through its Integrated Armored Vehicle (IAV). The international variant of the business' next generation heavy-duty armored Sport Utility Vehicle, the IAV features a high percentage of commercial-off-the-shelf parts and a unique chassis and suspension. Armor is also incorporated into the original design, resulting in a modern vehicle offering superior safety, reliability and handling. Visit us and see the IAV at Eurosatory June 17-21, 2024.

Booth B281, Hall 5A, USA Security and Defense Pavilion

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EXOSKIN®-S1

LOW-BURDEN,
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CBRN SUIT

Designed to meet the rigorous NATO AEP-38 standard, the EXOSKIN®-S1 offers defence against vapour, liquid and particulate Chemical Warfare Agents (CWA), Toxic Industrial Chemical (TIC) and biological threats.

The EXOSKIN®-S1 integrates seamlessly with Avon Protection's range of EXOSKIN® CBRN protective wear and respiratory systems while maximising the safety, comfort and agility of operators in the field.



AIR TARGET



POWER OF PRECISION

Air Target delivers modern, leading-edge acoustical scoring systems for quality practice and performance. Our products are continuously developed with the latest state of technology and components.

Air Target is the prime contractor to defense forces in more than 30 countries and has a complete product range, including MDIs, scoring stations, test equipment, sleeve targets and inboard target towing winches. Air Target has the capability to customize all products to the customer's requirements.

Air Target provides weapon system-operators with instant feedback, turning each fired shot into valuable experience.

Our products and solutions in short

The universal 12 sector Miss Distance Indicator (MDI) detects fire being directed at the target coming from any direction. Changes of the target course can be smoothly handled during the mission. The systems are compatible with a full range of weaponry from 5.56 small arms to missiles. The battery-operated MDI, uses pressure sensors to detect the shock wave generated by a passing supersonic projectile or missile. The MDI is installed on or close to the target. The amplitude and the time differences between the different sensors are used to calculate the miss distance and direction to the closest point of passage of the projectile relative the target.

Scoring data from the airborne system (MDI) are then sent to the scoring station, over a telemetry link for presentation in real-time. The scoring stations can receive scoring data from up to six targets (MDIs) simultaneously.

Our Goal

Our goal is to deliver scoring system solutions that truly meet the customer's requirements. We combine technical expertise with perceptiveness and never assume that we understand before we have a clear view of the whole picture.

For us a delivery is not complete until the customer has the solution up and running and should there be any issues, we will do everything in our power to resolve them as quickly and with as little inconvenience to the customer as possible. We believe that an excellent experience is the best way to cultivate good customer relationships that stand the test of time.

We do offer off the shelf-solutions, but we have learned that customer satisfaction increases immensely by working closely with the customer and adjusting the solution according to each unique application. Delivering a custom fit that is ready to be used out of the box. Our long experience from military applications, our dedication to quality, and our proven technology for turning physical stimuli into an electrical signal and converting it into digital data that can be visualized, guarantees optimal target precision training.

Air Target – Air to ground scoring system

The calibration free Air To Ground (ATG) scoring system is intended to be used at Air To Ground firing ranges for scoring of supersonic projectiles.

The target area equipment consists of a Target Processor Unit TPU, a Beam Sensor Unit BSU, an antenna and a 12 VDC battery. The target area equipment is placed in front and below the target, and behind a protection wall. The pressure sensors of the BSU detects the shock wave from a passing supersonic projectile.

The scoring data, i.e. hit order and time information from the sensors is transmitted via the radio link in real time to the Control Station Equipment (CSE). The scoring data is used by the CSE when calculating the scoring result. The scoring result is graphically displayed on the color monitor as x and y coordinates. The salvo center, mean miss distance, and total number of scored rounds are displayed together with the graphic picture.

The scoring result can also be displayed in tabular form round by round. A print-out of the scoring result is also possible. The scoring result is stored in a data base. The Control Station Equipment can as an option receive scoring data from six different targets.

Training scenarios

Air Target – Ground-to-air – Prepare to protect targets on the ground from airborne threats

You most likely know how much you have practiced a specific scenario, but unless you have measured the weapon system operator's precision you are not truly prepared for live action.

Our Ground-To-Air (GTA) system is designed for target practice of airborne threats, typically an attacking aircraft, helicopter, incoming attack missile or unmanned UAV, from the ground or surface.

Acoustical, universal angle sensors, placed on hard- or sleeve targets generate accurate data in both attack- and passing mode, allowing you to design realistic training scenarios, and to instantaneously switch from one scenario to another. Train the ground based anti-air forces to protect targets of tactical importance from a fixed location or an armored vehicle and prepare the personnel onboard a surface vessel for effective self-protection.

Our sensors will indicate how each individual performs and provides them with insightful feedback in real time. Training becomes more effective as the personnel on the ground or surface will learn from each fired round or missile. Time spent training and cost of ammunition can be reduced and most importantly; you will know how well you stand prepared for live action.

Air Target – Air-to-air – Realistic training scenarios with universal angle sensors

You wouldn't ask the pilots to train for a battle in the air with their eyes closed. From our perspective, not using a system that allows you to measure the precision of each fired shot is equally unwise.

Our Air-To-Air (ATA) system is designed for target practice of airborne threats typically attacking aircraft, helicopter or unmanned UAV entering your air space. Acoustic, universal angle sensors placed on hard- or sleeve targets generate accurate data in both attack- and passing mode, allowing you to design realistic training scenarios of varying levels of difficulty, and to instantaneously switch from one scenario to another.

The exercise control center will see how the pilots performs in real time and can provide them with insightful auditory feedback. Access to the right information increases the level of training quality and the pilot will learn optimally from each training run. Accuracy is everything in a battle in the air. Provide your pilots with the best possible conditions in order to hit and neutralize the target they have committed to.

Air Target – Air-to-ground – Improving the pilot's precision skills with every exercise

Air Target's practice sensors can be placed on virtually anything allowing you to design realistic training scenarios of varying degrees of difficulty for air-to ground target practice.

Our universal angle target practice system allows you to optimize the value of the training in all the scenarios you design. You can for example emulate the advancement of tanks or set up fixed targets in your choice of terrain.

After each practice round the pilot receives instant feedback on the performance allowing him or her to improve their precision skills continuously throughout the training session. As training becomes more effective you maximize the benefit of each fired round or missile and can thereby reduce the time and cost of fuel and ammunition. Precision target practice not only lets you know how long the pilots have trained for; it will let you know if they are prepared for live action.



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FALCONA 360 DEGREE CAMERA SYSTEMS

IN CONTEMPORARY MILITARY ENDEAVORS, THE INTEGRATION OF 360-DEGREE CAMERA SYSTEMS INTO MILITARY VEHICLES PLAYS A PIVOTAL ROLE IN BOLSTERING SITUATIONAL AWARENESS AND ENSURING THE SAFETY OF PERSONNEL AMIDST CHALLENGING CONDITIONS.

These advanced camera systems facilitate real-time monitoring of the vehicle's surroundings, providing a comprehensive view in all directions.



Nedinsco's FALCONA and AQUILA 360-degree camera systems are exemplary in this regard, offering enhanced visibility by delivering a seamless 360° Field Of View (FOV). This seamless view not only enhances combat efficiency but also safeguards crew members during intricate missions. The absence of blind spots and the continuous monitoring of the environment provided by these systems are paramount for identifying potential threats, obstacles, or hazards.

One notable aspect of these camera systems is their contribution to tactical awareness. Utilizing live images from the camera system, military personnel can promptly assess the tactical situation and make well-informed decisions in real-time. The panoramic view around the vehicle aids in identifying obstacles, enemy movements, potential ambushes or other hostile activities.

Through the strategic placement of multiple rugged cameras on the vehicle, equipped with overlapping fields



NEDINSCO VENLO

of view and utilizing sophisticated imaging and software technologies, our advanced systems excel in generating a comprehensive 360° image. This capability empowers personnel with the agility needed to navigate complex environments effectively. Our solutions enable crews to maintain a seamless, real-time 360° overview, seamlessly transitioning between bird's eye, rear, left, right, and front views.

The FALCONA and AQUILA 360 configuration comprises modular optical sensors operating across various spectral ranges, including low light CMOS (daylight), short-wave infrared (SWIR), and long-wave infrared (LWIR). Inspired by the keen eyesight of birds of prey, the names of these sensors reflect their value proposition: providing a sharp, hawk-eye view in any tense situation.

These camera systems offer remarkable operational adaptability, showcasing versatility by being deployable across a diverse range of military vehicles. Whether

installed on armored personnel carriers, tanks, reconnaissance vehicles, or unmanned ground vehicles (UGVs), they provide flexibility in mission planning and execution across diverse operational scenarios.

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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.

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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.

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RUGGED GENSETS

ATLAS TOUBKAL RANGE

Critical power requirements, in the military defence sector are of unimaginable importance and can even mean, the difference between mission success and failure.



Available as communications vehicle Gensets, field hospitals, camp power, or as any Gensets that comply with particular military requirements, defence Gensets.

Especially designed for extreme environments and emergency situations, defence Gensets can provide emergency power when needed the most. Ensuring power continuity and therefore the prevention of power failure and power outages, defence Gensets provide peace of mind to those that depend on them, allowing them to focus on more pressing matters.

Defence Gensets can withstand harsh terrains, protect against power strikes and ensure that power supply is always provided. Aiding military missions, ensuring crisp communication and data transfer, military Gensets can truly make or break the team they are serving.

OUR DEFENCE GENSET RANGE

At ATLAS NRG TECH, we have an extensive range of defence Gensets and military Gensets that can be used for applications including field hospitals, military camps, communications vehicles and other key military sites and operations. Supporting your team during mission-critical endeavours and ensuring they're always in reach, your defence Genset will become an important part of your operations.

A diesel Genset from our industrial range is ideally suited for military applications, with their robust and compact structure, ease of transport and soundproofing capabilities. Within this diesel Genset range, we can supply, install and manage both 50 Hz Gensets and 60 Hz Gensets, as well as single phase Gensets and three phase Gensets.

ATLAS TOUBKAL MILITARY FEATURES

- *Withstand harsh conditions*
- *Low infrared and noise signatures*



- **Supported by internal resources**
- **Rated power at high altitude**
- **Fuel types including JP-8, JP-4, DF-1, DF-2, DF-A**
- **Full featured Controller (SCADA)**
- **Able to function in extreme ambient conditions**
- **Delivers high-quality power consistently**
- **Provides exceptional reliability**
- **Provides movability on the battlefield**
- **Combat scenarios survivability**
- **MIL grade certified (NATO compliant)**
- **Electro-magnetic pulses resistant**
- **Lowest Preventive Maintenance time**
- **EMI/EMC Compliance**
- **Diagnostic and prognostic capability**
- **Stainless steel fuel tank SS304**
- **Ease of Maintenance**
- **Sliding system 50% and 100%**
- **Provision for grouting**
- **Less foot print**

THE BENEFITS OF ATLAS TOUBKAL GENSETS

Comprehensive range of Gensets (7,5kVA to 270kVA) and transfer switch offerings.

Reliable solutions suitable for diverse applications with minimal risk.

ADVANTAGES OF ROBUST MOBILE POWER

Substantial operational advantages for various military branches.

Decreased logistical burden in terms of fuel and maintenance.

Enhanced mobility and ease of transport for units.

Considerable savings in operations and maintenance expenses.

TOUBKAL20 CBRN

20 kVA Type Approved DG set for CBRN Vehicle. The complete system is integrated in a metallic acoustic canopy.

TOUBKAL 45 TWIN

MIL Standard Environmental Tests and EMI/ EMC compactable Twin 45 kVA Genset mounted on trailer truck to aid power requirements of electronics equipment available on another Vehicle. The complete system is integrated in a metallic acoustic canopy.

TOUBKAL 25 TWIN

MIL Standard Environmental Tests and EMI/ EMC compactable Twin 25 kVA Genset mounted on trailer truck to aid power requirements of electronics equipment available on another Vehicle. The complete system is integrated in a metallic acoustic canopy.

TOUBKAL 7,5

Rugged MIL Standard Environmental Tests and EMI/ EMC approved 7.5 kVA Genset mounted on trailer truck to aid power requirements of electronics equipment available on another Vehicle. The complete system is integrated in a metallic acoustic canopy.

TOUBKAL 50 TWIN

MIL Standard Environmental Tests and EMI/ EMC compactable Twin 25 kVA Genset mounted on trailer truck to aid power requirements of electronics equipment available on another Vehicle. The complete system is integrated in a metallic acoustic canopy.

TOUBKAL 20

EMI/ EMC complied 20 kVA Genset set mounted on trailer truck to aid power requirements of electronics equipment available on another Vehicle. The complete system is integrated in a metallic acoustic canopy.

TOUBKAL 25

Approved Environmental Test passed and EMI/ EMC complied 25 kVA Genset set mounted on 6x6 vehicle for Mine Field Marking Equipment.

TOUBKAL 3 X 90 TRIPLET

EMI/ EMC complied 20 kVA Genset set mounted on trailer truck to aid power requirements of electronics equipment available on another Vehicle. The complete system is integrated in a metallic acoustic canopy.

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Integration and Elevation Systems



RED CAT Launches Robotics & Autonomous Systems Consortium

TO BRIDGE CRITICAL UAS TECHNOLOGY GAPS FOR WARFIGHTERS



Red Cat Holdings, Inc. (Nasdaq: RCAT) (“Red Cat”), a drone technology company integrating robotic hardware and software for military, government, and commercial operations, today announced the formation of the Red Cat Futures Initiative (RFI).

RFI is an independent, industry-wide consortium of robotics and autonomous systems (RAS) partners dedicated to putting the most advanced and interoperable uncrewed aircraft systems into the hands of warfighters.

Anchored by Red Cat’s Teal Drones, the RFI unites the world’s most innovative UAS hardware and software companies focused on AI/ML, swarming, FPV, command and control, and payloads. Founding members include Ocean Power Technologies, Sentien Robotics, Primordial Labs, Doodle Labs, Athena AI, Unusual Machines, Reach

Power, and MMS Products. The shared goal is advocacy, integrations and co-marketing that bridges considerable technology gaps through modular open architecture.

“One of many Teal Drone advantages is the modular design that allows for effortless swapping of propulsion, payload and other hardware based on the specific needs of warfighters,” said Jason Gunter, Red Cat Director of Special Programs. ***“Additionally, with Teal as a hub, we’ve already built a robust ecosystem of partners that specialize in AI and computer vision applications, 3D mapping, target acquisition, swarming, and other sUAS decision support features. The RFI formalizes this but is also a launchpad for co-marketing, tech collaboration, and grassroots advocacy.”***

Red Cat developed this initiative to support the Pentagon’s desire to accelerate innovation for its Replicator initiative and the need for “attritable” autonomous systems across air, land, and sea. This includes the U.S. Army’s Short-Range Reconnaissance (SRR) Program. The consortium will collaborate to ensure requirements-based UAS production that meets the needs of specific missions, as well as reduce vendor lock-in and promote interoperability. The RFI will also focus on R&D and government advocacy that accelerates technology maturation.

“The need for the UAS sector to move quickly to meet the requirements of Replicator is more urgent than ever,” said Jeff Thompson, Red Cat CEO. ***“The needs of***



Defining the Future of Aerial Intelligence



warfighters have shifted dramatically over the past several years, and the key to bridge technology gaps and accelerate maturation is co-innovation amongst hardware and software companies that span the entire value chain. The RFI will spearhead this mission and be a central place to showcase new capabilities and industry voices.”

Red Cat subsidiary Teal Drones builds its Teal 2 system, designed to support U.S. and allied military operations, public safety organizations, and government agencies, at its Utah facility. Teal 2 is a cost-effective, man-portable sUAS designed to “Dominate the Night™” that has best-in-class night vision, multi-vehicle control support, and a fully modular design. It is both Blue UAS Certified and FAA Remote ID approved. Through technology partnerships, the RFI will exponentially expand the use cases for Teal Drones into multi domain (air, land, and sea) operations.

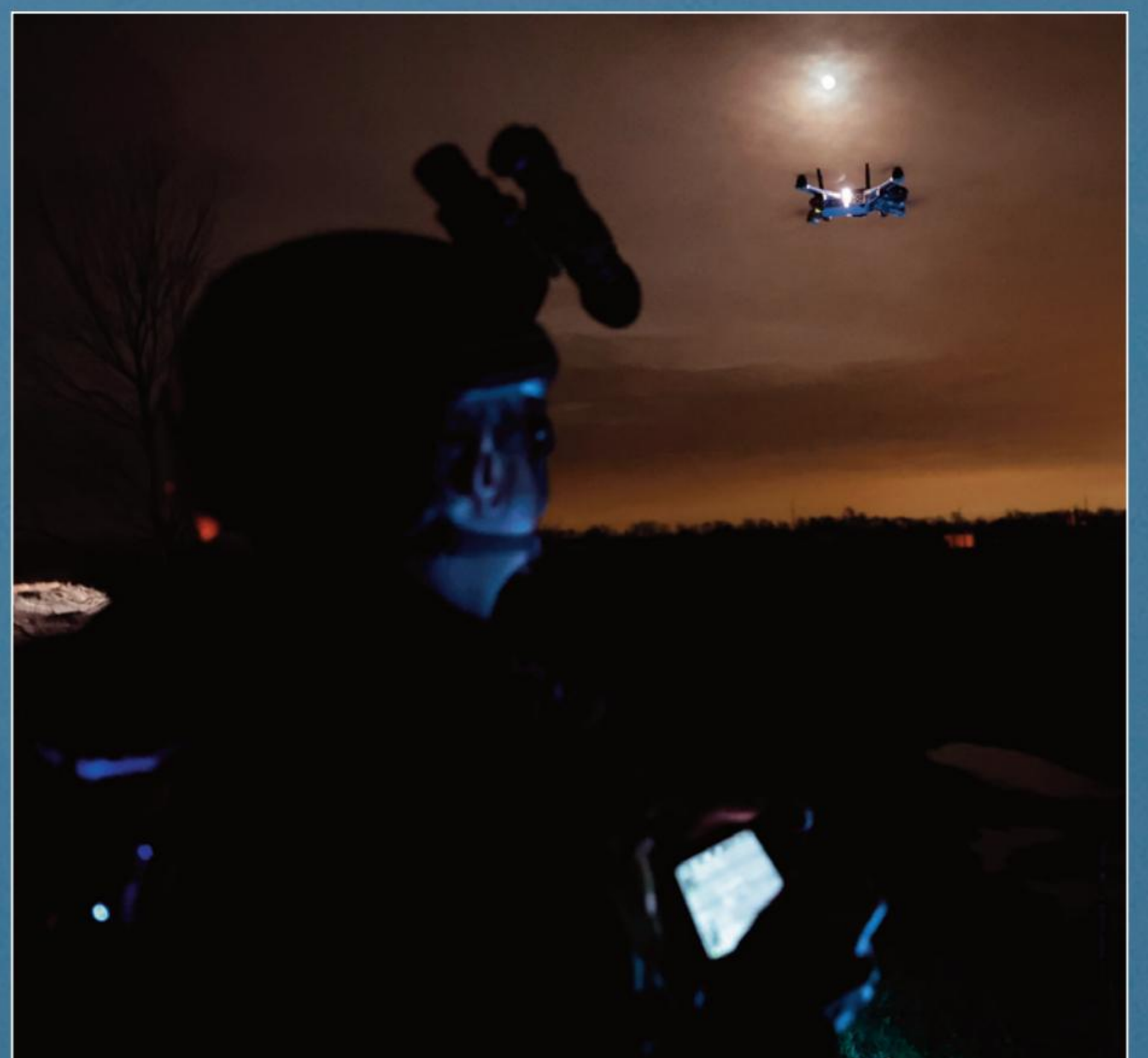
As a member-based consortium, RFI welcomes broad industry participation by companies of all sizes. Membership benefits include formal marketing support, dual reseller agreements, event and conference collaboration, letters of support for government lobbying, and inclusion in a technology “menu” for visibility and RFQs on the Teal website. For more information, or if you would like to get involved with the RFI, visit:

<https://redcat.red/solutions/futures-initiative/>.

About Red Cat, Inc.

Red Cat (Nasdaq: RCAT) is a drone technology company integrating robotic hardware and software for military, government, and commercial operations. Red Cat’s solutions are designed to “Dominate the Night™” and include the Teal 2, a small unmanned system offering the highest-resolution thermal imaging in its class. Learn more at:

www.redcat.red



Connector specialist launches infographic on space worthy connectors



PEI-Genesis, a leading provider of custom connector and cable solutions, has released its latest educational resource, an infographic titled Key considerations for designing space worthy electrical connectors.

This infographic aims to shed light on the intricate design considerations and challenges involved in developing connectors for space missions.



Space exploration poses unique challenges for electronic equipment, from enduring extreme temperatures ranging from scorching heat to bitter cold, to withstanding the vacuum pressure of the space environment. Additionally, the requirement for maintenance-free operation adds another layer of complexity, as any malfunction or failure could jeopardise the success of critical space missions. The new infographic offers a comprehensive overview of the critical factors that must be considered in the development of connectors for space applications.

The visual resource explores the challenge of outgassing mitigation, emphasising the need to prevent materials like elastomers and plastics from releasing volatile organic compounds (VOCs) that could contaminate sensitive equipment. It also highlights the importance of minimising residual magnetism in connectors to ensure optimal performance and reliability in space environments.

Additionally, the infographic addresses the critical aspects of EMI-RFI shielding and environmental sealing, essential



for protecting connectors from electromagnetic interference and maintaining system integrity. Through these key considerations, the infographic provides valuable insights into the complexities of space connector design.

“At PEI-Genesis, we carry a wide range of space-ready and space-grade connectors built to withstand the unique requirements of space exploration,” explained Alex Raymond, product manager at PEI-Genesis.

“The launch of this infographic underscores PEI-Genesis’ dedication to fostering innovation and achieving excellence in the realm of interconnect solutions. Through the provision of invaluable resources, our company endeavours to equip engineers, designers, and enthusiasts with the essential knowledge required to adeptly navigate the complexities of space exploration,” continued Raymond.

The infographic further discusses suitable connectors for space exploration, such as MIL-DTL-38999, D-Sub,

Micro-Miniature and push-pull connectors from industry-leading manufacturers, such as Amphenol, ITT Cannon, Cinch and Eaton.

PEI-Genesis, a value-add connector distributor, has strong relationships with space-rated connector manufacturers. Serving as a trusted advisor, the company tailors custom solutions for unique missions, leveraging its vast inventory for swift access.

To view the infographic or to find out more about PEI-Genesis’ offering and expertise in space worthy connectors, visit:

www.peigenesis.com/en/markets/space.html



PEI-Genesis™



PEI-Genesis is a leader in the design of custom interconnect solutions with a best in class product portfolio that supports the harsh environments of the aviation, energy, military, industrial, rail, and medical sectors worldwide. With sales offices throughout North America, EMEA, and APAC, PEI has a robust distribution network. In addition, PEI-Genesis has years of strong, established relationships with industry leading companies & corporations within this network.

As a designer and manufacturer in the ever-growing electrical interconnect industry, partnering with PEI-Genesis means everlasting growth potential and an esteemed service level to customers that is unmatched in the industry.

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CONNECTING GLOBALLY

A large graphic on the right side of the page. It features a stylized map of the world in shades of blue, with numerous glowing white dots representing global locations. These dots are interconnected by a complex web of thin, light blue lines, symbolizing a global network or connectivity. The background is a dark blue gradient.

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Portability and Safety for Avionics Software:

The FACE[®] Approach and Ada

Ben Brosgol, AdaCore

Source code portability – the ability to compile the same source code on multiple toolchains or target platforms and get equivalent behavior when running the executable – has long been the Holy Grail for system developers as a way to reduce verification and deployment costs.

However, the path to this goal is beset with traps and pitfalls. Using implementation-dependent features or extensions of the programming language, invoking non-standard Application Program Interfaces (APIs), or making direct calls on services provided by the underlying operating system, will result in vendor lock-in, defeat portability and reuse, and increase software life cycle costs. Approaches based on virtual machine technology, such as Java, pay a performance price (and even with Java, portability can be compromised by implementation dependencies such as the language's thread scheduling semantics).

The portability challenge is especially acute in hard real-time systems such as avionics, which are among the most complex and costly kinds of software to develop. To help address this

issue, an effort known as the FACE[®] (Future Airborne Capability Environment[®]) approach was initiated by the US Department of Defense several years ago. It is now managed by the FACE Consortium (comprising members from government, industry, and academia) under the auspices of The Open Group. Membership in the FACE Consortium is currently limited to persons from Australia, Canada, New Zealand, the UK, and the US, but many of the Consortium's work products are publicly available.

As documented in the FACE Technical Standard, the fundamental approach is based on sound software engineering principles and the use of standard interfaces:

- a data modeling technology that ensures a consistent worldview across independently developed components,
- a layered architecture that embodies a separation of concerns, with a clear division between platform-independent and platform-specific services and a well-defined functional interface for inter-component communication, and
- a reliance on open standards for programming languages (C, C++, Ada, and Java) and for APIs (POSIX and ARINC-653).

Writing portable source code is an important way to save development effort, but hard real-time software has other requirements to satisfy. Reliability (e.g., ensuring that real-time deadlines are met) is critical, and certifiability against a relevant safety and/or security standard is typically needed. The FACE approach does not impose specific requirements in these areas – it is not a standard like DO-178C – and verifying FACE conformance does not entail demonstrating that the software correctly implements its intended functionality. However, the FACE approach was designed so that it does not impede the



verification of assurance properties, and the FACE software architecture reflects the reality that different components of an airborne system may be at different levels of safety criticality.

To this end, the FACE Technical Standard defines several profiles (function subsets) for the POSIX and ARINC-653 APIs. From most general to most restrictive, these are the General-Purpose, Safety-Extended, Safety-Base, and Security profiles. Analogously, for each of the supported programming languages the FACE Technical Standard defines corresponding capability sets (language feature subsets): General-Purpose, Safety-Extended, and Safety-Base/Security. Since feature generality may incur a cost in run-time complexity and safety certification difficulty, inclusion in the more restrictive profiles and capability sets is based on functional applicability and certification ease at that level.

Some examples:

- For C, the POSIX `free()` function is allowed in the Safety-Extended and General-Purpose profiles but not in Safety-Base or Security.
- For both Ada 95 and Ada 2012, unbounded strings are allowed in the General-Purpose capability set, but not in Safety-Extended or Safety-Base/Security.

Based on the safety criticality of an application software component (e.g., its Design Assurance Level), the developer will target a specific profile and capability set. The software then needs to adhere to the resulting restrictions, and an official verification process centered around a Conformance Test Suite is used to check that the restrictions are met.

Ensuring that a FACE conformant software component has the desired safety properties entails design decisions at the earliest stages of the software life cycle. Selecting an appropriate profile and capability set is one such decision. But even more basic is the choice of programming language(s) and toolchain(s), since the programming language is the medium in which the software is expressed and maintained and since languages differ in their support for early error detection and prevention of run-time crashes.

Seen from this perspective, Ada stands out as a solid and trusted choice. First, it strongly supports source code portability; for example its data type facility allows the programmer to express numeric types in terms of application-oriented and target-independent properties (ranges and precisions) rather than specific bit sizes. Second, It has a long and successful history in the avionics domain, both military and commercial, and the Ada 2012 version of the language standard supports a feature known as contract-based programming, which in effect embeds requirements in the source code where they can be verified by either compile-time or run-time checks. AdaCore's GNAT Pro for Ada implements both Ada 95 and Ada 2012, and the Assurance edition of the product has specific support for developing long-lived safety-critical systems (including certifiable run-time libraries).



For software that needs to conform to the FACE requirements, Ada and the GNAT Pro for Ada product line bring added benefits.

- Ada provides a standard feature, pragma Restrictions, that allows the programmer to specify language features that are not supposed to be used. Many of the Ada profile and capability set requirements can be formulated as arguments to pragma Restrictions, enabling compile-time detection of violations.
- The GNAT Static Analysis Suite, available as an option for the GNAT Pro for Ada toolchain, includes the GNATcheck tool. GNATcheck is a tailorable coding standard enforcer, with rules that check conformance with nearly all of the capability set restrictions. By using GNATcheck in a continuous-integration pipeline, programmers can verify that their software meets the FACE requirements each time they do a build.

Decades of experience, over generations of software and hardware technology, have shown that developing portable software is hard and that developing safety-critical real-time software is orders of magnitude harder. But by targeting one of the FACE safety profiles and capability sets for Ada, and using GNAT Pro for Ada along with GNATcheck, an avionics software supplier has the tools to meet the challenge.

AdaCore

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MILITARY-STEEL

A NEW MATERIAL FOR DEEP PENETRATING BOMBS

Dr. Gregory Vartanov

Advanced Materials Development Corp., Toronto, CANADA

The 2,000-lb class bunker buster bomb filled with the 530-lb explosive material, and having a case made from the USAF-96 steel, called the BLU-137 penetrator, is being in a serial production at this time.

The BLU-137 is intended to provide improvements in capability and survivability over the BLU-109 penetrator.

An ultra-high-performance concrete (UHPC) made by combining pure powdered quartz with a mixture of metals and nanofibers with a compression strength of up to 30,000 psi, compared to traditional concrete of up to 5,000 psi, is currently utilized for critical applications. Despite all advantages, the BLU-137 penetrator cannot destroy deep targets made from concrete having more than 5,000 psi compression strength.

To penetrate bunkers made from the UHPC, an enhanced penetrator has been designed. Computer modeling showed an ability of the new penetrator to destroy such bunkers.

Description

Currently, the commercial USAF-96 steel is utilized for manufacturing of cases of the BLU-137 penetrators. The designed and developed by AMD Corp. high strength steel for defense applications – the Military-Steel exhibits higher strength compared to the USAF-96 steel at approximately the same ductility and toughness. The concentrations of expensive elements of the Military-Steel are significantly lower than the USAF-96 steel, while the cost of melting, hot forging, and heat treatment are comparable. Another advantage of the Military-Steel is better formability at hot working and better machinability that is critical.

A new design of a monolithic case made from the Military-Steel has been developed to increase its penetrability and capability. The design based on the concept that a material and a shape and sizes play crucial role in capability and survivability of the case. If the material of the penetrator does not have enough strength, large deformation of the nose and wall occurs, and as a result, the nose is flattened, and the wall is warped. On the other hand, if a material of the penetrator does not have enough impact toughness, a fracture of a wall occurs. Both scenarios lead to a reduction of penetrability and do not meet the strict requirements for the penetrator. Therefore, the main parameters effected on penetrability are strength and toughness of the material, shape and length of the nose, thickness of the wall, and length and diameter of the case. The new monolithic case has the same weight as the standard case and the same capacity of the explosive material. Computer



modelling showed that the penetrator with the new monolithic case has more than 20% higher penetration distance compared to a penetrator with the standard case.

Recently developed an ultra-high-performance concrete (UHPC) can withstand bunker penetrators that makes it as a unique material for bunkers. The UHPC is made by combining pure powdered quartz with a mixture of metals and nanofibers and has compression strength of up to 30,000 psi compared to traditional reinforced concrete at just up to 5,000 psi. To reach and destroy well protected bunkers, new weapon systems such as the 30,000-lb Massive Ordnance Penetrator (MOP) and the High Velocity Penetrating Weapons (HVPW) have been developed and manufactured. However, neither the BLU-137 penetrator nor MOP or HVPW and the new designed penetrator with monolithic case made from the Military-Steel can penetrate the bunkers made from the UHPC with compression strength of >10,000 psi and thickness of >10 ft.

To penetrate such bunkers, a new composite case has been developed. The composite case has the following improvements compared to the monolithic case:

- **Utilizing a super-high strength grade of Military-Steel with a strength of >300 ksi and Charpy v-notch impact toughness (CVN) of >20 ft-lb for a nose**
- **Wall made from a high impact toughness grade of Military-Steel with a strength of >245 ksi and CVN of > 35 ft-lb.**

The nose and wall are joined by a special diffusion welding that supplies high strength and high impact toughness of the welding zone.

The composite case has the same weight and the same capacity for explosive materials as the new monolithic case while the projected cost of production of the composite case is 20-30% lower. The new design of the composite case is applicable for penetrators, including BLU-137 penetrator, MOP, and HVPW to penetrate bunkers made from the UHPC.

Conclusion

High strength steel for defense applications – the Military-Steel has been developed as a lower cost substitution of the commercial USAF-96 steel.

A new monolithic case has been designed to increase its penetration distance compared to the standard case.

To penetrate bankers made from the UHPC, a composite case has been developed.

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CALIAN

Calian continues to expand its presence in the U.K. and Europe delivering Training and Simulation for defence customers



Calian is a reliable, global defence partner for Canada, NATO, and its allies, supporting military readiness with its renowned cutting-edge military training services.

As a global military training leader, Calian uses a blend of technology solutions, modelling and simulation, and the experience and expertise of its international team to design, develop, and deliver training to meet NATO's training objectives. Using NATO-standard methods and approaches for training development and delivery, Calian integrates subject matter experts with deep military experience and industry-leading simulation technologies to design, develop and deliver cost-effective training experiences.

Live training field training is essential for unit-level readiness training, and is an increasingly expensive option. Simulation training can help forces maximize their training budgets by providing realistic, immersive training in synthetic environments. Simulation-based training allows units to work as a team in a synthetic environment, in preparation of deploying to the field for live training. This allows for joint and multinational training at a fraction of the cost.

New Acquisition in the UK

To expand Calian's range of training solutions and to establish a larger presence in the United Kingdom, Calian acquired Mabway for up to \$41m. Mabway is leader for supporting large military exercise with role-playing environments that simulate real-world situations, and also deliver technical and engineering education for maritime forces. With over a decade of experience supporting British Army training exercises and over 1000 ex-military and permanent staff and contractors, Mabway brings expanded capacity to Calian's exercise and training delivery. The acquisition of Mabway brings new capabilities and new possibilities for Calian in the British, European and Middle East defence markets.

Strong Record of Delivery in NATO

Calian has been delivering training for NATO for fifteen years, delivering over 75 large-scale exercises. Over the years that team have supported large, complex NATO exercises, providing subject matter experts, scenario developers, and master events lists. Given NATO's increased focus on readiness post-Ukraine invasion, these exercises are crucial for joint and multinational operations and including the integration of air, land and sea forces working together in all domains including space, cyber and information domains.

Calian also expanded into new areas of work for NATO in 2024, winning a contract with NATO Supreme Headquarters Allied Powers Europe (SHAPE) to develop and conduct chemical, biological, radiological and nuclear (CBRN) training, with evaluation and training support components. This project will support NATO's CBRN defence capability by improving readiness for the unthinkable in the case of major conflict. Recently, the Calian team re-won a contract for a major NATO 360 exercise concept development, exercise planning, scenario development and master events list development and a range of other training activities like integrating computer-assisted technologies, role-playing, mentoring, and advising. The NATO Joint Warfare Centre's 360 Collaborative Production Environment Development and Delivery Support Contract is currently Calian's biggest NATO contract. This collaborative work involves exercise, design, development, and delivery at the NATO Joint Warfare Centre in Stavanger.

With its leading-edge technology solutions, Calian has expanded training offerings to meet the evolving needs of NATO and its member countries. Calian has consistently worked alongside NATO at the JWC, ACT and across ACO to find solutions that offer the best value to NATO; adapting

to changes to ensure the right services are provided in the most effective and efficient ways possible. The training exercises include elements of offensive and defensive operations designed to meet the training audience's objectives. As 'Mission Partners', the Calian team sees the demand increase for their realistic and immersive military training across member states of NATO who require integrated end-to-end training solutions.

Simulation Tools, Systems and AI

To design, develop and deliver large-scale exercises Calian relies on MaestroEDE. MaestroEDE allows training leaders to design, develop and deliver simulation-based training in a common synthetic environment. MaestroEDE streamlines planning, enhances training outcomes, and centralizes data with a user-friendly interface. It fosters real-time feedback and collaboration, accommodating participants from any organization. Additionally, its AI Chatbot automates exercise content generation, reducing human effort and accelerating development for greater agility. Using AI, Calian has massively reduced the timeline and effort required to develop training.

In the NATO context, interoperability is essential. Many NATO-member nations have their own proprietary training and operational systems that are not necessarily compatible with those of their allies. To address this challenge, Calian uses the Virtual Command and Control Interface (VCCI). VCCI is a purpose-built interoperability solution that is continuously updated. VCCI is already fully interoperable with many simulation systems used in NATO, and is being used to connect operational communications and ISR systems into large headquarters. With Calian's audio distribution service (ADS), we are delivering system-agnostic connectivity of field radios, allowing leaders to see and contact any callsign in the network. ADS also has voice-to-text capability, turning audio radio calls into text on screen in a headquarters. With translation capability, the language barrier is reduced with voice translated into different languages in text. ADS reduces the volume and distraction in a busy headquarters, facilitating clear communications, passage of information and enabling faster decision-making. VCCI and ADS connect simulation and operational systems to deliver a real "train-as-you-fight" experience.

For individual-level training, Calian delivers augmented reality (AR) and virtual reality (VR) solutions to offer immersive, interactive training tailored to specific job roles, complete with realistic voice procedures. This approach provides a cost-effective alternative to live training, with reduced risk of injury. Immersive environments allow trainees to learn

from mistakes, enhancing the training experience. Using AR and VR, Calian provides immersive, interactive training that engages the training audience throughout the process. The Calian trainers are tailored to the processes and protocols of a specific job role and integrate the necessary voice procedure and syntax to provide maximum realism. Immersing the training audience in a virtual environment provides a very cost-effective alternative to relying on live training alone and does so with much lower risk of injury. Immersive environments allow trainees to make mistakes and learn from them, increasing the learning value of training.

Innovation drives the development of new solutions and expanding the range of what we deliver for customers, and provides new possibilities for the broader defence community. Calian recently launched an artificial intelligence (AI) assistant capability for developing scenarios and writing traffic for large, complex military exercise. The AI capability allows content to be generated automatically and then reviewed by experienced human operators. This technology has vastly reduced the amount of effort required to develop exercises, delivering greater agility to military customers.

Recognized Leader in Defence

Calian's commitment to our customers and to the defence community is being recognized. This year Canadian Defence Review (CDR) recognized Calian's successes in defence by ranking us 21st in their Top 100 Defence Companies in Canada. Companies are ranked on their economic impact, research and development (R&D) initiatives, innovation, contribution to Canada's national security, domestic and international contract wins, excellence in management and overall support for Canada's military. Calian's CEO Kevin Ford was also recognized by CDR this year at the Defence Executive of the Year for his leadership in building Calian's presence in the defence market in Canada.

At Calian, we have a global mindset and a commitment to delivering solutions for customers around the world. In 2024 we have sustained momentum on delivering defence programs for existing customers and expanded our commitments across the defence community. We are also expanding our ambitions with new innovations for defence customers, delivering solutions in new subject matter areas, and securing acquisitions with new capabilities in global markets. We continue to grow globally while meeting or exceeding our customer's expectations. Calian delivers confidence for military customers, no matter their needs.

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HOW TO ADDRESS GPS JAMMING IN HIGH-JAMMING ENVIRONMENTS

The eastern Mediterranean, Black Sea, areas of the Baltic, Poland, and parts of Scandinavia are heavily jammed areas—which has negatively impacted the safety of maritime and air navigation, both military and civilian.

Ceasing operations is not an option, and moving around the jamming is costly, so operators must rely on technology that allows electronic protection, jamming identification, and geolocating the source of the jamming.

TYPES OF GPS JAMMING

There are two types of jamming: blocking and hacking. The first two methods below are examples of blocking, while the third is an example of hacking.

Continuous Wave (CW) jamming: In this simple-yet-effective method, a jammer continuously emits a single frequency or a narrow band of frequencies. This makes it difficult for receivers to process incoming signals as they are flooded with a steady stream of unmodulated signals.

Narrowband jamming: A jammer emits signals at specific, narrow frequency ranges (2 MHz), directly targeting the GPS frequency. This method allows for precise targeting of enemy frequencies while minimizing disruption to adjacent bands, avoiding disruption to friendly signals.

Modulation techniques: There are several modulation techniques to jam GPS. Conversely to the above techniques, which are noise-based, meaning they overwhelm GPS, modulation techniques involve the transmission of signals that are similar to genuine GPS signals. They make it complex for GPS to determine between true and false information. Modulation techniques involve spoofing, which tries to deceive a GPS instrument by providing false location, and complex interference, which makes it difficult for GPS receivers to lock onto the correct satellite signal.

HIGH GPS JAMMING AREAS

GPS jamming has become more prevalent since 2016. In the late 2010s vast areas were affected in South Korea, the Suez Canal, Cyprus, and Israel. In 2024, the eastern Mediterranean, Black Sea, areas of the Baltic, Poland, and parts of Scandinavia are the world's most heavily jammed areas.

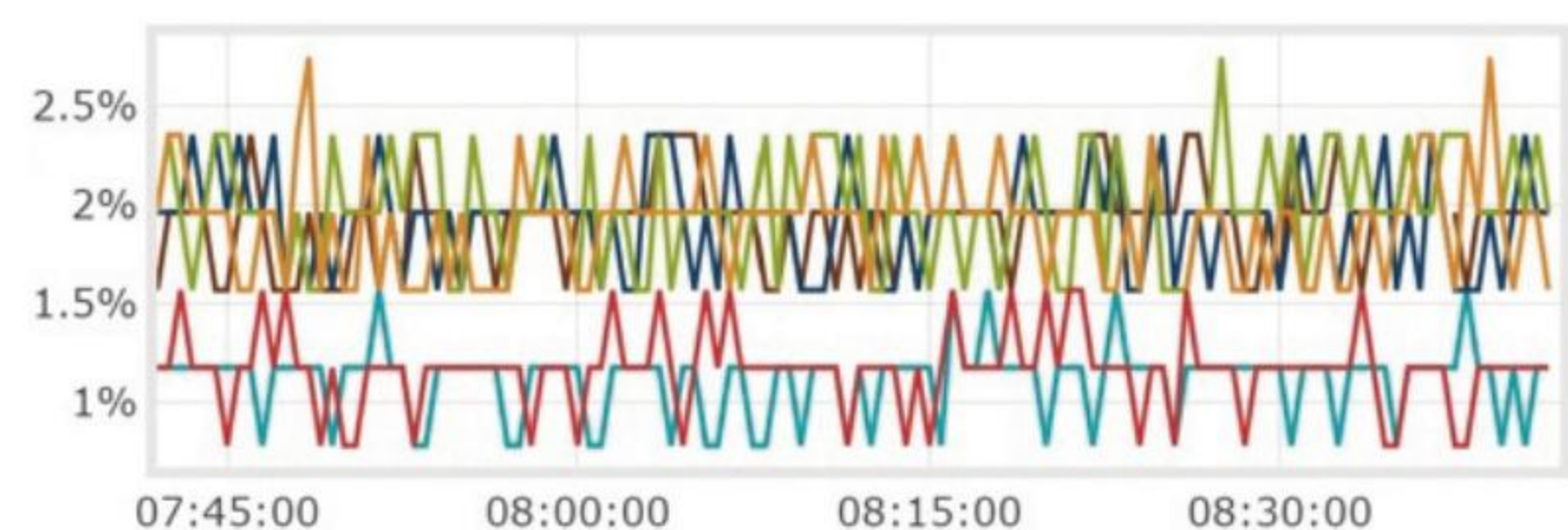


Chart shows jamming as a percentage of jamming probability over time

Navigation is now achieved by GPS alternatives: ship captains are relying on traditional methods, pilots are switching to inertial reference systems, and the military is investing in multiple Assured Positioning, Navigation, and Timing (A-PNT) solutions.

Instead of simply avoiding these GPS jamming areas, victims can take proactive measures, including:

1. Installing electronic protection techniques for GPS jamming
2. Conducting pre-mission intelligence or risk assessment of jamming to signal ratios
3. Geolocating the GPS jammer itself and sending the location to a military or police force

ELECTRONIC PROTECTION TECHNIQUES FOR GPS JAMMING

One effective way to counter GPS jamming is to use Controlled Reception Pattern Antennas (CRPA) instead of standard GNSS antennas. CRPA are phased array antennas that shape their signal reception beams—minimizing the impact of jamming signals while optimizing the reception of GPS satellite signals.

For spectrum monitoring and geolocation tasks, CRFS can supply and fix CRPA to [RFeye Nodes](#) — to minimize the risk of GPS jamming.

When the CRPA antennas detect GPS interference, they angle the beams toward the satellites while ignoring the GPS jamming signals. CRPA antennas use the following techniques to optimize GPS performance.

Adaptive beamforming: The antenna pattern is dynamically adjusted towards the GPS satellites and away from sources of interference. The antenna array steers the beam, which enhances GPS signals while generating zones of minimal sensitivity elsewhere. By doing so, beamforming improves the signal-to-noise ratio of GPS reception, enabling more robust and reliable GPS performance, even in high-jamming environments.

Antenna gain: By increasing the gain of an antenna and simultaneously reducing the gain for signals coming from other angles, a receiver can more effectively receive signals from satellites while reducing signals from other directions. This approach relies on directional antennas that ensure the receiver locks onto and maintains a stronger connection with legitimate signals, improving GPS functionality.

Null steering: The array antenna array is manipulated to form an area where there is significantly reduced signal reception (a null). This is achieved by creating constructive interference (in the GPS satellite's direction, which helps the wanted GPS signals), while also creating destructive interference (in the direction of the jamming, which nulls the interference).

Assessing the probability of jamming: There is no rapid way to determine if jamming is occurring; attribution requires detection and fusing that data with other intelligence. However, before other intelligence capabilities (such as overhead ELINT, IMINT, or COMINT) are applied, detection of the jammer inside the spectrum is usually the first step in this process.

RFeye Nodes contain a jamming indicator provided by the u-blox chipset, which outputs a value from 0 to 256. CRFS automated spectrum management software, RFeye Mission Manager, has a feature that converts the number to a percentage, which is visually represented on a chart (as a percentage of jamming probability over time).

This feature is helpful as jamming is not always binary. A 30% jamming level could indicate several other possibilities in addition to intentional jamming by an adversary, including unintentional interference, the result of signal blockages, or a receiver fault.

By assessing the level of jamming over time, operators can keep a record of the jamming of a particular unit. During critical missions, operators are likely to want to monitor this feature continuously, so when the percentage passes a certain threshold, they can be alerted to carry out geolocations of the sources of the jamming.

Spoofing detection: RFeye Nodes can also detect suspected spoofing.

GEOLOCATING THE SOURCE OF THE JAMMING

Once a percentage threshold of jamming has been surpassed, operators need to geolocate the source of the jamming to stop it from broadcasting.

AoA geolocation: RFeye arrays can perform angle of arrival (AoA) geolocation of jammers in GNSS-denied environments to determine the location of a signal source based on the angle at which the signal arrives at different sensor locations.

RF sensors inside the RFeye Array determine a line of bearing for the incoming signal by measuring the signal strength across the antennas, allowing the sensor to estimate the direction of the signal. By comparing data from multiple sensors that show the point of intersection, the accurate location of the signal source can be triangulated.

TDoA geolocation: Fixed deployments of RFeye Nodes and Arrays can perform 2D and 3D TDoA geolocation of jammers in a GPS-denied environment with the help of two optional components:

- GNSS Holdover module
- Anti-jam CRPA antennas

The GNSS Holdover module ensures the RFeye Node continues to receive an accurate timing reference even when the internal GNSS receiver is compromised by jamming. It allows operators to continue performing geolocations by providing accurate timing to within 1.5 μ s for up to eight hours.

The RFeye Node automatically switches between GNSS and the holdover module depending on the availability of a viable GNSS signal. Using the Holdover module, militaries can then use TDOA geolocation to identify and neutralize the source of the jamming to resume GPS functionality.

CONCLUSION

The proliferation of GPS jamming means military and civilian navigators must change tactics. Ceasing operations is not an option, and avoiding heavily jammed areas is costly; therefore, operators need to rely on technological solutions: taking steps to protect GNSS connection, understanding when jamming is occurring, and geolocating the source of the jamming.

CRFS is an RF technology specialist for defense, national security agencies and systems integration partners. We provide advanced capabilities for real-time spectrum monitoring, situational awareness and electronic warfare support to help our customers understand and exploit the electromagnetic environment.



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NP Aerospace at Eurosatory

Equipements des Métiers
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Contact info@npaerospace.com
to book a meeting with the NP Team

OUR MISSION IS Y

Proven solutions for today's frontline

NP Aerospace is exhibiting at Eurosatory with French distribution partner, Equipements des Métiers de la Défense (EMD) at **booth K21 Hall 6**.

Teams from our Composites and Armour Systems business and Vehicle Systems, Services and Spares business will be at the show presenting the latest developments including high performance body armour, next generation bomb disposal suits and vehicle armour and integration solutions. The company has achieved fourfold growth since 2018 in response to growing user demand and is continuing to expanding its product and service portfolio.

High Performance Personal Protection

The team will be presenting the 4030 ELITE suit, alongside our ballistic body armour plates and lightweight helmet technology. The 4030 ELITE is gaining traction in global markets such as Eastern Europe and Asia and is being used in Ukraine to support the country's



demining efforts. Our production capacity is ramping up to support demand, for example we are now producing 100,000 helmets per year, in partnership with Galvion. We are also supporting Ukraine with further sets of body armour having delivered 2,000 ballistic plates through a recent contract with the UK MOD and Norwegian Ministry of Defence. This takes the total number of ballistic plates sent to Ukraine from NP Aerospace to over 180,000 since the start of the war.

Part of an extensive portfolio of EOD suits, the 3020 ELITE Tactical Suit is also attracting interest due to its modularity and upgrade options. The suit offers multiple levels of protection depending on use, and a variety of visor options and upgrades, delivering a de-mining and search suit in its most basic configuration up to a lightweight bomb disposal suit.

Vehicle Armour Capabilities

NP Aerospace is expanding its vehicle armour capabilities, recently being awarded the Volvo Defense contract for the design, manufacture, and supply of composite armoured cabs for militarised versions of their Volvo FMX Series trucks. At Eurosatory, our STANAG Level FSP Level 3 armour will be showcased on the booth and the Cab will be shown on Volvo Defense's booth.

YOUR PROTECTION



Aerospace

Mission Critical Protection



Vehicle Systems and Services Innovation

The NP Vehicles team have been working on numerous vehicle integration projects with a variety of partners. Most recently, announcing it is one of the key partners on the UK MOD's Laser Directed Energy Weapon Land Demonstrator programme working with Raytheon UK to progress integration of Raytheon's High-Energy Laser Weapon System (HELWS) onto the Wolfhound vehicle.

Alongside this, by partnering with Nurol Makina UK, NP Aerospace is introducing new to the UK vehicles. These include the NMS 4x4

vehicle and Ejder Yalcin 'Dragon' vehicles which have been used on operation in Turkey, Estonia, and other European countries. The platforms have a unique bolt on vehicle architecture which enables faster panel replacements and offers a cost effective solution in theatre. The first vehicles are currently being built in the UK at NP Aerospace's Coventry facility.

The team are also continuing to collaborate with GM Defense on the ISV vehicle.

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VISIT US AT EUROSATORY 2024 HALL 5A STAND K319

EXPANSION AND INVESTMENT

After doubling our revenue in 2023, 2024 is set to be another year of expansion for RunFlat International with the commissioning of a new casting line in our chemical plant, additional machinery such as CNC centres and the move of the fitting centre to a 25,000 sq. ft. (2300 m²) building to assemble complete wheels, a purchasing trend among our

customers. The combined investment has increased our capacity by 50%, enabling us to meet market demands with short leadtimes.

Meanwhile our commitment to premium quality has never been higher. We have also expanded the team to include a Doctor of Chemistry, building a working laboratory on-site for him to run comprehensive material checks and enable us to accelerate our R&D programmes.



NEW PRODUCTS AND DEVELOPMENT

Automotive advancements are enabling increased vehicle weights and higher speeds for operational vehicles. Our RunFlat Systems are proving dominant in terms of deflated run flat performance, increased handling and comfort and no concern of vibration. This has meant we have been recently approved on multiple new OEM's (Original Equipment Manufacturer) programmes globally, including in North America.

Our high-load wheel programme has also gathered great pace thanks to our ability to swiftly conceive new wheels tailored to customers' specifications. Our offering of steel and aluminium, single-piece and multi-piece high-load wheels is now a cornerstone of RunFlat International's range of products, both for generic applications such as Toyota Landcruiser's or Ford F550 and more bespoke platforms.

QUALITY AND SUSTAINABILITY

QHSE (Quality, Health, Safety and Environment) is at the forefront of our ethos. Accordingly, we hold accreditations including ISO 9001:2015 and multiple global OEMs' certifications. We are currently working towards ISO 14001 certification with a view to be accredited later this year.

Sustainability through the reduction of our carbon footprint is key to our strategy. Our solar panels now generate 20% of the electricity consumed by our manufacturing plant. Most of our vehicle fleet has now been replaced with electric vehicles. Our RunFlat material is not only recyclable for our customers but all but a very small portion of our manufacturing offcuts are now being recycled with depolymerised monomer being used in less demanding applications as diverse as fishing or textile.

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Hall **5A** / Stand **BC372**

LANDING MADE SIMPLER

FAUN Trackway Limited, the leading manufacturer of ground stabilisation matting, launched their latest Trackway® panel – PSA Flat Top N Trackway®.

Facilitating the safe take-off and landing of aircraft, the panel has been tried and tested by the US Marine Corps for VTOL Operations. FAUN Trackway Limited's Helicopter Landing Mat (HLM) is an interlocking system of military-grade aluminium panels that can be installed on difficult terrain, or in hard to reach places, and since its launch, this system has supported the mobility requirements of the armed services during remote operations.

With its flat surface and anti-skid grip, the PSA Flat Top N Trackway® panel ensures personal and asset safety by suppressing dust, sand and foreign objects; whilst its structurally sound yet flexible foundation supports VTOL.

Each project is thoroughly planned out by their engineers, and is bespoke and tailored to each of their client's needs. The HLM can be manufactured to any size requirement, yet its design enables two panels to stack into a combined state of 1.1in; allowing for increased

square footage, facilitating quicker movement and packing. With increased panel bundles within ISO containers, this reduces transport costs and carbon footprint. The entire kit has been developed to be light and quick to assemble as well as multipurpose, this allows for efficient and safe deployment and recovery of the Trackway® but also the versatility of using the ISO container as an operational base if needed.

The PSA Flat Top N Trackway® is made to be durable, resistant to all types of weather and the ability to withstand extreme temperatures, however easily repairable if necessary with interchanging panels, making it one of the easiest solutions in unpredictable situations.

FAUN Trackway Limited have had immediate success following the release of their new Trackway® catch the team at Eurosatory, in Paris Nord Villepinte exhibition centre in June.

FAUN Trackway Limited will be in **hall 5A, stand BC372.**

www.fauntrackway.co.uk

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Helicopters can often be called on to land in tough surroundings, where airfields do not exist or it is not feasible to install permanent infrastructure.

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VERTICAL TOP LOAD	3-5 KG	2-50 KG	2-5 KG	5-10 KG	20-130 KG	50-600 KG	10-50 KG	50-120 KG

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EVENT DETAILS:

Event: EUROSATORY 2024
Date: June 17-21, 2024
Booth: 5B-B349
Venue: Paris, France

Our dedicated team will be on-site in Paris, ready to provide comprehensive insights, address any inquiries you may have, and present the innovative solutions we have been diligently developing. We firmly believe that EUROSATORY 2024 will serve as an invaluable platform for fruitful exchanges and collaboration. If you want to be along the first ones to book a meeting with our experts, please contact us directly via: sales@mastsystem.com.

PRODUCTS ON DISPLAY IN EUROSATORY 2024:

Light mast systems for man-portable applications:

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DIS INTEGRATION OR DISINTEGRATION

A microcosm of the broader complexity of collaboration

Robert Taylor and Justin Megawarne

Introduction

With defence in an unheralded period of uncertainty it is always pleasant to find some firm ground. To that end the notion that the use of simulation in military training will increase dramatically over the next 5 years will not cause much disagreement.

Against a training burden that has never been so intensive the MoD is faced with equipment costs increasing, availability of ammunition¹ decreasing and the complexity of training clashing with emerging restrictions. Simulation is a critical tool in tackling these problems.

Given the scale of this challenge, coupled with the breadth (more on this later) of the UK defence industry, integrating multiple systems into a single virtual² battlefield (or Single Synthetic Environment) demands simple, understandable, interoperable and effective standards. We are not there.

Where are we?

The world of defence simulation is sufficiently opaque. This piece does not intend to add to that technical layer of fog. Rather it intends to explain the current issues as simply as possible, before offering three potential solutions.

In 2024 we are collectively spoiled. We are accustomed to the concept of “plug in and play” across our lives with HDMI cables, USB plugs, Qi charging among others. So much so that one might casually assume that the same level of standardisation would be found in defence simulation hardware.

DIS³ (or the Distributed Interactive Simulation standard) was created in 1992 from work done with SimNet (created in 1987). Despite cancellation by NATO in 2010 it is still in use within the MoD. DIS's successor HLA⁴ (High Level Architecture), formed from a blend of DIS and ALSP (Aggregate

Level Simulation Protocol) in 1996, is still 1 year older than the Nintendo64 game Goldeneye, at 28.

Despite iteration, both standards are outdated and limiting. This limitation is exacerbated by the number of adaptations being made with lenient, or in some cases no, centralised oversight (despite the valiant efforts of some in the UK through the Defence Policy for Modelling and Simulation – DMASC). Experimental Protocol Data Units (PDUs for short)^{5,6} are network messages created by all parties to overcome the standard's shortfalls. Their variance, lack of regulation and lack of standardisation have created a situation akin to the simulation Tower of Babel.

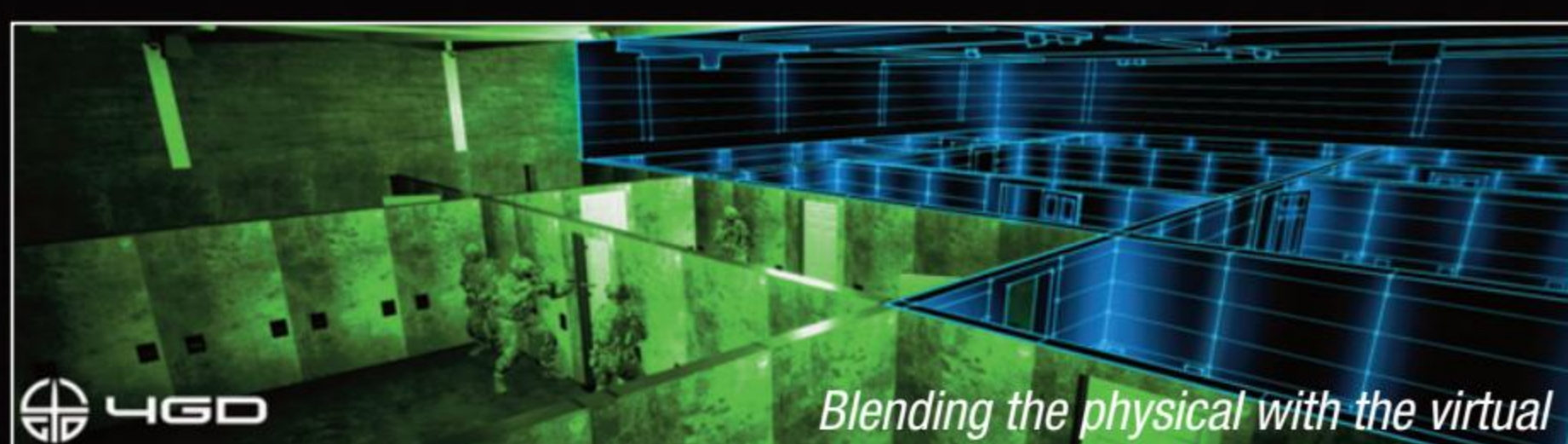
An unwillingness to conduct wholesale change, combined with a broader lack of understanding is now leading to the creation of an entirely unexpected problem – the launch of new products to overcome the shortfalls of DIS and HLA. Far from solving the problem by filling the gaps, this is adding to both the complexity and now the cost of new capabilities. Imagine the entire country having to use plug adaptors, just because manufacturers were unwilling to adhere to the Type G standard. Nobody would tolerate it there: so why do we tolerate it in defence?

Solution 1: Unilateral not collaborative development.

There are 3 potential solutions to this issue and these will be looked at in increasing order of feasibility.

The MoD likes collaboration and partnerships and with the technological breadth and challenges on the global stage this has its place. That being said, some of the biggest technological leaps of the last 20 years have been made by singular organisations headed up by empowered and focussed leaders.

Nowhere would this difference in approach be more apparent than when comparing Project Purple (the 2005-2007 £120M development of the first generation iPhone) and Morpheus (the now cancelled 2017-2024 £690M component of the development of the next generation of tactical communications)^{7, 8}. Collaboration is critical to development but when



Blending the physical with the virtual

that approach drifts into “design by committee”, both from MoD and industry, things go wrong.

Especially when said collaboration is not being done to ensure best in class but to prop up a British defence industry landscape that is overburdened, when adjusted to a like for like comparison with the US DoD.

One way to simplify integration would be to offer larger slices of the simulation pie to fewer companies. While this by no means advocates the monopolisation of simulation it would be simpler if the Army, Navy and Air Force had 1 or 2 simulation specialists each as would largely limit the requirement for standards to the service, or strategic, level.

In simulation the loss of fidelity inevitably caused by standardisation matters less at the higher level, where the data is often icons on maps. Where it causes considerable frustration is when a single soldier's equipment has simulation capability from 2+ companies interoperating poorly.

Solution 2: New Standard.

A bold approach would be the creation of an up-to-date and more prescriptive standard, designed with the premise of empowering contemporary engines (such as Unreal or Unity)¹⁰. This approach could rebaseline defence simulation in 2024 rather than 1996. HLA, through its UDIs (user defined interactions), has the same issues as DIS and is only 4 years younger. That simply isn't good enough for this century, and it is high time for a change.

This approach could shake the current paralysis but a decision would need to be made as to whether this is done at a national (MoD) or international (NATO) level.

Real lessons could be learnt from the HDMI standardisation of 2002. Lessons such as pan-industry engagement (representing a large portion of the market), it being led by industry vice Government/Academia and regular committee meetings with strong expectations have all ensured the HDMI standard remains at the forefront of visual connectivity. All this, despite being conceived 5 years before the first iPhone was launched.

Solution 3: Adherence.

While the first two solutions would create the most dramatic change, they would both take more time than is available to benefit operational performance. As such a more tactical, and timely, approach is needed.

The core of this solution is the need for a developed and enforced common behaviour. There must be a unilateral arrangement of a multilateral agreement as to permitted/unregulated PDUs, namely those that enhance the individual simulator, such as the enhancement of avatar emotion, but do not interfere with the aggregated simulation, such as weapon effects. The MoD should be strict and industry should be candid, that the intent of all simulation capability should be to be standardised. Vague statements such as “DIS compatible” must become a thing of the past from industry and toothless statements like “wherever there is a clear operational benefit and Value for Money” must disappear from policy. Integration must lead to the sum being greater than the parts, or it is no integration at all.

A well resourced, funded and intentioned committee must be established with a frequent drumbeat and be empowered to act decisively. This may need to be re-regionalised to reinvigorate much-needed dynamism, as both HLA and DIS are currently managed by the US based Simulation Interoperability Standards Organisation (SISO). The funding is critical, as ensuring PDU compliance will require otherwise unincentivised industry to be pushed to keep their software up to date. It is naïve to assume this will be done without proper motivation.

One aspect of solution 1 that could be leveraged is the fact that adherence is easier if industry have larger slices of the pie, and thus greater incentives. One way to look at this would be to differentiate products



(simulators) and federations (simulations). For example, standardisations could be improved is a policy that single simulators, or experiences, should, where possible, be the sole responsibility of a single commercial entity.

Summary

Simulation is here to stay, and is in fact destined to grow considerably. If the UK, and it's Allies, are to leverage this to find operational differentiators there is a need for all simulators to truly integrate into centralised simulations. Army JTACs should be talking to RAF and Navy Pilots daily through simulation. Combined arms should have improved dramatically in the last decade, it hasn't and the lack of proper standardisation is heavily to blame for this.

U-turns are challenging and are even more so in defence. As such it is often preferable to utilise the existing rules better than try to create new ones. In order to make this a reality the MoD should consider both supplier and data standardisation at the core of future acquisitions.

If this is achieved it could facilitate the federated and aggregated approach to simulation that both industry and defence want and avoid the need to create, or acquire, expensive temporary adaptors. The MoD has a limited budget, it should be spending more on hardware and simulators that enhance and improve training rather than middleware that, with some clearer thought, should not be required.

The alternative is that we continue with an experimental PDU free-for-all, with multiple users all trying to capture the exact same data in a myriad of different ways. Which, in turn, means simulators cannot talk to each other in any sensible or painless manner, leading DIS integration to become disintegration.

www.4gd.co.uk

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Understanding DEF STAN 80-161

DEF STAN 80-161 specifies high-performance, corrosion-resistant coatings for military applications. This standard ensures coatings

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The A98 Trimite Coating System exceeds DEF STAN 80-161 requirements, formulated explicitly for internal components of tanks and ground equipment. It provides exceptional protection, ensuring critical parts remain operational under demanding conditions.

Key Features:

Corrosion Resistance: Protects components from rust and degradation in harsh environments.

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Mechanical Durability: Enhances durability, reducing wear and extending service life.

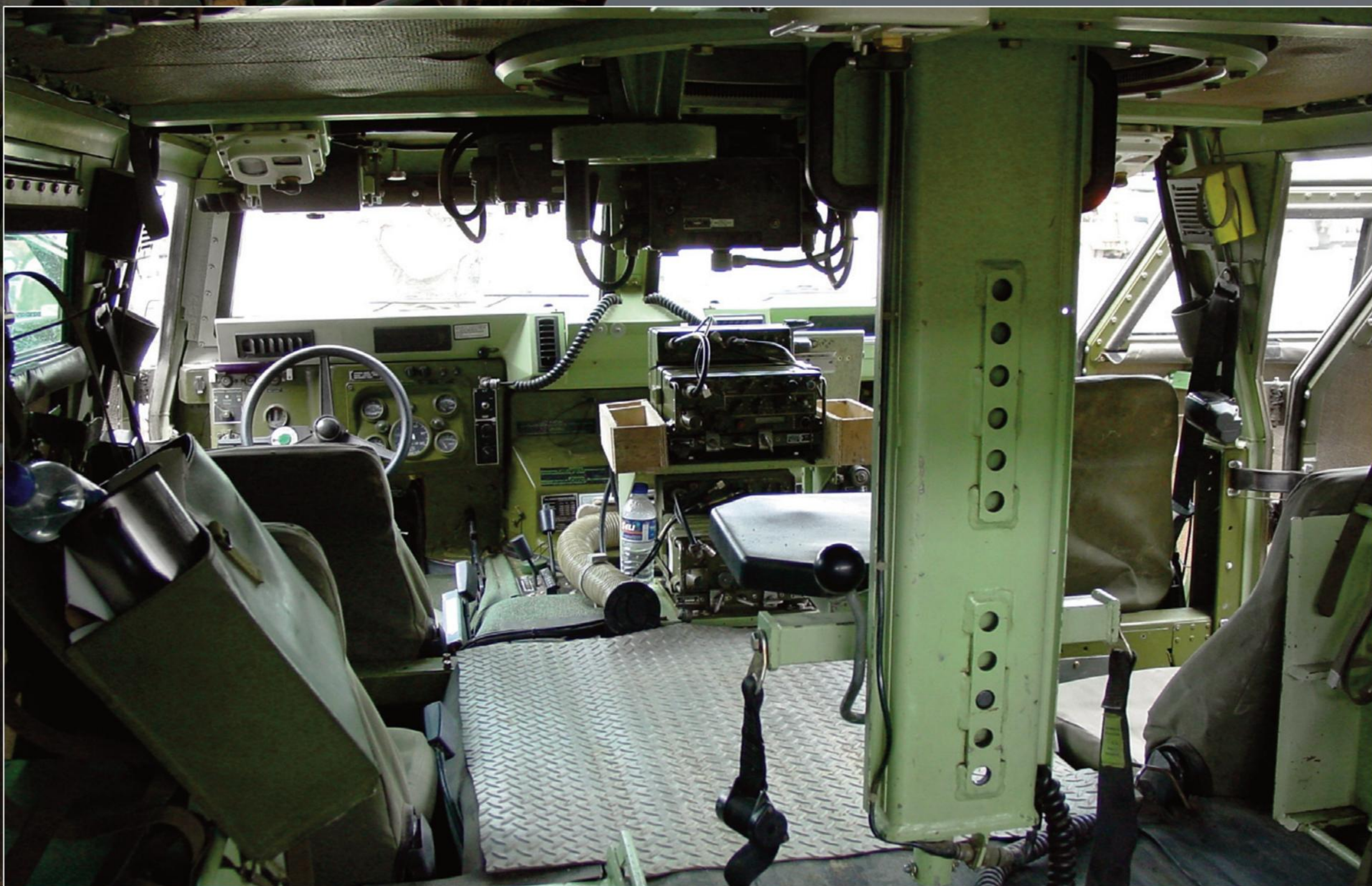
Thermal Stability: Maintains protective properties across a wide temperature range.

Adhesion: Exhibits excellent adhesion to various substrates, ensuring durability.

Technical Specifications

The A98 Trimite system is an air-drying, two-pack epoxy paint





designed for the aviation and defence industries. It can be applied over pretreated aluminium or steel, making it versatile for military vehicle substrates.

- **Two-Pack Epoxide:** Offers enhanced durability and performance.
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- **Spraying Application:** Ensures even and consistent coating.
- **Abrasion Resistance:** Withstands physical wear and tear.
- **Saline Condition Resistance:** Prevents corrosion in marine environments.
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Compliance and Applications

The A98 system meets DEF STAN 80-161 requirements, ensuring components are protected to the highest military standards. In Challenger tanks, it protects internal components like engine parts and transmission systems, enhancing reliability, reducing maintenance costs, and providing a strategic battlefield advantage.

Trusted by the Industry

Trimite Global Coatings supports OEMs from formulation to application, ensuring compliance with DEF STAN 80-161. With over 80 years of experience, Trimite leads in developing coatings for the

defence industry. They offer exceptional service, technical support, and training, setting industry standards.

Based in the UK with a global reach, it serves various industries, including Defence, Aerospace, Plastics, Engines, Rail, and General Industrial sectors. Their commitment to quality and innovation ensures OEMs have the best tools for creating durable, high-performance military equipment.

Trimite is a long-standing member of The British Coatings Federation (BCF), a prominent trade association for the coatings industry in the UK. Additionally they are proud members of Made In Britain, upholding the standards of quality, innovation, and excellence in British manufacturing. For more information, visit:

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The system incorporates a radar, 30mm cannon with specially designed ammunition, and EOS proprietary stabilisation and pointing technology for counter-drone operations. The system is capable of tracking and engaging moving drones beyond 800m, with unique ammunition making it suitable for use in built-up environments. Slinger can be operated independently or as part of a network.



THE SLINGER PHILOSOPHY

The Slinger counter-drone system draws inspiration from the historical Slinger soldier, renowned for their remarkable precision in launching small stones to defeat enemy soldiers from a distance. Just as the ancient Slinger provided accurate long-range firepower using a lightweight and affordable weapon, the Slinger system effectively counters the modern threat of drone attacks with a single, precise shot of lethal force.

Fully-stabilised for accurate, on-the-move engagements that deliver superior performance at a competitive cost per kill

KEY FEATURES

- *High precision weapon platform weighing less than 400 kg*
- *Fully stabilised for on-the-move operation*
- *Exquisite pointing technology for extreme accuracy*
- *Four-axis sighting system with sensor unit that moves independently of the gun in both elevation and azimuth*
- *Bushmaster M230LF 30 x 113mm cannon*
- *Lightweight 30mm Proximity Sensing, high explosive, fragmentation round*
- *Echodyne ultra-low size, weight, and power (SWaP) 4D targeting radar with active beamsteering ESA*

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XEOS

How image processing is driving surveillance innovation



Steve Hogg, Director of Image Processing at Chess Dynamics



Surveillance is an everchanging area of defence, driven by the pace of technological advancement and changing requirements.

You only have to look at recent conflicts, such as in Ukraine to see how drones, or unmanned aerial vehicles (UAVs), have had a significant impact on the direction of the war. As these technologies develop, forces must react accordingly to defend themselves effectively.

However, the fundamental drivers of surveillance technology - accurate detection, identification and targeting - remain unchanged. The performance of surveillance systems has had to continually improve, both to match the technology of hostile forces and to get smarter in order to reduce operator burden.

In this article, I consider some key areas of technological development

within surveillance, before focusing on how advances in video detection and tracking in particular is enabling more flexible and robust surveillance and targeting systems for defence and security operators.

Digital advancements

As with the majority of technologies across the defence sector, digitisation is a key driver of change.

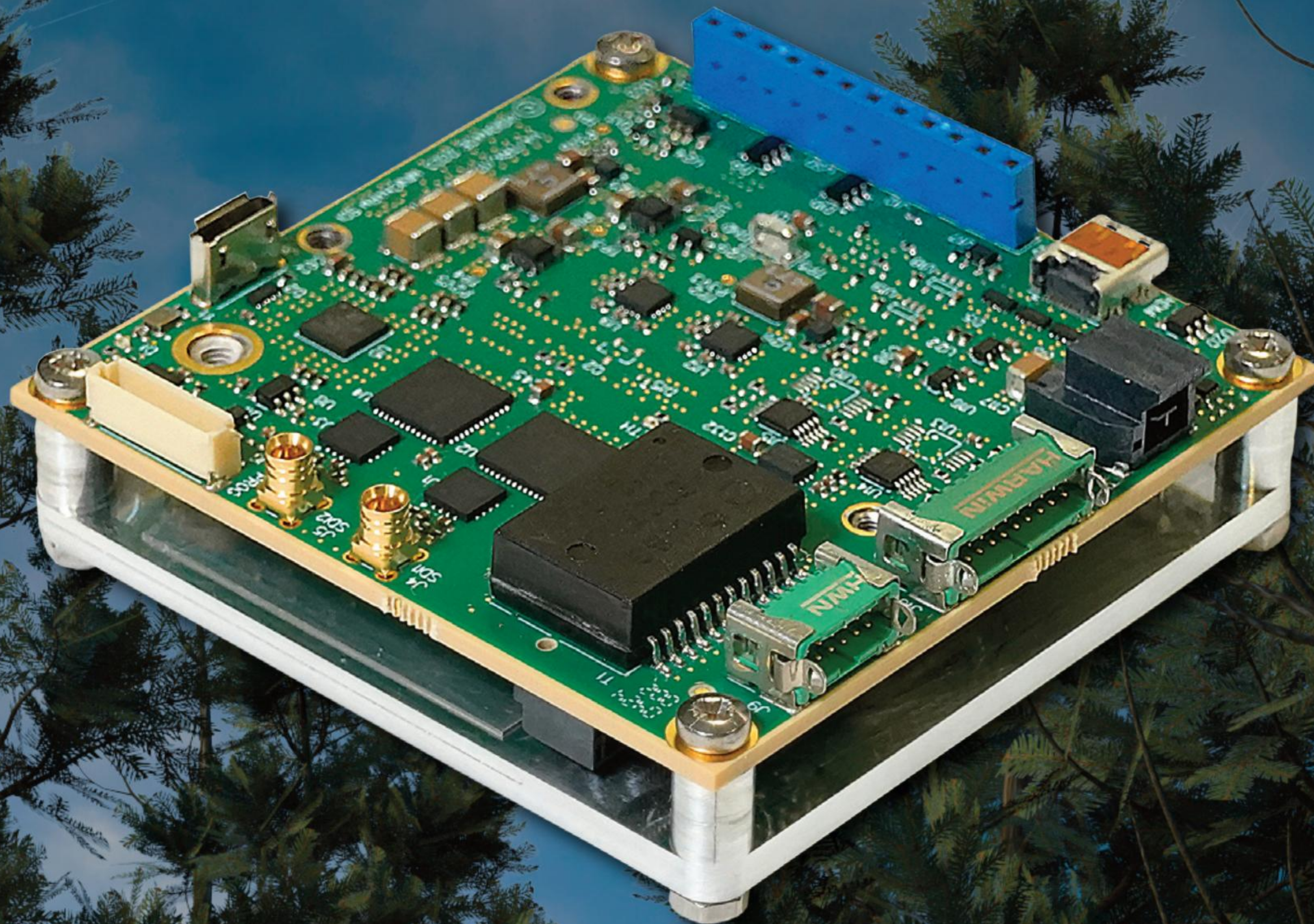
As the operating environment becomes more complex, the very best sensor technology is needed to provide an accurate picture and keep pace with the development of increasingly faster and diverse threats. This is driving the use of sensors with higher resolution and higher framing rates as well as a wider variety of sensors. This means a richer and more accurate picture can be generated for operators and, when combined with a modular approach, allows for customisation of a system to meet specific surveillance needs.

Digital architectures not only support a greater range of sensing options but also secure network access to support integration with other capabilities, increasing the volume and quality of data accessible to operators. Through the use of automated alert systems this ultimately enhances situational awareness while reducing the operator burden.

Accurate tracking capability

Another area in which significant developments have been made is in target identification and tracking. Driven by another key trend that we're seeing across the defence and commercial sectors, the use of artificial intelligence (AI) and machine learning has transformed the abilities of identification and tracking solutions.

A good example of this is the Video Target Trackers introduced by Vision4ce, a Chess Dynamics brand. Incorporating AI and machine



learning, the solution can automatically process images and identify threats.

Machine learning also improves tracking performance in cluttered environments where the AI technology can automatically acquire and, if needed, reacquire targets. This reduces operator involvement by delivering greater levels of automation - operators no longer need to sit behind a screen constantly monitoring for long periods of time. Added to this is the ability of the technology to recognise and identify dynamic targets such as the drones that have had such an impact in recent conflicts. Operators can therefore focus on other tasks while the system is maintaining a persistent surveillance capability and can input when alerted.

Getting smaller

As with technologies across many industries, small form factor is becoming increasingly desirable.

Chess Dynamics has recently launched its next generation tracking capability, the Vision4ce Mini CHARM, a new image processor specifically designed for size and weight-constrained applications, such as drones and small tactical vehicles.

The Mini CHARM offers a powerful and flexible solution for electro-optical system manufacturers and integrators seeking advanced image processing capabilities in a compact footprint. Its compact design and efficient operation make it ideal for integration into small, lightweight camera systems, offering a leading image processing capability to space-constrained platforms.

In practice, this can provide smaller, mobile platforms such as drones or unmanned ground vehicles with an image processing capability that can allow them to provide a more flexible picture of the operational environment.

Additionally, the real-time, low-latency processing enables rapid

decision-making and accurate performance in critical situations.

The engineering challenge

Developing an image processor of this size faced some significant engineering challenges. Primary among them was reducing the size, weight and power of the system without sacrificing performance, particularly for AI-based algorithms which require significant computer resources.

The Chess Dynamics team of experienced engineers have been developing real time image processing solutions for many years and were therefore able to draw on a deep understanding of the machine learning algorithms and the implementation on low power embedded platforms without compromising system performance.

Looking ahead

As new surveillance concepts emerge and AI shapes the future of surveillance systems, it's clear that surveillance capabilities will need continually to evolve to meet the needs of the defence landscape. While hostile technology continues to advance, so will the requirements on defence companies such as ourselves. We may not know what the surveillance landscape will look like in the future, but we can be sure that accurate detection, identification and targeting will remain key pillars.

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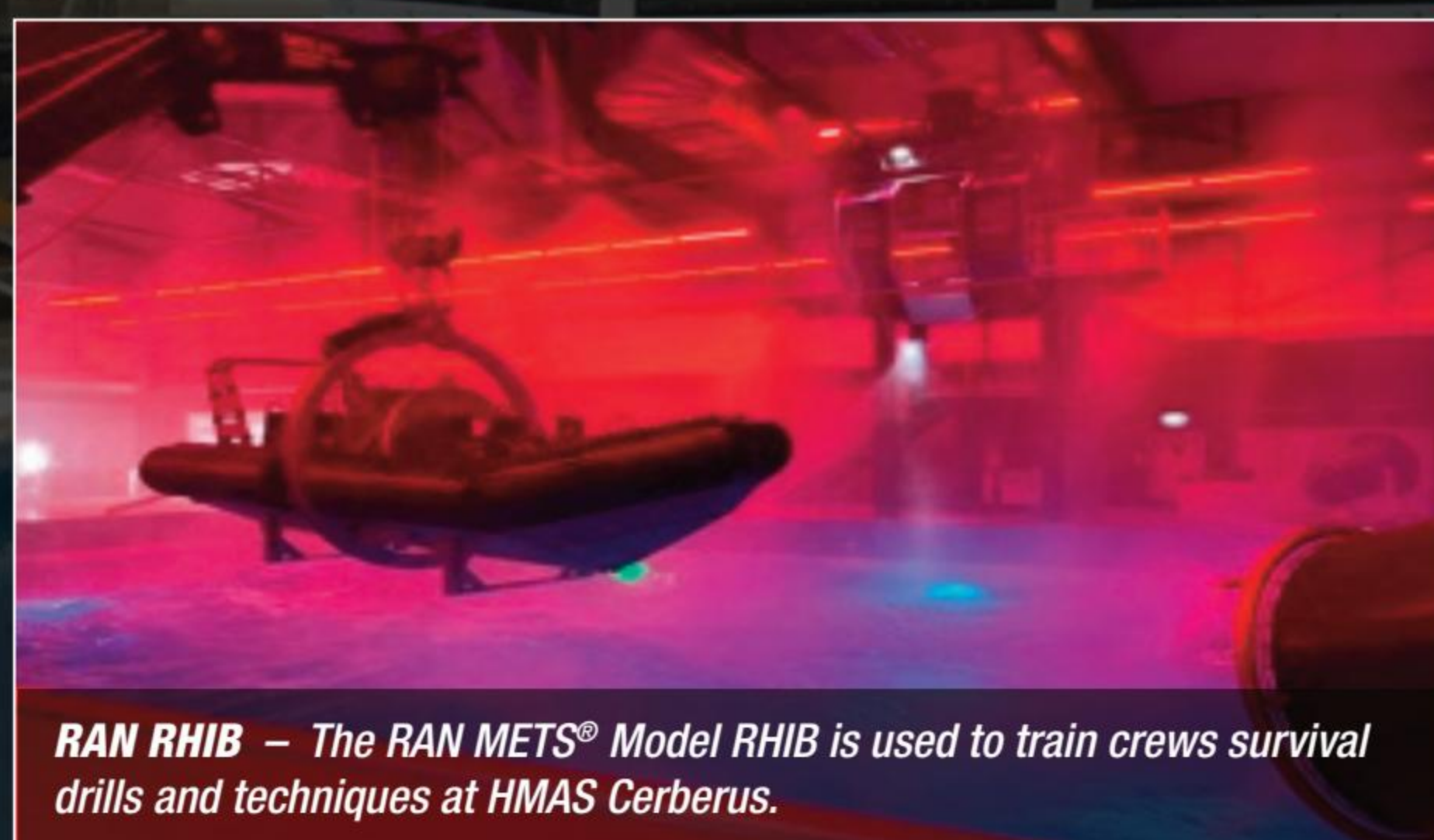
Survival System Limited's approach to the Survival Training Market

Survival Systems Limited (SSL) is based in Halifax NS Canada. They are world leaders in supplying and supporting simulation trainers to replicate helicopters and other craft that venture over, into and onto the water.

These trainers are often referred to as HUETS (Helicopter Underwater Egress Trainers) because their antecedents were helicopter survival training simulators. SSL's product brand is called METS® (Modular Egress Training Simulators). The METS® range of survival training simulators and environmental training aids such as wind, rain, waves, water current, lighting effect are all designed to replicate a real survival situation and teach the ability to survive it.

Halifax provides SSL with a unique multi angle perspective on their market: they are close to the Canadian Military, SSL's first customer; Halifax is on the edge of the Atlantic Ocean one of the most forbidding environments in the maritime and aeronautical firmaments, in both of which SSL's clients and end users operate separately and combined, an Atlantic storm is a firsthand experience; Halifax is close to a second major market, the Canadian offshore oil and gas industry hub; Halifax is a major maritime manufacturing and service provider which means they are culturally in the right environment; Halifax is also a destination or port of call for many of Canada's allies' military assets.

SSL has a defining purpose: To enhance and preserve workers' lives through safety education, training technologies, and applied research and

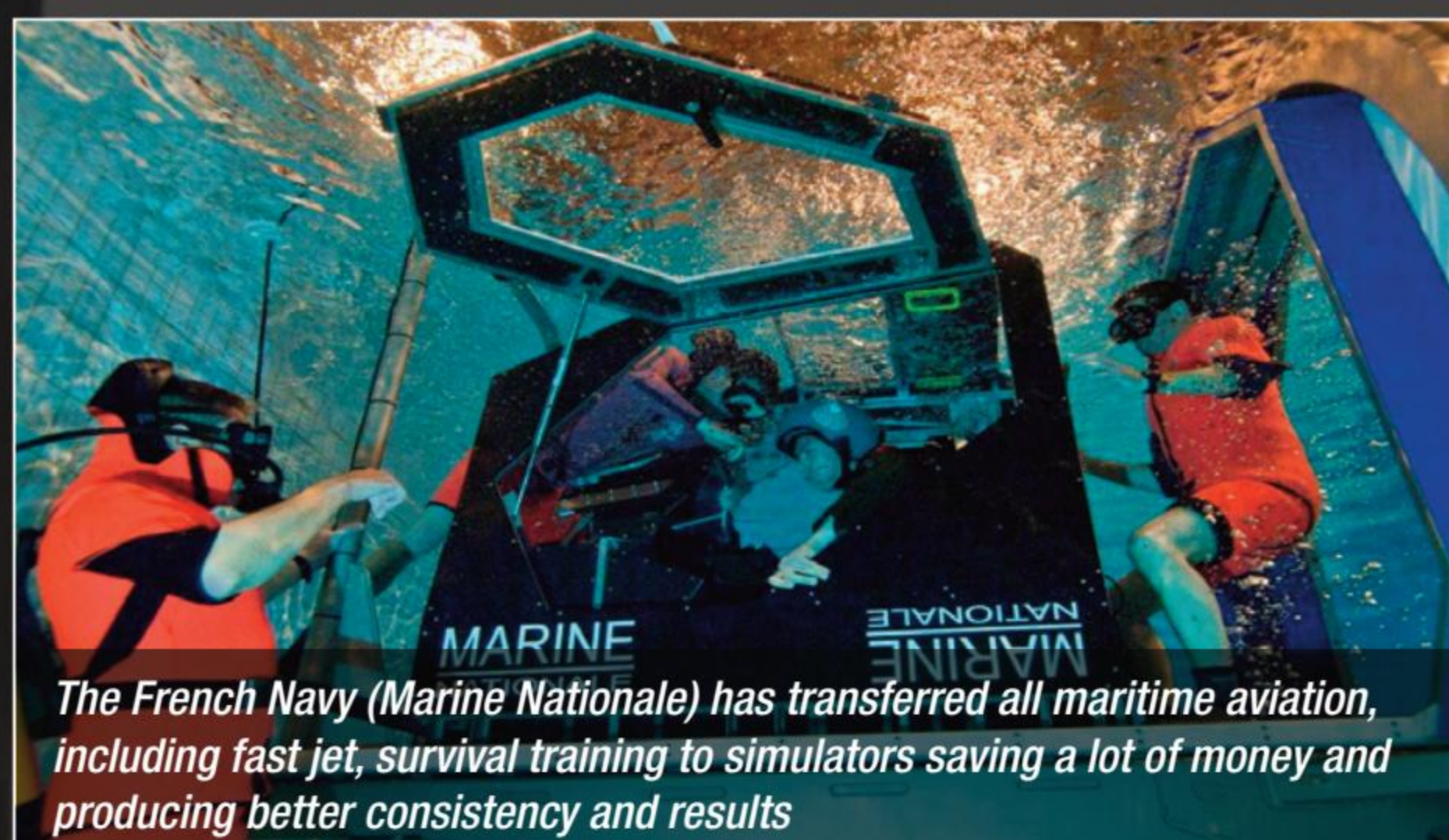


RAN RHIB – The RAN METS® Model RHIB is used to train crews survival drills and techniques at HMAS Cerberus.

development. Translating this purpose into performance is key to the way SSL works. Three watchwords dominate SSL's approach to business; design, deliver, support. Three simple words but they drive everything SSL does. Similarly, they all say so much about an holistic approach to business.

Design starts with thought. Thinking about the subject. Immersing, pun intended, the team in the subject. Knowing it, understanding it, not just thinking in terms of making "product" on a production line is a skill SSL have refined. Yes, everyone has their role and expected to fulfil it but all are expected to speak up if something needs raising. It might be a design or a manufacture or a training issue to name three of a myriad of subjects endlessly discussed at SSL. It is committing yourself to the whole subject.

SSL prides itself on listening to others, understanding customers viewpoints and issues. Taking their feedback and being prepared to adapt their thought,



The French Navy (Marine Nationale) has transferred all maritime aviation, including fast jet, survival training to simulators saving a lot of money and producing better consistency and results

"Our Purpose is to Enhance and Preserve Workers' Lives Through Safety Education, Training Technologies, and Applied Research and Development".

not chasing will o'the wisp ideas but considering them in a hardnosed way. SSL sift those ideas, so the client or customer gets what they need. Sometimes that sifting of ideas and those of the clients and marrying them with hardheaded art of the possible and financially achievable end up with results working in a better way than the customer expected either because there are things that they have no knowledge of, the www being a very blinkered source of knowledge compared to lived experience, or because the ideas have not previously emerged into the daylight.

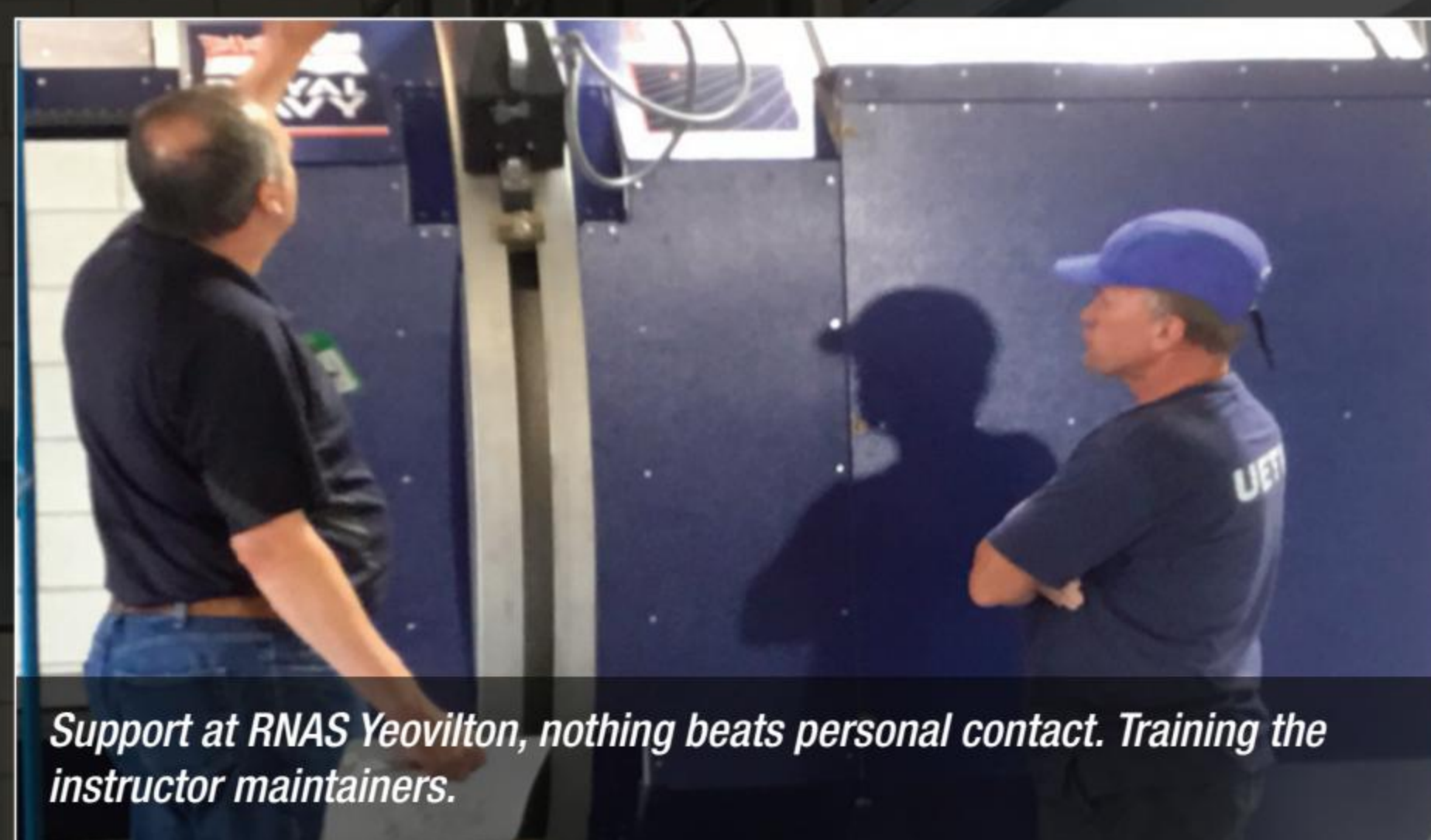
Part of that listening is delivering what customers want which is a comprehensive system without fault lines in the design which can be supported with the minimum of effort. That means it must be designed as a package, lifting system, METS, control system which must be suitable for the pool and crucially supportable. Going to each component or module manufacturer and buying the cheapest ensures fragmentation and is always more expensive in the long term.

As equipment is used lessons are identified and ideas are modified, or new ones formed. Incorporating these into concepts and uses and equipment design rather than allowing thought and ideas to stagnate and equipment to become moribund is crucial. Equally taking ideas from people outside your area of interest and expertise is crucial too. They have vision, ideas and capability which is useful and may well be the catalyst for something new or improved.

Two new METS® variants emerged from direct access and discussions with customers. Firstly The United States Coast Guard needed to emulate a Rescue Boat – Small (RB-S) and train crews for underwater egress. More recently the Royal Australian Navy required its own style rescue craft, the Rigid Hull Inflatable Boat (RHIB) to be simulated to improve training and safety. From inception through to Site Acceptance Testing (SAT) SSL delighted these demanding customers by not settling for “good enough” solutions but achieving excellent ones.

Equally important is making sure to hear what people are thinking. A wise proverb is; “you have two eyes and two ears and only one mouth, use them in that ratio”. Hearing about things is part being active and involved in niche industry forums / events including the International Association of Safety Survival Training's (OPITO) annual symposium; and crucial in person customer meetings at targeted conferences and tradeshow and importantly at customers sites. They are never frightened to expose ideas and thinking at the right moment. Wonderous as video conferencing is it is no substitute for interacting with real live humans. Getting into each other's brains and sharing thoughts and ideas and sparking conversations. A pretty good equation is plane tickets = interest and involvement = long-term win-win value add relationships. Thus collectively advancing improvements in abilities to achieve SSL's purpose: to enhance and preserve. It's all about being present, listening and sparking off other people. There is simply no substitute for meeting people despite what accountants say.

There is a lot of interesting and useful material to read ranging from colleagues reports to articles via scientific papers (sometimes not in your field) and criticism from users. Time to read them whilst travelling and frequently better than a book in your hotel room! By all means draw your



Support at RNAS Yeovilton, nothing beats personal contact. Training the instructor maintainers.

colleagues' attention to ideas in the written word and use those items to spark internal discussion and start ideas moving in the user community. SSL has a reputation for world class R&D and interacting with others in the field, deploying the latest ideas and techniques to achieve the best outcome for their clients. This R&D is sparked by a deep knowledge of the subject from manufacturing materials and processes to the latest thinking on survival techniques. That R&D also spills over into vehicle design and manufacture. If it can go wrong, it will go wrong, and many crashes are survivable. Helping designers of the vessels / vehicles design for survivability is part of SSL's purpose.

Delivery is a key aspect of the process, but it is so much more than just basic equipment, it's the support; delivering instruction for operators, maintainers, and instructors, sharing ideas and thinking and being generous with advice and help are such important adjuncts of equipment delivery. These, sometimes pre-contract, consulting activities and after sales support activities have been central from SSL's inception, and perfected by them during its first four decades. Thinking at all times to ensure the customer gets what they need at the time it was promised is core to the company's beliefs. This is down to a mixture of factors: unswerving belief in customer service permeates the company, planning, forethought and anticipation are key, thinking what the customer will need and when before the customer does, being realistic in what you promise and not over promising are just some of the aspects of the SSL approach and yes fair pricing which earns a reasonable profit is part of the equation. Two aspects that SSL seem to have captured is understanding their supply network and its issues and then being inclusive and fair it's the classic trait of an SME. All in all it is a simple proposition, just difficult to do consistently and well. An outsider would say it is not a mechanistic process driven by spreadsheets more a human centric one. The bottom line is actually the application of common sense.

Support is the flaw that causes so many defence programme failures. The manuals and tomes written on integrated logistic support (ILS) are many and voluminous. In most cases they come down to mechanistic processes. In reality good ILS is not about applications of mnemonics it is about common sense and a dedication to making things workable and effective for the end user. It's about spares provision and training and so many other things and helping make decisions as to where and how they should be positioned or take place to maintain the fleets whilst overcoming obsolescence and keep the training undertaken relevant and effective. Of course, the customer can reject that advice. That is their choice and frequently they are driven to that by their logistics and procurement constraints be they process or financial but exposing those constraints to SSL allows SSL to deploy their experience which in terms of HUET and other training systems will usually be much greater than that of the client or customer.

In short SSL is dedicated to the design, delivery and support of their stock in trade the METS® range of HUETS and other training systems which enable fulfilment of their purpose. It is all about marrying purpose and reality.



USCG METS® – The USCG's METS® Model RB-S is used to train USCG Crews in underwater egress

RTI CONNEXT®

TSS 3.1:

Why Avionics Systems Must Adapt for the Future Battlespace

Today, the defense industry is strategically focused on modernizing systems. However, rapidly deploying modern capabilities doesn't happen by default.

These advances stem from innovative technical and business strategies designed to fulfill the mandate of the Modular Open Systems Approach (MOSA). MOSA emphasizes using open standards and modular designs to improve interoperability and flexibility in defense systems.

A great example of MOSA within system design is the use of the Future Airborne Capability Environment® (FACE) technical standard and business approach. The FACE Approach is an integrated business and technical strategy

that employs modular design tenets, uses widely supported and open, consensus-based standards for its key interfaces, and has a validation and verification process to ensure the openness of its key interfaces. To help drive these outcomes, RTI has been a committed member of the FACE Consortium since 2010 to enable new levels of rapid integration, cross-platform software reuse, and interoperability for avionics systems.

Two Industry Firsts in Connex TSS 3.1

RTI Connex TSS 3.1 has achieved two major industry firsts. It is the first Transport Services Segment (TSS) to receive conformance certification to the FACE Technical Standard, Edition 3.1, and it is the first TSS available with RTCA DO-178C Design Assurance Level (DAL) A safety certification evidence. Connex TSS is uniquely able to deliver a reduced risk connectivity solution for modular, open, and safety-critical avionics systems.

Connex TSS is based on RTI Connex, making it easy for component developers and systems integrators to take advantage of both the FACE Technical Standard and the



Data Distribution Service (DDS™) standard. Connex TSS offers loosely coupled, decentralized architecture with peer-to-peer communication for low latency while having no single point of failure. No brokers or servers are required.

Connex TSS was certified FACE 3.1 Conformant for both Safety Base and General Purpose Profiles. The DO-178C certification evidence for Connex TSS was created on top of the DDC-I Deos safety RTOS executing on the North Atlantic Industries, Inc. (NAI) 68PPC2 T2080 board. All parties have completed the development of DO-178C DAL A certification evidence for this solution stack. Together, this integrated FACE and DO-178C solution stack with DDC-I, NAI, and RTI provides an immediate commercial foundation for building next-generation avionics systems.

Building Avionics Systems for the Future

Today, Connex is used in over 2,000 design wins and in more than 200 avionics programs. These include systems that are safety certified to the RTCA DO-178C standard for

avionics software, which Connex supports by providing commercial certification evidence at the highest avionics safety level, DO-178C DAL A.

RTI Connex TSS is designed to be a critical component of any complex avionics system. Coupled with RTI's diverse partner ecosystem, Connex TSS not only reduces program risk, but also accelerates integration, while delivering proven real-time performance, scalability and robustness. The data-centric, standards-based technology in RTI Connex TSS makes it the clear choice for next-generation avionics programs that are setting the course of the future battlespace.

For more information about Connex TSS, please visit www.rti.com/tss

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**Now Certified FACE 3.1 Conformant
with DO-178C DAL A Safety Evidence**



Connex[®] TSS uniquely delivers an open standards-conformant software connectivity framework that accelerates the development of modular and scalable safety-critical avionics systems.



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HIGH-RISK ENVIRONMENTS HAVE NEVER BEEN SAFER

WITH REMOTE MODE ON KROMEK'S D5 RIID



Mount the D5 RIID on any UGV, and receive rapid agnostic isotopic data from a safe distance

High sensitivity and medium resolution RIID for reliable Gamma and Neutron detection and identification in weak, mixed, shielded and heavily masked sources

REVOLUTIONISING REMOTE RADIOISOTOPE DETECTION WITH THE D5 RIID

IN ANY SECURITY AND DEFENCE MISSION CONCERNING RADIOLOGICAL THREATS, OPERATOR SAFETY IS A CHALLENGE, YET PARAMOUNT.

Ensuring safety with remote detection, Kromek have developed the Remote Mode application for the D5 RIID; the smallest and lightest RIID on the market.

With Remote Mode, D5 RIID, when mounted on any UGV, the operator can establish crucial distance from a high-risk environment. Essential spectral and isotopic data can be collected with reduced risk to human life. Rapid alarms keep those on the ground safe, whilst ANSI N42.42 data files generated in the field can be rapidly sent to remote technical authorities to confidently complete secondary adjudications and make informed decisions quickly.

Agnostic isotopic data from a defined area or suspect package is delivered in real-time to the remote operator at distance via a wired or wirelessly connected device. This includes isotope ID, high accuracy dose measurements for gamma and neutron radiation, exact counts per second and all types of energies present across spectra.

The <4% medium resolution and high sensitivity of the device also enables a more definitive confirmation of radioisotopes present, even those in weak, mixed, shielded and/or heavily masked sources.

The D5 RIID facilitates rapid action in the face of a real threat; its low false alarm rate, exceeds international ANSI N42.34 standards, and alerts users reliably in real-time to the specific threat. Therefore, there are only essential interruptions to a mission.

With 30 seconds start up time, the D5 RIID is simple to set up and use almost immediately, ensuring no minutes are wasted in time-dependent situations. Its intuitive interface means that a new operator requires less than 10 minutes of training to be confident in using the detector.

Communication is reliable and far-reaching when connected directly to the communications module of the UGV. Receiving power via USB, the D5 RIID can supply data to the onsite operator across the entire range covered during a specific mission, no matter how far the robot travels. Even radioactive sources at a distance to the detector itself are identified 50 times more accurately than the ANSI standard. With the option to also receive power over ethernet, the D5 can interface with any UGV robot system, providing the ultimate mission flexibility.

The operator can maintain wider situational awareness, as the D5 RIID can be integrated into existing mapping and alarm networks. ANSI N42.42 files can be easily extracted directly in the field and sent swiftly to remote decision-makers via reachback, facilitating rapid decision-making.

Small, lightweight and ruggedized, the D5 RIID offers the ultimate radiation detection performance, ready for deployment into any situation at any time.

Make people's safety a challenge that can be met.

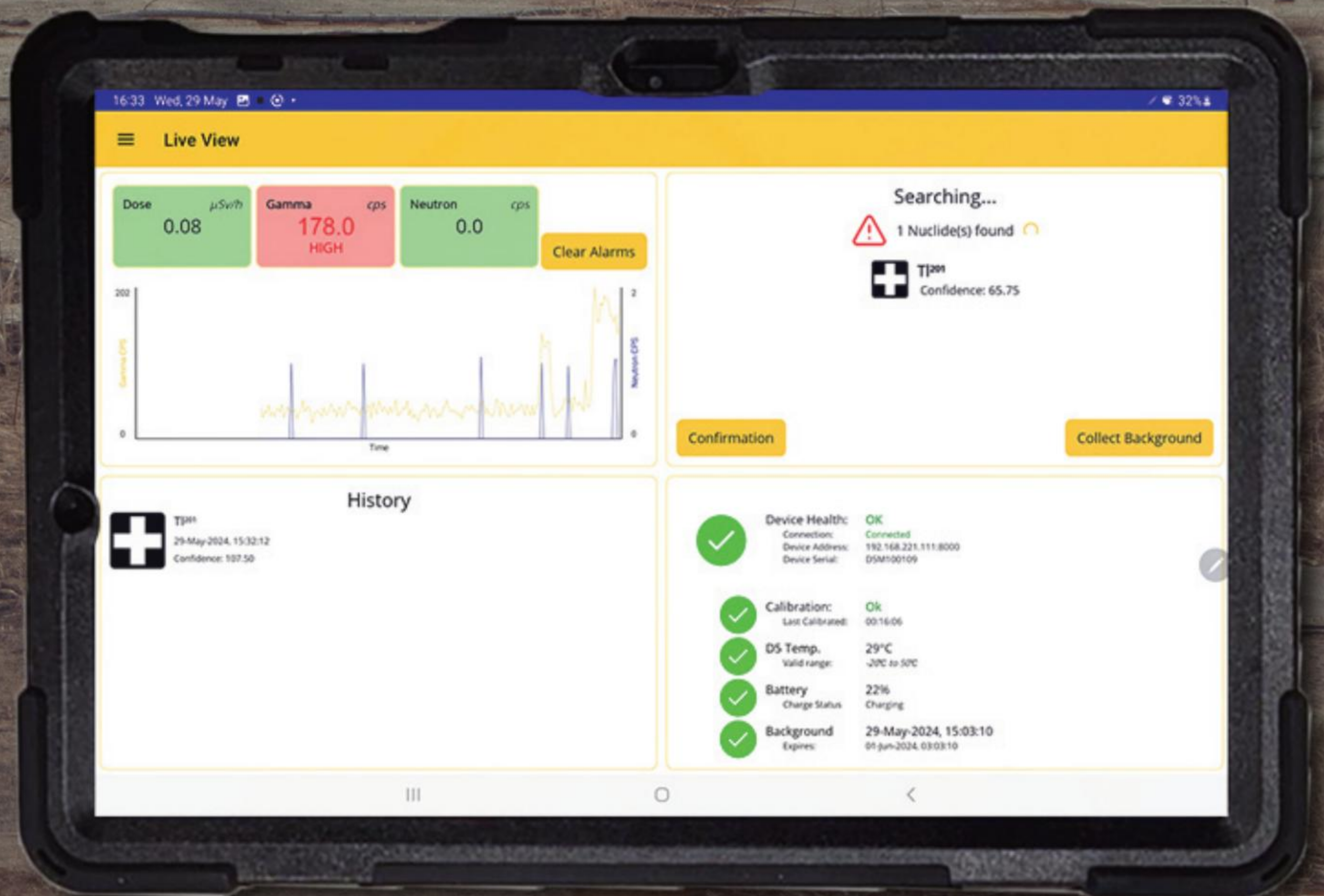
Come and meet Kromek at Eurosatory 2024 in Paris, from the 17th to 21st of June. Contact sales@kromek.com with any questions.

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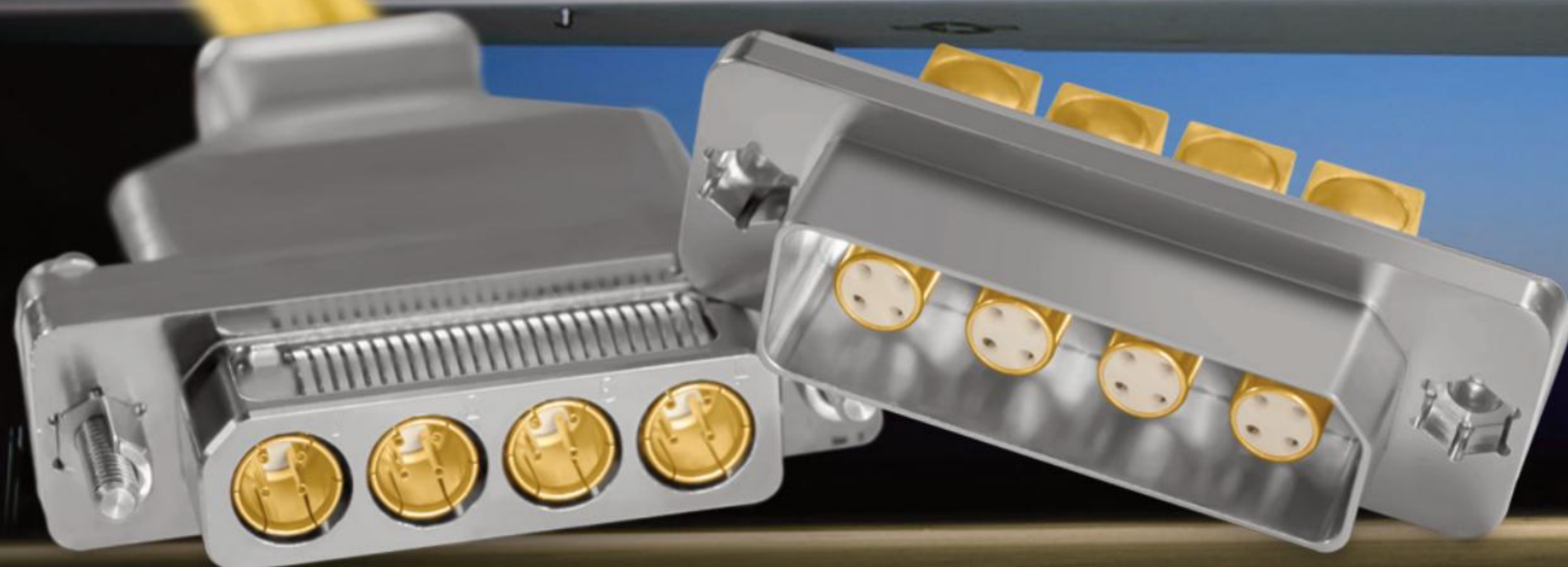
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ACCELERATING CONNECTIVITY:

EXPLORING HIGH-SPEED DATA CONNECTORS WITH SMITHS INTERCONNECT



In today's digital age, where speed and efficiency are paramount, high-speed data connectors play a pivotal role in ensuring seamless communication and data transfer across various devices and systems. As our world becomes increasingly interconnected, the demand for faster and more reliable connectivity solutions continues to surge. Enter high-speed data connectors – the unsung heroes powering the backbone of our digital infrastructure.

At the forefront of this technological evolution is Smiths Interconnect, a leading provider of advanced connectivity solutions. With a diverse portfolio of high-speed data connectors designed to meet the rigorous demands of modern applications, Smiths Interconnect stands as a beacon of innovation in connectivity.

What are High-Speed Data Connectors?

High-speed data connectors are specialized interfaces that facilitate the transmission of data at exceptionally high rates. These connectors serve as the vital link between various electronic devices, enabling rapid data exchange across networks, servers, storage systems, and other interconnected components.

The Need for Speed: Key Features of High-Speed Data Connectors
In an era where milliseconds can make a difference, high-speed data connectors are engineered to deliver unparalleled performance and reliability. Here are some key features that define these cutting-edge connectors:

1 Bandwidth Capacity: High-speed data connectors boast impressive bandwidth capacities, allowing for the rapid transfer of large volumes of data. Whether it is streaming high-definition video,

conducting real-time data analysis, or transmitting mission-critical information, these connectors can manage the demands of today's data-intensive applications.

2 Low Latency: Minimizing latency is essential in high-speed data transmission, particularly in industries such as finance, telecommunications, and gaming, where split-second delays can have significant repercussions. High-speed connectors are designed to reduce latency, ensuring swift response times and seamless user experiences.

3 Signal Integrity: Maintaining signal integrity is crucial in high-speed data transmission to prevent data loss or corruption. Advanced signal conditioning techniques and robust design principles are employed to preserve signal integrity, even in challenging environments with electromagnetic interference (EMI) or signal attenuation.

4 Reliability and Durability: High-speed data connectors undergo rigorous testing to ensure reliability and durability in demanding operating conditions. From extreme temperatures to mechanical stress, these connectors are built to withstand the rigors of industrial environments, aerospace applications, automotive systems, and beyond.

Smiths Interconnect: Driving Connectivity Forward

Smiths Interconnect stands out as a leader in the field of connectivity solutions, offering a comprehensive range of high-speed data



connectors that set the industry standard for performance and reliability. Their portfolio includes a variety of innovative products designed to meet the diverse needs of customers across various industries.

Among Smiths Interconnect's impressive lineup of high-speed data connectors are:

- 1 **Rectangular Connectors:** These connectors offer high-density packaging and exceptional signal integrity, making them ideal for applications where space is limited, such as telecommunications equipment, data centers, and industrial automation systems.
- 2 **Circular Connectors:** Engineered for ruggedness and reliability, Smiths Interconnect's circular connectors are well-suited for harsh environments, including aerospace, defense, and transportation applications.
- 3 **RF Connectors:** Designed for high-frequency applications, RF connectors enable seamless connectivity in wireless communication systems, radar systems, and test and measurement equipment.
- 4 **Board-to-Board Connectors:** These connectors facilitate the connection between printed circuit boards (PCBs), enabling high-speed data transmission within electronic devices and systems.

Taking a Closer Look into the Wide Market of High-Speed Data Connectors

High-speed data connectors are not just about transferring data; they are the enablers of modern technological marvels. Picture streaming

your favorite high-definition movie without a glitch, engaging in lag-free online gaming experiences, or conducting real-time financial transactions with utmost security. These seamless experiences are made possible by the lightning-fast data transmission facilitated by high-speed connectors. Whether it is powering autonomous vehicles, enabling remote medical diagnostics, or enhancing communication networks, these connectors are the silent champions behind the innovations that shape our lives.

The Future of Connectivity: Embracing Innovation

As we look ahead to the future, the role of high-speed data connectors will only become more vital as emerging technologies such as 5G, IoT, AI, and autonomous vehicles continue to reshape our world. By leveraging the power of advanced connectivity solutions, we can unlock new possibilities, drive efficiency gains, and propel progress towards a more connected and sustainable future.

In conclusion, high-speed data connectors are the cornerstone of our interconnected world, enabling the seamless exchange of information and powering the technologies that drive progress. With industry leaders such as Smiths Interconnect at the forefront, the outlook for connectivity shines brighter than ever. Together, we can forge ahead towards a more interconnected and prosperous future.

www.smithsinterconnect.com

All Change?

The Consultant's Role is Never Dull

In the 17 Years (goodness is it that long?) Lutra Associates has existed and the 50 years or so its chief executive has been active in defence so many things have changed, or appear to have done so.

One must always be trying to adapt and meet the new challenges and issues. As a consultant and consulting company this is two fold; keeping one's clients abreast of the bureaucratic developments, which frequently seem to happen with bewildering regularity and equally bewildering logic, and adapt to how to interact with the various branches of the end customer, whilst submitting proposals and quotations as rules and bureaucracies emerge with seemingly impenetrable thinking.

Once when discussing this cultural slipperiness, a noted defence official was trying to explain the reasoning for the most recent changes. He was asked quizzically by an audience member "Again?" to which he replied "Still!". Three watchwords are always worth remembering in defence supply; Design, Deliver, Support.

Design is about so much more than designing equipment. There are a number of issues. The most important is thinking about the issues and then design strategies to promote your capability and products and deal with the issues. This involves knowing the subject and understanding the context, background, politics and foibles of the end customer. All governments labour under different political, procedural and financial constraints. Understanding these and the changes is fundamental.

So many companies arrive in a country or design a product, having read that there is potential i.e. a purchasing programme has been announced, with little more knowledge than that, expecting to waltz into the defence ministry and skip out with an order. No more research is done apart for the cost of a plane fare. They forget bureaucratic systems have, rather like a descendant of the dinosaurs, evolved to survive and like sharks or

crocodiles will consume easy prey very quickly and have wonderous self-protection sensors and mechanisms. Best to enlist the help of a skilled hunter. He will point out the pitfalls such as officials who are applying rules rescinded by the Cabinet Office at least 3 probably 5 years previously.

Two classic examples of bureaucratic systems' penchant for this sort of survival mode are topical in UK with the Sub Postmaster and The Infected Blood Scandals. The COVID enquiry is probably hot on their heels but the Civil Service has successfully kicked the result of that down the road. They are by no means the only ones, there are many other examples. Nor is the UK unique. What has been called "the blob" at the centre of UK government, and UK is far from the only government that has a self-sustaining entity at its centre, has a self-interest in survival. The complex messages is radically reform the underpinning bureaucracy, yes dispense with the bath water, but in the meantime find a hunter who has the experience and knowledge to find the baby and save it and does not gloss over the difficulties of doing so. If the hunter asks you difficult questions about your aim, methods and knowledge they are probably the company or individual to be involved with.

A good hunter will give you good advice and feedback. Take it. Often it may seem as though that feedback will cost you money because there is a time element to it. Even with current UK Defence Acquisition reforms it is difficult to see defence programmes taking less than five years. So be prepared, better to be so than to "flash the cash" to someone who readily accepts it, then declares that bad weather has stopped the match, taken your money and moved to somewhere where the weather is better.

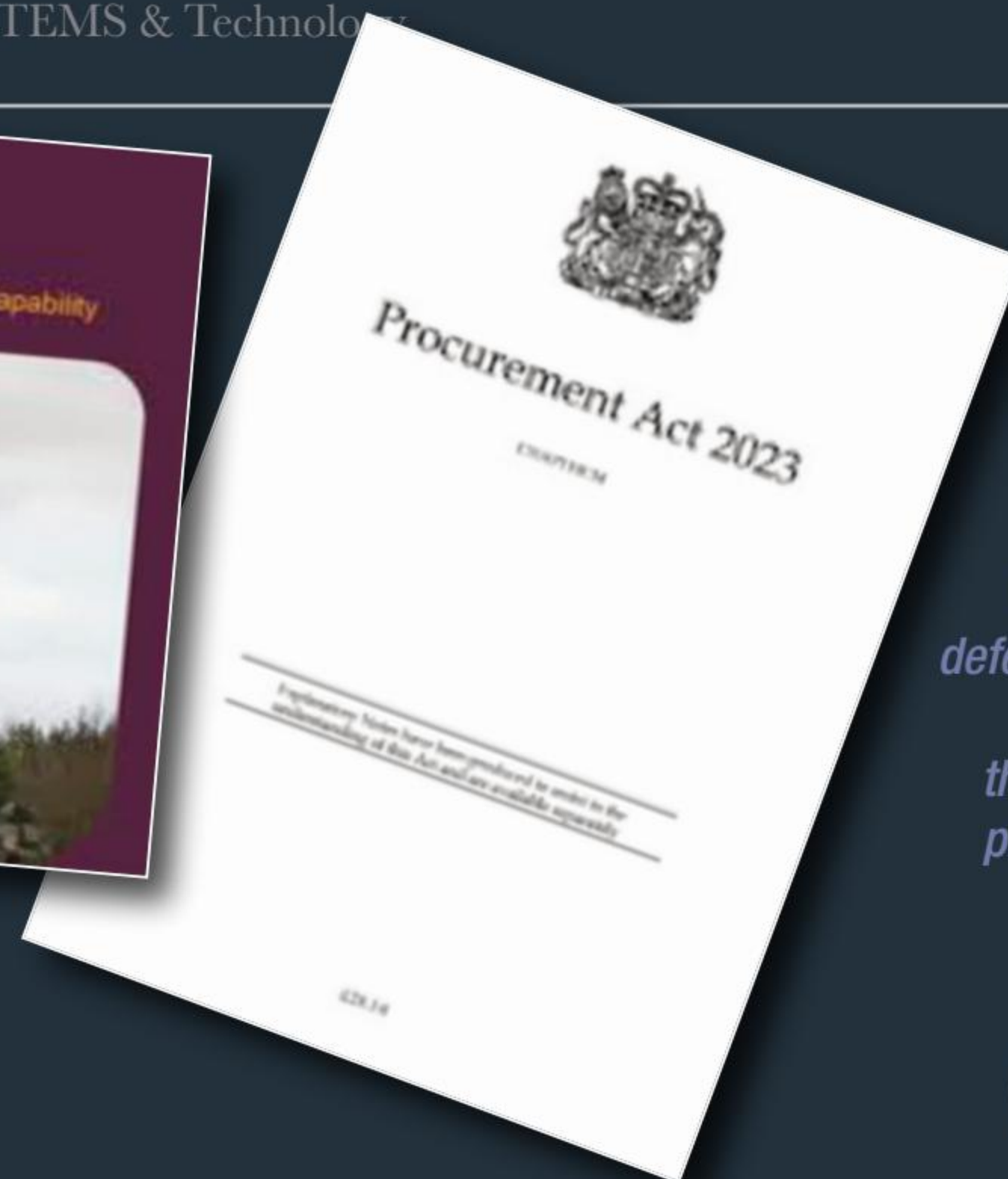
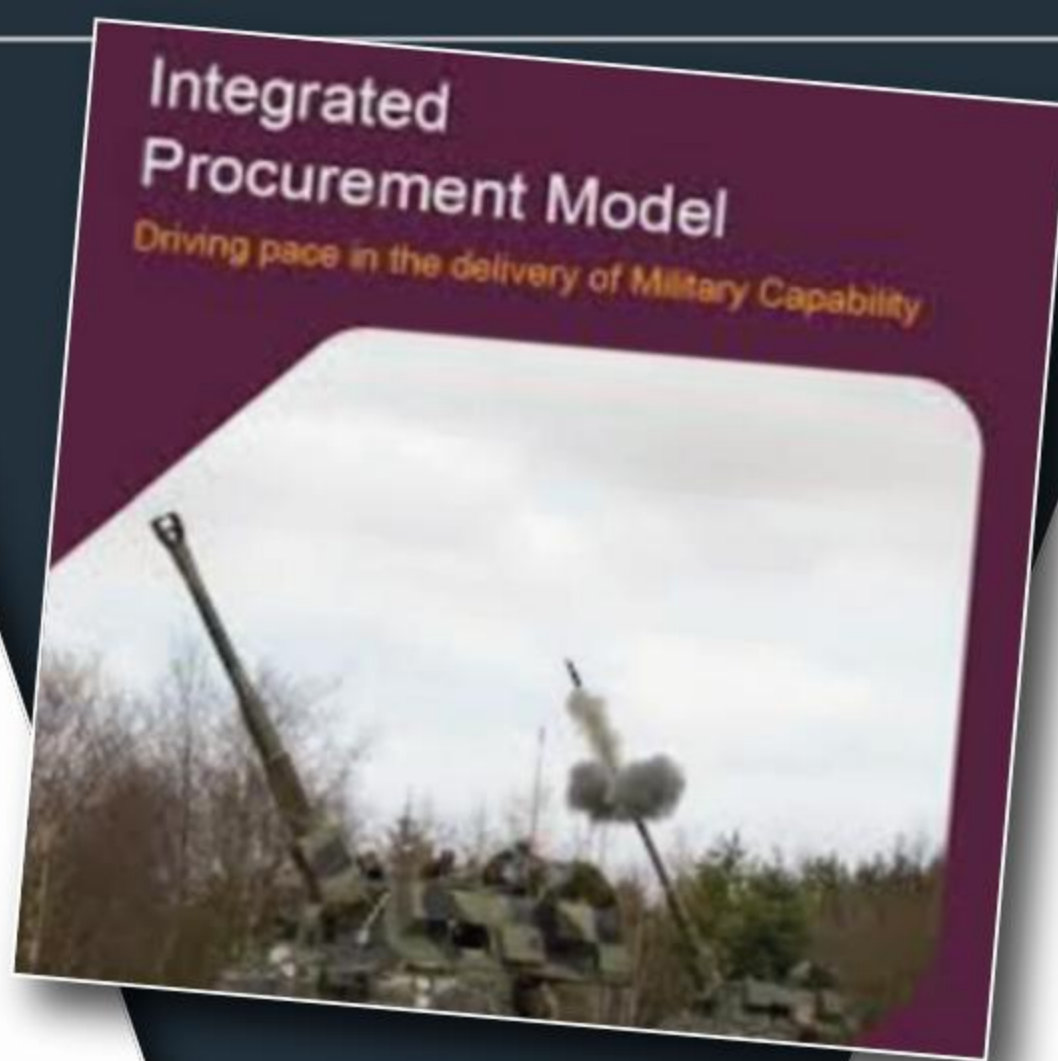
This probably means that you have to forget your preconceptions and prepare to adapt your programmes, attitudes, financial forecasts and products. Providing defence equipment is never easy, arguably it is, generically, the most difficult market in the world. Programmes take an awful long time to come to full term in all but crisis situations, a personal record was 19 years from first meeting to contract signature, and the end user had already decided which item of equipment they wanted to buy. Therefore, do learn the lessons others have learnt the hard way through bitter experience.

Given these hurdles do try to envisage where your products and services will be after the delays and factor the changes into your planning. Envisage improvements and what they mean for customers. Do not present them as fact but options and should that mean changes in financial situations do say so and offer the options as part of the presentation. Also offer the savings of moving faster.

A key aspect is keeping your finger on the pulse. Use your consultants to do this. A good consultant will report faithfully and frequently but you must ask questions and engage. It's a two-way street. Get your money's worth. On that subject consultants are better value for money because being experienced hunters they will know where to go to find out about what is happening. However, do remember that you have to be active in presenting



If you are unable to attend an event your consultant may well be able to share the costs with other clients and make contacts or refresh existing ones and keep the interest flame burning or even make it burn brighter.



Do these 3 documents herald a new phase in defence procurement in UK or are we going to go through another round of plans and report in a few years time?



yourselves. Again, the consultant can help with time and place but there is an awful tendency, backed up in some cases with legislative obstacles that prevents many people in the customer community actually acquiring the knowledge of what is or might be available either off the shelf or coming down the track. Lutra's recent experience is of a relatively senior officer/official specifying an equipment and a larger capability about which he had little or no professional experience based entirely from hearsay and the world wide web. Needless to say, everything was delivered to specification but its performance as a system was sub optimal, a long way sub optimal.

This means using your consultant as part of your team to help you be active. Go to the places and events he advises you to go to or suggests he attends. It means you get to engage with people as the opportunity presents itself. These are chances not to be missed. Never reject the chance to make personal contact with the end users and on face value there might only be 15 chances over the ten years of a project going through its gestation. However, there are all sorts of other opportunities, however fleeting, that can present themselves and need to be exploited.

This leads to another important point do not forget to keep your consultant updated. They will be covering a lot of meetings and events without you, often for other clients, at which they may well meet the people you are interested in. The chance to quickly brief them on progress keeps the flame of interest burning or even make it burn brighter.

Delivery for a consultant is about realism. Keeping the link between client and customer alive is critical as is finding new approaches and activities to enhance the client's presence. It is a constantly evolving picture. Thus, when really genuine attempts are being made to deal with issues the consultant must be free to act independently and in the best interests of all concerned, often without having the chance to discuss issues with their client. TE Lawrence described tactical flair as being as fast moving and darting as a kingfisher. Predicting where the kingfisher's flight will take it is almost impossible. The same is true of being "involved" with the market.

A consultant will be of more value to you if they are seen to be and act independently. Thus when evidence is called for in a genuine attempt to highlight issues and their remedies as was the case with the recent Report by the House of Commons Defence Committee on Defence Procurement *It is broke — and it's time to fix it: The UK's defence procurement system* the consultant has two duties first to himself and the committee to give evidence and second to their clients, by firstly being seen to be independent and involved in wider defence and then explaining the intricacies of what is going on. The same is equally true of the recent *Procurement Act 2023* and the MOD's *Integrated Procurement Model Driving pace in the delivery of Military Capability*.

However realism is Important. Remember the question and answer to the senior defence official. These are the latest in a flurry of reports and

solutions. They are the latest of many. There are so many sticking plasters of the defence procurement balloon there are now more plasters than balloon and many plasters have one or more plasters applied over the top of them. Keeping a sense of perspective and balance in reports to the client is important. Direct truth is more important than dressed up responses which may well be what the client wants to read rather than something on which the client can base a decision. In the same breath pick a consultant who knows their capability to deliver. It takes time to build up a relationship across the political and military perspective and it frequently needs patience on both sides but "I will try" is often a better answer than "Yes". If you promise, deliver.

Support or the lack of it bedevils defence. There are a huge number of reasons for this. In larger defence forces a very formulaic methodology deters and confuses. People forget that mnemonics are meant as an aide memoire not a mandatory check list. In smaller defence forces the whole subject is often poorly understood. One of the root causes is that Defence programmes take so long to creep through the bureaucracy they are obsolescent or out of date by the time the equipment is in service.

The former means getting spares becomes really difficult and having to buy estimated repair or replacement stocks with the initial equipment purchase raises the initial programme cost way above where it should be. One small arithmetical error can result in huge cost issues downstream as purchases have to be made of short production runs of obsolete spares which can only be made from production equipment which has itself gone out of service. The latter results in the farcical situation of a replacement having to go into programme before the original is delivered. In short, all options are a nightmare. The solution is to move programmes through the bureaucracy more quickly, so they are contemporary.

The consultant can help in a number of ways. Firstly by helping the company stay close to the end users and customer branch's issues and solutions can be identified and worked on earlier. Acting as a semi independent voice may well jog the end user or purchasing branch into action earlier and may well also come up with pragmatic solutions for which the purchasing branch is grateful. One of those pragmatic solutions might well be a sensible phased replacement programme either as part of the initial programme or midlife of the initial batch. For the equipment supplier be they UK or overseas based it allows permanent employees to be reduced and costs to be kept down.

In short choose an experienced consultant who might not be the cheapest but gives honest answers to questions and will work hard and in a wide-ranging way for you. It might seem a lot of money and it might not be the dressed-up answer but its will be value for money.

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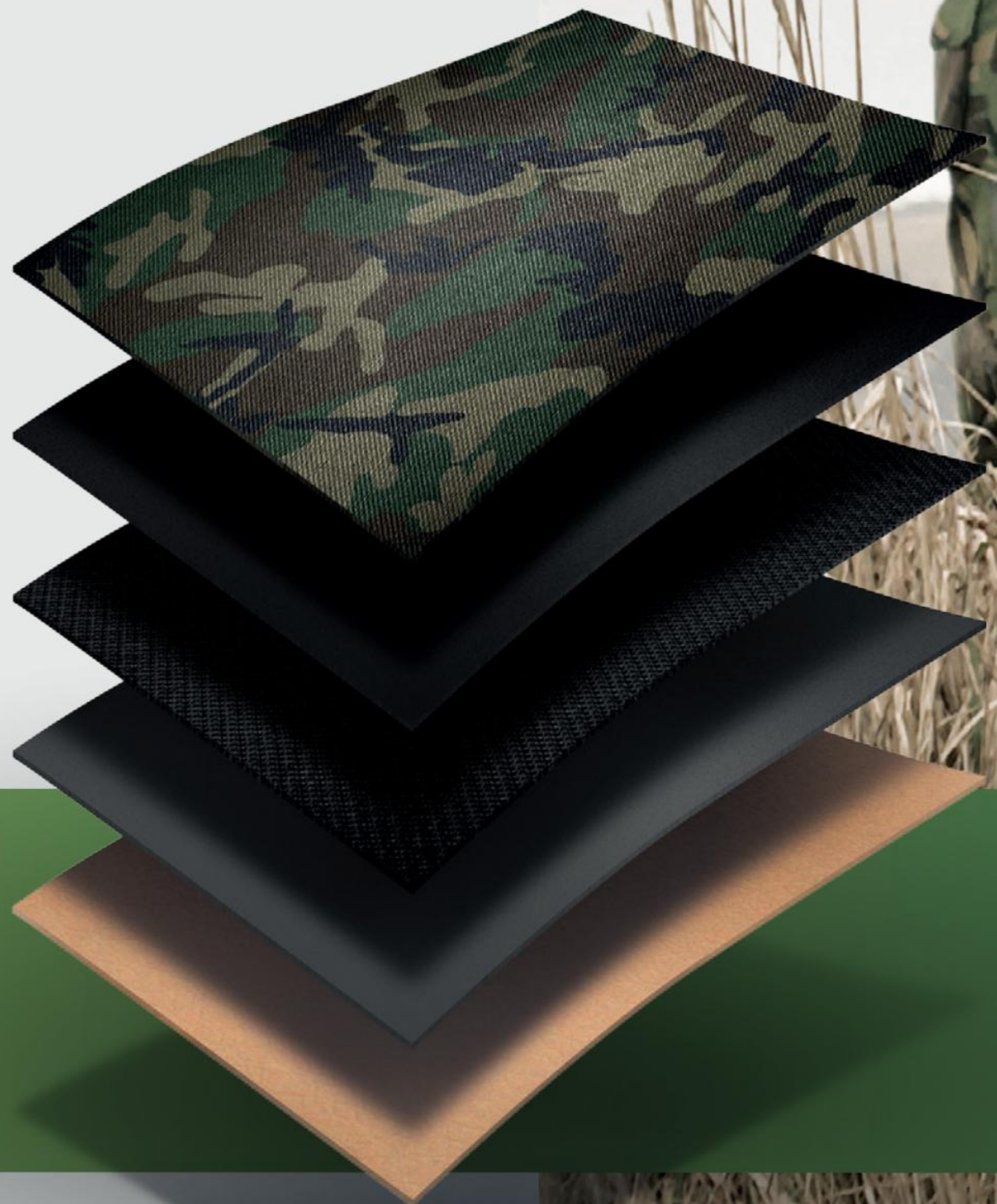
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Teledyne FLIR, part of Teledyne Technologies Incorporated, today released its next generation of high-performance Hadron 640 dual radiometric thermal and visible camera modules. The ITAR-free Hadron

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“The Hadron 640 series gives integrators the opportunity to deploy AI-ready, high-performance dual-camera modules into small unmanned systems where SWaP, performance, run time, and battery life are mission critical,” said Michael Walters, Vice President Product Management, Teledyne FLIR. “With Teledyne FLIR’s new Prism AI detection, tracking, and classification models and Prism ISP libraries offering super-resolution, turbulence mitigation, contrast enhancement, and more, Hadron 640 also enables effective AI-based applications.”

The new Hadron 640 modules include a 640 x 512 resolution Boson+ longwave infrared (LWIR) camera module with industry-leading thermal sensitivity of 20 millikelvin (mK) or better. It sees through total darkness, smoke, most fog, and glare allowing operational awareness day and night. The Hadron 640R+ provides temperature measurements for every pixel in the scene. The addition of a 64MP visible camera enables the Hadron 640 series to provide both thermal and visible imagery within a single camera module.

“Continued collaboration with Teledyne FLIR enables rapid payload and performance innovation for Teal drones, accelerates time to market, and equips warfighters with the best possible technology for operational success,” said George Matus, CTO of Red Cat. “The Hadron 640 series features enhanced thermal sensitivity and HD visible cameras to provide superior performance within a compact package for the support of our

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The Hadron 640 series products are all dual use and classified under US Department of Commerce jurisdiction. It is available for purchase globally from Teledyne FLIR and its authorized dealers. To learn more or to purchase, visit <https://www.flir.com/hadron640>.

For an exclusive in-person first look at the Hadron 640R+ running Prism AI, please visit **hall 5A, stand #5A-127** at EuroSatory, June 17-21, 2024, in Paris, France.

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