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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.

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T: +44 (0) 1884 258019
E: tony.nutt@militarysystems-tech.com
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Fast-growing defense market Saudi Arabia opens its doors to the world

SAUDI ARABIA, WHICH HAS LONG BEEN A MAJOR IMPORTER OF DEFENSE EQUIPMENT, IS NOW WELL ON TRACK TO PUT ITS DEFENSE INDUSTRY ON A PATH OF SELF-RELIANCE.

Historically dominated by a handful of international players, the World Defense Show will create a new level playing field for global firms and startups alike within the Kingdom's defense market by opening up new opportunities across all levels of the defense ecosystem.

Saudi is open for business

Under Vision 2030, the Kingdom plans to increase its local production of defense manufacturing to 50% of its defense spending. To achieve this objective, the Kingdom is offering international defense players and investors a unique opportunity to invest in its defense industry, which, with an expected CAGR of 7%, represents one of the most attractive opportunities in the global defense market.

Across four days of trade conferences and exhibitions from 6-9 March 2022 in Riyadh, the World Defense Show will unlock a wide range of opportunities within the Saudi defense ecosystem for global players. Founded by the Kingdom's General Authority for Military Industries (GAMI), which oversees and manages the growth of the local defense sector, the World Defense Show will offer participants unprecedented access through curated networking events, such as the Investor-Investee program and Meet the KSA government program.

The latter, expected to attract large numbers of investors and defense players to the inaugural event, will give participants exclusive access to Saudi key decision makers from entities like GAMI, SAMI and the Saudi's Ministry of Defense.

Exploring the future of defense

Through World Defense Show's Thought Leadership program, featuring a range of conferences dedicated to the future of the defense sector, participants will gain invaluable insights into the Kingdom's defense investment roadmap.

While it is no secret that interoperability and technology transfer are at the heart of Saudi's localization plans, GAMI has also earmarked priority areas and targets for localization across each defense domain under its Vision 2030 plans.

In line with these plans, World Defense Show's 800,000 sqm purpose-built venue will showcase integration across all five defense domains –

land, sea, air, security and space – through live and static displays, as well as virtual simulations held in a 23,200 sqm dedicated area. The show's daily demonstrations will allow visitors to witness how cross-sector interoperable systems operate in action and how cutting-edge equipment comes into play in mission-critical scenarios.

An opportunity too big to ignore

Aside from its high-growth potential, the Saudi defense market offers incredible benefits to foreign investors and defense players. In just a few years, the defense sector's localization rates have more than doubled to 8 percent of total expenditure, and the availability and cost of raw materials used in the manufacturing of defense equipment are particularly attractive for international defense players keen to join the government's efforts to open local manufacturing facilities.

Several prime companies, including Boeing and BAE Systems, started defense manufacturing activities in Saudi Arabia in 2015 and 2017 respectively to leverage the first-mover advantage and historical trade ties with the Kingdom.

With innovation and interoperability dominating the Saudi defense localization agenda, primes, SMEs and startups from across the globe are welcomed to use this once-in-a-lifetime chance to explore the opportunities offered by one of the largest regional defense players. Hundreds of exhibitors, including 125 local Saudi defense companies, and more than 100 military delegations from over 70 countries have already confirmed their participation to the inaugural edition of World Defense Show. The show, which is expected to welcome more than 30,000 visitors in March 2022, has already had to expand its exhibition site by 14,500 sqm to accommodate high levels of exhibitor demand.

Trade visitors have until February to register for the show. Registrants will receive a complimentary multi-entry visa, valid for one year – allowing for connections to extend beyond the show days. To attend World Defense Show in Riyadh from 6-9 March 2022, click on the following link or visit www.worlddefenseshow.com.

Mission Command in the Land Tactical Environment

Peter Hurst – Vice President, International Projects & Business Strategy – Leonardo DRS

Mission Command systems are at the heart of a military's combat operations core. The complex battlefields of today require integrated network systems that can easily interpret an array of threats, enemy positions, and location of friendly troops, all while giving commanders the best situational awareness available.

One of the leaders in this space, Leonardo DRS is redefining the way ground vehicles and command post mission systems operate in the toughest tactical environments.

Combat Computing Systems

Developed through years of combat experience and continuous technology evolution, Leonardo DRS's integrated networking systems allows commanders and platform operators to control and interface with weapons & sensors, communications equipment, mission command applications, navigational devices, and platform avionics from any workstation on or off the platform or command post.

All the voice, video and data from these platform devices can be connected across the tactical network with adjacent platforms, remote or mobile command posts, higher headquarters and, when desired, with coalition partners.

The system is designed to be agnostic to the network and applications allowing end users to adopt best-of-breed solutions in terms of communications and data applications such as the Battle Management System (BMS).

At the heart of this system is the Leonardo DRS range of ultra-rugged, MIL-STD qualified hardware and cyber hardened software solutions. It is built from the experience and continuous improvement

derived from supplying more than 300,000 platform computing and networking devices for the U.S. and International military across a wide range of application types. At the core of the company's success is its pivotal position in delivering the US Army's MFCSS (Mounted Family of Computer Systems) II. The U.S. military has made substantial investments in mission-critical mounted computing hardware and software, beginning with the Force XXI Battle Command Brigade and Below/Blue Force Tracking programs (FBCB2/BFT) in the mid-90s. The latest iteration of Leonardo DRS tactical computing capability comes with a Cyber hardened core that will enable end users to build trusted systems to protect against the fast-developing cyber threat.

Supporting Key Combat Apps

While designed to be plug-and-play for any number of platforms and operational systems, the Leonardo DRS system already supports Line of Sight (LOS) and Beyond Line of Sight (BLOS) communications for a full-circle ability to reach mobile, airborne, or dismounted troops, while also supporting Tactical LTE and Mobile SatCom on the move technologies.

An open architecture approach enables system integrators to build a scalable capability for use at all echelons, from dismounted soldier to Brigade HQ. Leonardo DRS currently supports and has demonstrated interoperability with Battle Management Systems applications in use by the U.S. Army and Marine Corps, as well as Australia, United Kingdom, Royal Netherlands Marines, Taiwan, the UAE and Bahrain ground forces. Its open system approach can support a wide range of additional tactical applications such as network planning tools, UAV down and up links, shot detection systems integrated with weapon systems, and



Electronic Warfare (EW) systems such as the Leonardo DRS Blackstone direction finding (DF) capability. Blackstone (which can be soldier worn, or vehicle mounted) provides mission-critical intelligence to the warfighter by rapidly detecting and locating a wide range of threat signals, monitoring signals of interest, and supporting real-time analysis of the signal environment.

Leonardo DRS' next generation tactical hardware capability builds upon the strengths of its predecessors with faster processing speeds, memory and increasing I/O flexibility. The fourth generation Data Distribution Unit (DDU Block 4) is a highly integrated and extremely rugged mission critical computing/network server that simultaneously supports hosting of applications, management of network infrastructures, collection and streaming of sensor data. It can also host virtual machine capabilities to permit multiple operating systems and applications running concurrently while also providing low-latency sensor and data distribution capabilities.

The DDU Block 4 is a Vehicle Processor Unit (VPU) that enables improved situational awareness and understanding by permitting the integration of voice, video and data streams related to the Common Operating Picture (COP), Communications, Platform Sensors and avionics. The DDU permits a true convergence of multiple computers and displays into a common mounted computing environment (MCE). Additionally, the architecture supports embedded RFID for In-Transit Visibility (ITV) of logistics data and can even monitor CANBUS and MIL-STD 1553 databus information to provide the automatic collection and analysis of onboard vehicle diagnostics for Health and Usage Monitoring Systems (HUMS) or Embedded Diagnostics.



Advanced Communications Systems

Working together with a wide range of networking systems specialists, Leonardo DRS has developed an advanced communications solution built around its powerful DDU Block 4 architecture. The system is transport layer agnostic and integrates SATCOM on the move (SOTM), legacy analog systems, the latest generation Software Defined Radios (SDR) and commercial LTE and Wi-Fi. The DDU permits the integration of tactical C4I and BMS systems to provide communications (voice, data, video) reach back and ground to air communications. The Leonardo DRS solution for advanced tactical communications integration delivers tremendous advantages in terms of size, weight and power (SWAP) and its modular approach allows users to re-configure and re-purpose its systems onto a wide range of land, air and sea platforms.

Emerging Capabilities - Next Gen Tactical Computing, APNT & Cyber

Leonardo DRS continue to invest in and develop our core Mission Systems capabilities. Two examples of note are in the areas of Assured Position Navigation and Timing (A-PNT) and Cyber Security. In the modern battlefield, it is equally important to know accurate “time” as it is to know your position. If timing information from the GPS is unavailable or cannot be trusted, it is critical to have access to other sources for execution of the mission. Leonardo DRS AC²ES offers a choice of multiple timing holdup modules that increase accuracy proportionately with cost. AC²ES offers a unique benefit to users since they can select the accuracy level needed for their mission purpose and avoid paying unnecessary costs for higher capability levels. Designed with extensibility and future growth in mind, customers can tailor their system configuration based on the military unit’s mission profile, operational needs, and budget. This ability to tailor the configuration offers different tiers of AC²ES capabilities throughout the echelons of the modern fighting force. All Warfighters now have access to resilient A-PNT capabilities that integrates with existing or new Leonardo DRS tactical computing systems. As the enemy adapts, AC²ES provides the fighting force with the system flexibility to conduct modular upgrades, facilitating precision mission execution.

AC²ES is a solution to Global Positioning System (GPS) disruption designed to always provide A-PNT information. Developed with Size, Weight, Power and Cost (SWAP-C) efficiency in mind, AC²ES is embedded in our widely used Data Distribution Unit (DDU). The DDUx II and military variants are currently fielded in the U.S. Army, U.S. Marine Corps. In the Middle East, both the UAE and Bahrain

Land Forces have adopted a DDU based mission systems architecture for their Tactical C4/5I systems. The AC²ES capability is easily implemented without additional space or weight requirements. The DDU also allows for integration of A-PNT functionality with the Battle Management System (BMS) in a currently fielded Line Replaceable Unit (LRU). The DDU is the ideal source of A-PNT not only because it is a critical user of PNT, but also because it can provide A-PNT distribution to all other devices needing PNT within the vehicle without adding any additional SWAP.

The vehicle operator uses the BMS’s Graphical User Interface (GUI) on a rugged display to view and manage Mission Command functions, GPS, and A-PNT on a single pane of glass, including distribution to all vehicle PNT users. AC²ES provides A-PNT capability by augmenting standard military GPS PNT sources with technologies such as anti-jam, anti-spoof, M-code receivers, additional RF sources, vehicle Infra-Red (IR) sensor vision navigation, wheel rotation and inertial measurement units (IMUs). The fusion engine merges and prioritizes all PNT sensor data to provide a reliable, GPS-denied navigation solution during real world jamming and spoofing attacks. The AC²ES capability operates standalone, or while hosting the vehicle’s BMS and is controlled via its GUI.

Leonardo DRS has been at the forefront of building and delivering Cyber secure tactical systems since 2007. In addition to attacks targeting operating system vulnerabilities, modern threats are aggressively targeting BIOS and firmware subsystems within the computers themselves. Successful exploits at this level are extremely difficult to detect and nearly impossible to remove. Establishment of a Hardware Root of Trust (HROt) and implementation of Transitive Trust Chains



are key technologies for protecting against these threats. In 2007, Leonardo DRS began embedment and provisioning of Trusted Platform Modules (TPMs) in fleet-base tactical computers. Since then, the company has continued to develop and expand its use of this technology and is now considered an industry leader in embedded cybersecurity. In 2011, Leonardo DRS began development of a dedicated secure TPM Provisioning Room containing the TPM Provisioning Server and the associated Hardware Security Module (HSM). This Server - Client Provisioning system has become the cornerstone for verifying integrity, mitigating supply chain risks, and provisioning of tactical computers in a high volume-manufacturing environment. These technologies are critical for establishing a HRoT that can then be used as the basis for making integrity measurements of the computer's subsystems.

Leonardo DRS has developed embedded cybersecurity Edge-Assured® technologies, based on industry standards, but customised for use at the tactical edge. The technologies provide secure storage of signing and encryption keys, custom secure boot signatures, trusted boot with hardware whitelist, random and unique-per-computer

BIOS passwords, trusted factory assertion of TPM ownership, TPM/Trusted boot coordinated unlocking of self-encrypting drives, secure system updates, and access to TCG Software Stack (TSS) trusted middleware.

Leonardo DRS in the Middle East

Leonardo DRS has established a firm foundation in the Middle East with a major regional support hub located in Abu Dhabi. Plans are being discussed to replicate this support hub in Saudi Arabia enabling Leonardo DRS's world leading Tactical C5I capabilities to be delivered and supported within the kingdom.

For more information about the Leonardo DRS integrated mission command systems, please visit LeonardoDRS.com/Mission-Command or visit the Leonardo DRS stand at the World Defense Show in booth #N2.



MISSION CRITICAL PROTECTION

Composite Armour Technology innovation

World Defense Show, NP Aerospace Booth J43, UK Pavilion

For over 40 years NP aerospace has been at the front line, pioneering the technology of composites for the defence industry.

Today, with rapid progress in armour systems and materials, we are helping governments and security services around the globe to keep up with the speed of change.

We are an independent UK and Canadian based company, employing 160 experts in research, manufacturing, testing and fabrication at our facilities in Coventry and London, Ontario.

And our size is our strength. As a medium sized, nimble, specialist company we are capable of adapting to the unique demands of our clients, providing bespoke solutions and partnering with a select group of global suppliers who share our passion for excellence.

As to the materials we use within our composite armour, we purchase only from high quality original equipment manufacturers and not from distributors. In an industry where safety is paramount, we deploy stringent measures to ensure that quality is never compromised.

We have carefully established a prominent position in the field of advanced, lightweight, high performance armour systems for military and law enforcement personnel and land and marine platforms. We also lead the way in the integration of military vehicle systems, delivering complete turnkey services in engineering, driven in part due to our role as engineering authority for the UK MOD protected mobility fleet.

Let us help you protect your people and vehicles with the safest

and most cost-efficient systems for ensuring your essential assets are suitably secure.

Personal Armour – Helmets, Plates & Shields

British and Canadian designed, tested and manufactured, life saving protective equipment from NP Aerospace is used by military and security personnel around the world. Our cutting-edge technology offers clients the ideal coefficient of high threat protection with minimal weight, making our equipment safe against the rigours of modern conflict while providing ease of use and durability within the harshest of environments.

To date we have supplied more than one million ballistic helmets to forces in the UK, Canada, Italy and NATO allies. Since the 1990s we have provided more some 200,000 body armour plates to world leading defence organisations including the UK MOD and Canadian DND. We are at the forefront of developing the latest range of lightweight, ergonomic ballistic shields for protection against bullets and blast fragments.

Our equipment meets many international performance standards, including the US National Institute of Justice (NIJ) Standard for Police Body Armour and product-specific STANAG and MIL standards. Our products benefit from significant user feedback and include a





range of features that make them as comfortable and safe as possible.

Of course, we understand that every requirement is different, and that as technology continues to develop, the need to meet unique user requirements is both necessary and part of the service we offer clients. We can therefore design shields and helmets which incorporate many non-standard accessories including lights, cameras, comms systems and viewports all of which are supported by our network of global suppliers and meeting our own exacting standards for performance and durability.

Our manufacturing facility has the flexibility and capacity to meet your needs whether it is small quantities of a niche product or a large order of military combat equipment and is supported by a fully accredited testing department and developmental lab.

Bomb Disposal Suits

We are proud to launch to the market our next generation 4030 ELITE bomb disposal suit certified to NIJ 0117.01 – the culmination of more than 15 years' experience selling to armed forces all over the world. NP Aerospace is one of only two manufacturers in the world to have achieved this level of accreditation.

The 4030 ELITE goes beyond NIJ 0117.01, with extensive blast testing against four internationally recognised scenarios and offers a range of features and benefits which place it truly at the cutting-edge in its class.

Features include:

- **advanced optical performance with a wide field of view and a demisting visor**
- **a patented two-pull quick release system, allowing removal in less than 30 seconds**
- **a combination of optimum survivability and low weight, with high protection across critical areas**
- **enhanced ergonomics to permit a range of movements and effective weight distribution**
- **a user configurable system which allows the attachment of the latest equipment.**

All these combine to create a suit which provides the pinnacle of protection against flame, fragmentation, blunt trauma from impact and blast pressure wave.

The 4030 ELITE is available with a range of communications, cooling and biometric systems to make what we believe is the most user configurable and most comfortable high performance bomb disposal suit in the world today. We're rightly proud of it.

We also offer the 4020 ELITE, a higher performing, commercially available version of the MKVI Suit currently in service with the UK MOD. Meanwhile the 3020 ELITE Tactical Suit offers a lightweight solution to enable extended wear in search and breaching missions. Blast tested against the NIJ 0117.01 standard, it is in service with diverse global agencies including the Tokyo Fire Department and the Japanese Defence Force.

Platform Armour & Integration

Our world leading CAMAC composite armour system weighs 50% less than the equivalent armoured steel products. Our capabilities include:

- **Spall liners for enhanced crew protection**
- **Appliqué armour systems for vehicle and other platforms**
- **Ultra-light semi-structural armour systems for protected weapon stations and other applications**
- **Lightweight composite armoured monocoque structures for crew compartments and vehicle cabs**

Working primarily with vehicle/system OEMs or government departments, our armour systems are a central component within the development of new platforms and systems across the world. They provide sector-leading levels of protection at minimal mass at competitive prices.

Alternatively, NP Aerospace's composite armour systems can be used to significantly upgrade the protection offered by legacy fleets allowing the end user to extend the life of the platform and improve specific capabilities. Ultimately increasing survivability against modern threat scenarios and providing the user greater operating freedom with minimal increased platform weight.

NP Aerospace's armour systems are capable of defeating threats up to and including STANAG 6 and with partners across the defence industry and academia, NP Aerospace is continuing to develop new materials and armour systems to defeat an ever-wider ranges of threats.

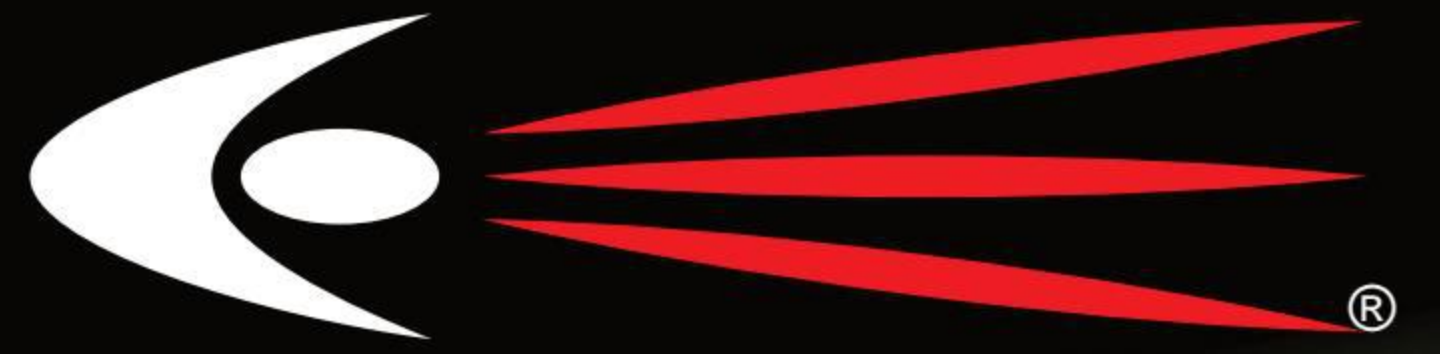
Our platform integration portfolio includes significant upgrades to the UK MOD's mine protected patrol vehicle fleet including the on-going provision of engineering services to a fleet of over 2,000 vehicles deployed throughout the world.

Whatever the threat, and in the harshest of environments, NP Aerospace has an armour solution that will keep your people safe at a price you can afford.

Contact Us: info@npaerospace.com

www.npaerospace.com





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www.adventuretactical.com

This past year has been challenging for many across the globe. The pandemic has affected all aspects of life: reaching families, borders, the economy, and businesses both large and small.

Adventure Lights Inc. – a business located in Beaconsfield, Quebec, Canada – has been fortunate to have been able to weather much of the storm. The company has created state-of-the-art research and development facilities that allow us to both improve existing capabilities while developing new cutting-edge technologies.

The company has won numerous awards, including four consecutive Innovation Awards in Canada, a Congressional Award for Program delivery with NAVAIR and a Tech Connect Defence Innovation Award. With our direct inhouse manufacturing and research and development capabilities, Adventure Lights new innovations are now available in both our new and established product lines.

In 2018 Adventure Lights launched *Adventure Tactical Inc.* and brought its associated company Quantum Marine Ltd. to the forefront of the Search and Rescue industry with significant contract wins. As part of our steady growth initiative and expansion across product lines, these respective companies have become known industry standards in record time.

While adopting the *Extreme Products for Extreme Conditions®* slogan, Adventure Lights is now focused on supplying products to the Outdoor Sports and Recreation enthusiast, while Adventure Tactical Inc. focuses on distributing Positive Identification Solutions to those on the front lines. Adventure Tactical will also continue to supply Landing and Drop Zone Lighting Systems for deployment, evacuation, and supply in harsh environments. Quantum Marine Ltd.'s main focus continues to be that of serving the SAR community with a substantial focus on waterborne operations.

With the expansion of the Adventure Lights' umbrella, comes the introduction of one of the most sophisticated I.F.F. Helmet Lights on the market, *the Trilobyte™*, available exclusively through Adventure Tactical Inc.



The Trilobyte™ launched at IDEX2019, quickly gained rapid adoption, and set a new industry standard. It caught the eye of the Defense and Security community globally and set-in motion purchase orders that the company is rapidly fulfilling. During 2020, the Trilobyte™ became one of the most highly sought, and deployed, I.F.F. solutions in the world.

In a time where NATO countries and their allies are focusing on Future Soldier Systems and Programs, the Trilobyte™ was tested and immediately adopted in East Asia as part of their Soldier Enhancement Program and will continue to be used for the next five years. In some Scandinavian countries the Trilobyte™ has been purchased as a complement to our venerable VIP and VIPIR product. As many militaries are currently upgrading their technology with new vision systems the Trilobyte is being adopted to provide best in class features and capabilities for current and future soldier initiatives. While you are reading this, more countries continue to adopt our technologies to enhance the safety of their soldiers and law enforcement officers across the globe.

The Trilobyte™, with its unique lightweight design, delivers unparalleled performance compared to other products in its category. The light boosts features such as Auto-Synchronization, Programming and Playback, Early Laser Warning Systems, Multiple Colour Outputs as well as NIR and SWIR outputs. While some features are documented others remain unshared, except for use with some of the world's most exclusive and Elite Special Forces Teams.

The Adventure Lights group instills a culture of durability, dependability and innovation in its people and products that exceeds that of our competitors. This has been proven repetitively over our 25-year history. Our *VIP™* and *VIPIR™* products have become iconic with Special Forces and are still in active service after over two decades. This legendary product first hit the market in 1996, and like the Trilobyte™ today, the VIPIR™ became the standard for Special Forces.



The VIPIR™ continues to be unsurpassed in durability, versatility, and effectiveness in action – it remains the clear choice when compared to everything else in its category – and many Militaries continue to purchase this product built on the trust they have in its performance.

In 2020, Adventure Tactical, in collaboration with FinnProtec, was able to secure one of the most sought-after contracts published by the Finnish Ministry of Defence in recent years. The Minister of Defence authorised the Defence Forces Logistics Command to sign contracts for the procurement of weapon lights, helmet lights and Identification Friend or Foe beacons for soldiers. The procurement was preceded by extensive field tests conducted in Finland in which the suitability and compatibility of over 25 products were evaluated. These procurements were included in the national defence development programme and are part of the overall infantry night combat capability development. These procurements are aimed at building infantry troops' ability to fight at night, especially in poor visibility conditions. The I.F.F. Beacon chosen was our venerable VIPIR™. The first products will be delivered by the end of 2021 and taken into use starting from 2022. The overall value of this procurement is more than EUR 1 million.

These are mere examples of the success that our group has been reaping, quietly (we are Canadian after all). As we celebrate our 25th anniversary, we also celebrate maintaining both our build quality and technology lead. From Personnel recovery and Identification Systems to Vehicle Identification & Safety Systems, and through our Expeditionary Landing and Drop Zones, the Adventure Lights group of companies offers a complete solution to many challenges.

While we continue to deliver trailblazing technologies to enhance soldier safety, we also pride ourselves in being socially and environmentally responsible. We have recently added a Renewable Energy Man Portable Power System which helps reduce battery waste on the front lines as well as help the user maximize their power sources. This initiative directly reduces the quantities of batteries purchased, reduces waste, and saves hundreds of thousands of dollars.

On our 25th Anniversary, we are proud to be one of the oldest companies in our industry and want to thank all those who have trusted our brand, on the battlefield at home and abroad. Your enhanced safety is our continued goal whether it is at sea, in the air, or on land – When Success is Vital™ we are there to help provide solutions to successfully complete the mission.

G&H further expands its R&D capability with new Optical Systems Innovation Hub

At G&H, our commitment to translating innovation into action drives the creation of new environments that optimize our teams' ability to develop and commercialize new ideas, products and customer solutions. This is the strategy behind both the launch of our Optical Systems Innovation Hub in a brand new facility in St Asaph, UK.

Over two floors, the specialized engineering environment houses our growing development engineering team comprising specialists in fields as diverse as optical design, opto-mechanical analysis, electronics development, system testing and integration, set to further our focus on application areas including aerospace and defence (A&D), space, life sciences and more.

The Hub also has the necessary cleanroom space to allow for development and functional verification of new concepts and product designs in the relevant operational environment. At the same time, it is the launch pad for our product management and sales team specializing in optical systems, creating a seamless and effective interface between our commercial and engineering functions.

Our Hub creates a seamless and effective interface between commercial and engineering functions.

So, why is the Hub such exciting news for us, the customers and OEMs we already have, and industry prospects with a challenge in search of a solution?

The Optical Systems Innovation Hub: a step-change in value delivery

Firstly, the Hub significantly expands our R&D capability, with a dedicated team that will work on customer-driven product development projects as well as market-driven internal products, and adjacent and independent fields of research, exploiting technology synergies.



Cleanroom at St Asaph



Secondly, it takes G&H into a new phase in its delivery of value to customers, since it strengthens our ability to design and build not just photonics and optics components, but the associated electro-optical subsystems and systems.

The Hub's objective will be to design and develop optical systems with differentiated performance enabled by our state-of-the-art component base in our manufacturing facilities in the UK and US. The close link and recurring design process between the system and component is expected to create the rapid technology transfer and added value required by our customers through an effective new product development process.

Customer collaboration is pivotal to the journey from concept to integration.

Thirdly, the Hub enables us to engage with our customers very early on in the development process. Collaboration in this conceptual phase has been shown to be pivotal for optimally setting the system requirements by leading the technology and component trade-off analysis right at the beginning of the journey. This means we are not only able to take a product from specification to final integration, but to help drive both the initial concept development and ongoing project scope, factoring in design improvements to anticipate product issues before they even find their way into the risk register.

In short, the Optical Systems Innovation Hub is helping G&H deliver strongly on all fronts – research, design, manufacture, integration, assembly – and create a business that is as much about expertise in end-to-end solutions as excellence in component-level manufacturing.

One of the early successes of the Hub has been the development of an AFV sighting system; the next generation of the Sabre - the Sabre-TI. With TI standing for thermal imaging the new version of this compact commander/gunner's sight now offers tank crews the opportunity to identify otherwise hidden targets. The integration of thermal imaging technology is illustrative of the G&H approach to devising solutions which will add value for end users and so enable customers to be more competitive.

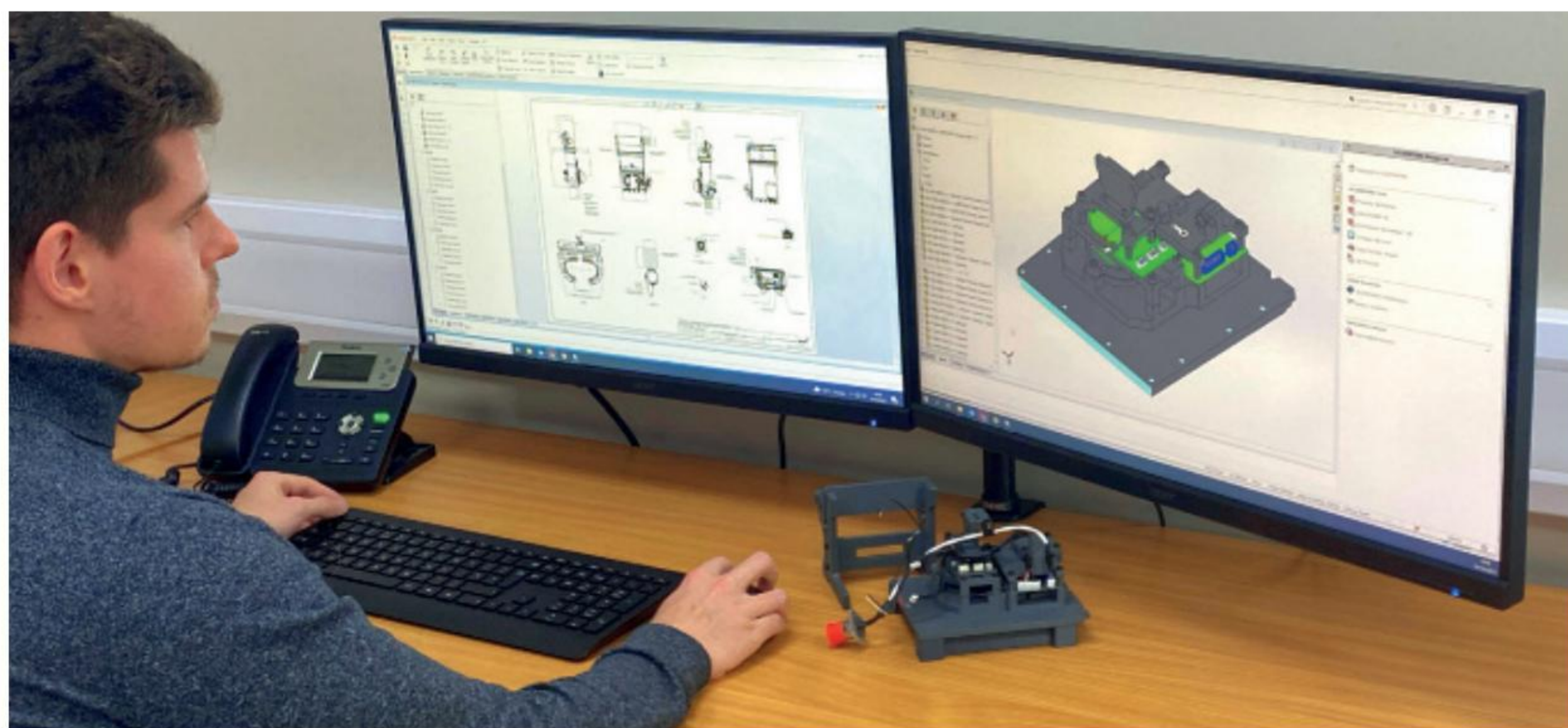
What innovation will take place at the Hub?

The Hub will build on and extend an existing track record of successful G&H component and systems development across many different market verticals. To cite just a few examples, in the A&D arena, it will enable us to expand the integration and delivery of optical systems that employ precision optical components manufactured in-house for applications such as sighting systems, imaging systems for intelligence, surveillance and reconnaissance, directed energy weapons and satellite laser communications.

The team will work on designing and developing next-generation optical systems that will enable increased situational awareness in A&D, lightweight optical payloads in aerial and space platforms that use innovative optical design, state-of-the-art components, sensors and image processing.

Drawing on our expertise in other parts of the business, the Hub will gradually expand into designing more functional systems with internal G&H content, delivering high performance and increased value to our customers. In any industry or deployment where there is a need to design, develop and deliver subsystems of these types, repeatably and at scale, G&H will now be better placed than ever to answer the call.

G&H's Chief Commercial Officer, Stratos Kehayas commented: "From sighting and imaging systems in aerospace and defense to minimally-invasive surgery, biomedical imaging systems, and industrial lasers, the key is always that intimate interface between the optical design and the precision optical components used to build them. We have to remember that



the language of photonics technology is universal, and we are very fluent in speaking it!"

How to access the Hub

Whether you are an existing customer or you have just found out about our capabilities and technologies, the Hub can act as the first port of call for your challenging project. Our intention is that the Optical Systems Innovation Hub will be an accessible resource that facilitates easy engagement, so getting in touch with it is as simple as using the contact information below.

As ever, G&H is committed to changing the world with photonics – and with the Innovation Hub, we're shifting the changes up a gear.

For further information on the G&H Optical Systems Innovation Hub, email info@gandh.com.

G&H
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with photonics

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Over 70 years designing and manufacturing ruggedized optical subsystems and components for mission-critical applications.

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ComEth4000e – 6U VME 1/10/40 Gigabit Ethernet Switch



Interface Concept, a leader in commercial-off-the-shelf (COTS) solutions is announcing the ComEth4000e, a new 6U VME 1/10/40 Gigabit Ethernet Switching board, dedicated to Defense and industrial high-computing applications.

Compared to its ComEth4000a predecessor, the ComEth4000e Gigabit Ethernet switch features 10/40 Gigabit Ethernet ports made available via special mezzanine boards, on a 1-slot or 2-slots 6U VME form-factor (aircooled configuration).

The single-slot 6U VME board comes with 12 x 1000BASE-T Ethernet ports while the dual-slot 6U VME board provides up to 24 x 1000BASE-T Ethernet ports on the front panel. Both configurations offer 8 x 1000BASE-T Ethernet ports as an option on the VME P0 connector, and can be equipped with up to 5 mezzanine boards (factory-build) providing 10GBASE-T, SFP+ (1G/10G), SFP (100M/1G) or QSFP (40G) ports instead of the 4 front 1000BASE-T ports.

This flexible product design allows the user to choose from various Ethernet interface configuration according to its application requirements.

The ComEth4000e managed Layer2/3 Ethernet switch is powered by a highly integrated Marvell System-on-a-Chip (SoC) with programmable packet processors. Its Ethernet switch matrix is managed with an independent Marvell ARMv7 dual-core processor, supporting the Switchware network management application. This highperformance Layer3 switch can be remotely configured by the Switchware web interface, SNMP or CLI interfaces. Moreover, this product offers IPv4/IPv6 routing capabilities.

"Our engineers have designed a flexible Ethernet Switch for 6U VME legacy systems, with a full array of configurations to meet integrators' demanding applications," said Pierre Ansquer, Interface Concept's Business Development and Customer Support Director.

Please contact us for more details.



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www.interfaceconcept.com

SCHROTH®

Mine Blast & Utility Seat Systems



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

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



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

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

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

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



KEY FEATURES

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

CUSTOM APPLICATIONS

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

CONTACT:

Mr. Julian Schulte
Tel: +49 2932 97420
E-Mail: Julian.Schulte@eu.schroth.com

VENOM LR

VENOM LR

Enters the 30 x 113mm RWS battlespace



VENOM LR (Low Recoil) is a ground up new design based on tried and tested aircraft revolver cannon architecture.

VENOM LR is designed for installation to Remote Weapon Stations (RWS).

VENOM LR has a 2,000m effective range and fires single shot, 225 and 1,200 spm.

VENOM LR is a marinised, highly price competitive and non-ITAR solution for 30 x 113mm RWS weapon requirements.

VENOM LR can be adapted for crew served land and naval mounts.

VENOM LR is production ready.



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Email: info@willburt.com

WILL-BURT GERMANY

Fischergasse 25
D-91344 Waischenfeld
Germany
Telephone: +49 9202 180
Fax: +49 9202 1811
Email: info@willburt.com

WILL-BURT UNITED KINGDOM

Unit 5b, Station Approach
Four Marks, Alton Hampshire,
GU34 5HN,
United Kingdom
Telephone: +44 (0) 1403 265532
Fax: +44 (0) 1403 259072
Email: info@willburt.com

WILL-BURT ASIA

SINGAPORE SALES OFFICE
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INTEGRATED TOWER SYSTEMS

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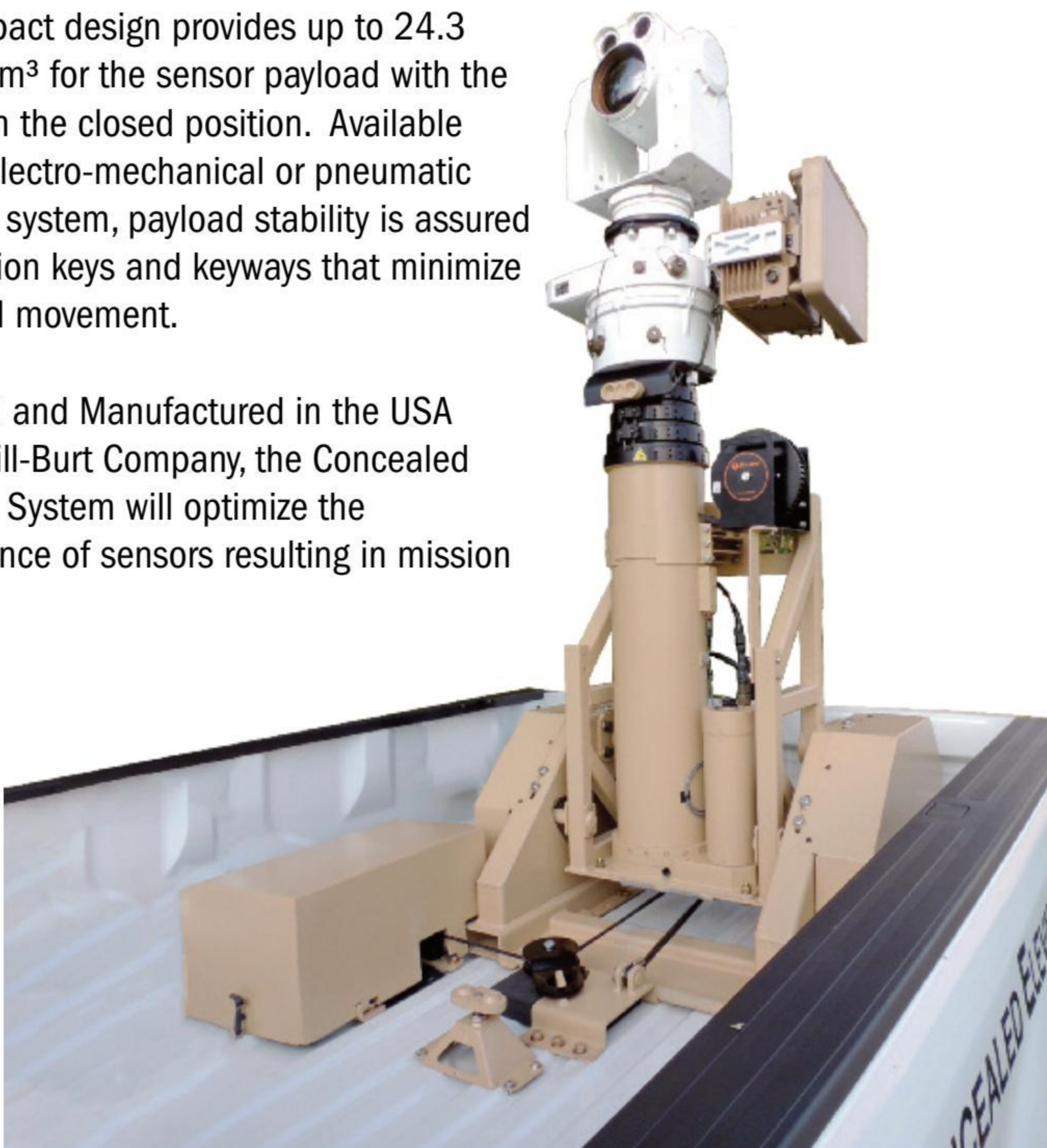
The Will-Burt Company is the world's premier manufacturer of mobile telescoping masts, towers, trailer systems, and pan and tilt positioners. We offer virtually every mobile payload elevation solution and full integration services for defense, government, first responders, telecommunications, energy production and other markets. Will-Burt also offers contract manufacturing, metal fabrication, powder-coating, and rapid prototyping services. We are an international company with offices and manufacturing in the USA, United Kingdom, Germany, Turkey, and Singapore. All manufacturing locations are backed by a certified ISO 9001:2015 Quality Management System. Incorporated in 1918, Will-Burt is an employee-owned company.

Concealed Elevation System

Will-Burt's Concealed Elevation System is a rugged and precise mobile elevation platform that provides rapid deployment of a wide variety of sensors from a concealed position in a standard 8' pickup truck bed.

The compact design provides up to 24.3 ft³ / .69 m³ for the sensor payload with the tailgate in the closed position. Available with an electro-mechanical or pneumatic elevation system, payload stability is assured with section keys and keyways that minimize rotational movement.

Designed and Manufactured in the USA by The Will-Burt Company, the Concealed Elevation System will optimize the performance of sensors resulting in mission success.



GEROH SPM



The GEROH SPM mast, the strongest and most accurate mobile mast, is now available in a compact, low-profile design. This low-nested mast allows a payload to be stored inside the vehicle to protect the valuable sensor.



All Will-Burt products sold for Defence are MIL-STD 810 certified by a third-party.



Tactical HF & VHF Radio Systems

Barrett tactical HF and VHF voice, data, interoperability and secure communications solutions have been field proven in over 150 countries.

By understanding the unique challenges facing our clients, Barrett provides complete communications solutions including tailored operator training and technical support.

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Vehicle Lighting Solutions

Oxley offers a wide range of high specification LED lighting to replace incandescent and fluorescent technology in both retrofit and new build vehicle projects. Our military lighting is robust & rugged with properties such as EMC protection, high MTBF and high sealing, as well as best in class for all weather performance in extreme conditions.

World leaders in vehicle lighting technology and night vision, Oxley pioneered the development of infra-red driving lights for use on covert operations and is now leading the way with new cutting-edge solutions.



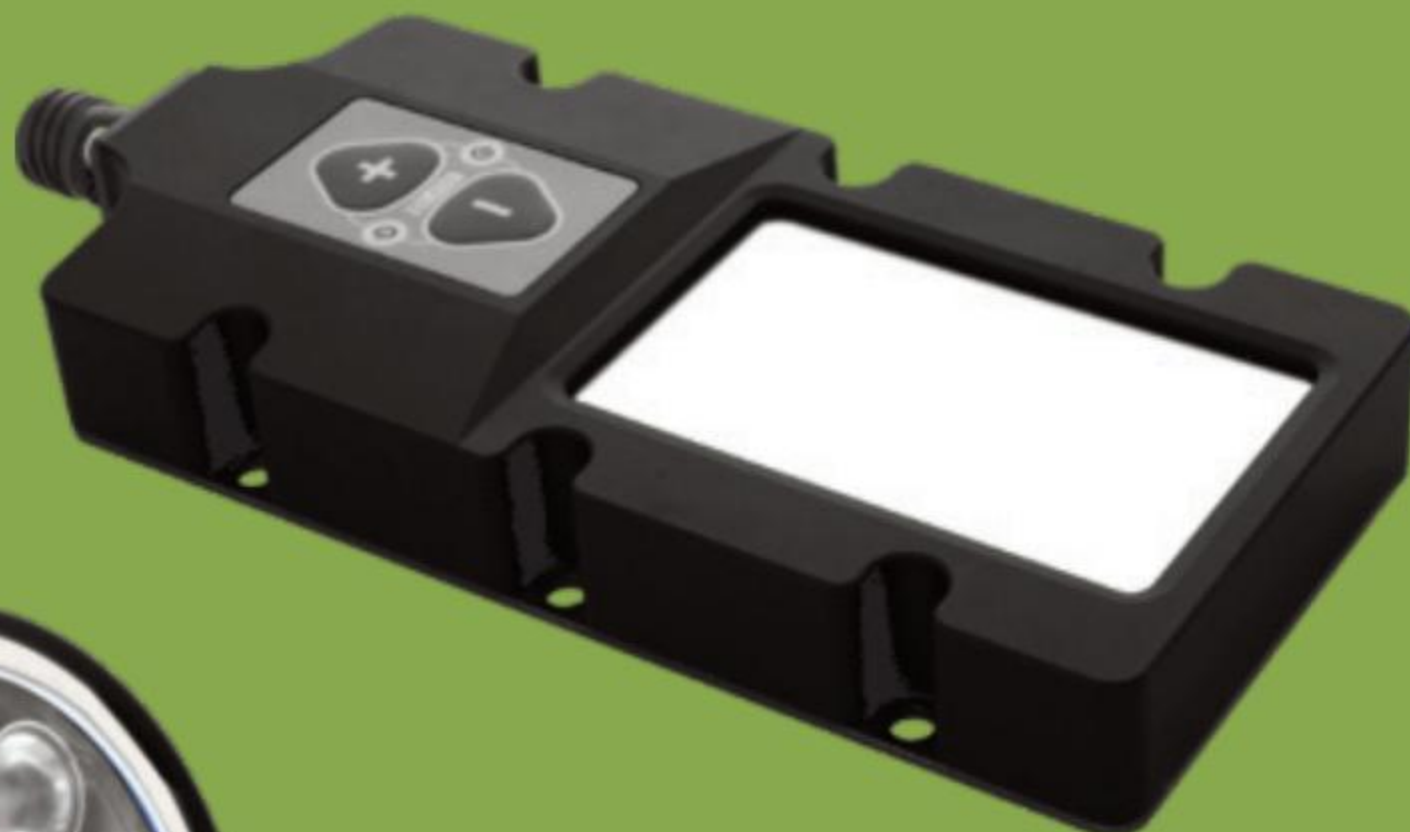
Cockpit Utility Light



IR Driving Lights



Gooseneck



DC Combi



Compact
LED Searchlight



Situational Awareness with Vision4ce's GRIP Video Processing Distribution Unit

Innovative solutions are required to provide an accurate and timely view of surroundings to detect dangers and prevent unwelcome surprises.



*Video Processing Distribution Unit
(Multiple Channel Image Processing Computer)*

Vision4ce's 360° Situational Awareness solutions provide an accurate and real-time view of any surroundings, whether in a stationary or mobile environment, supplying system operators, war fighters, or security personnel with actionable data.

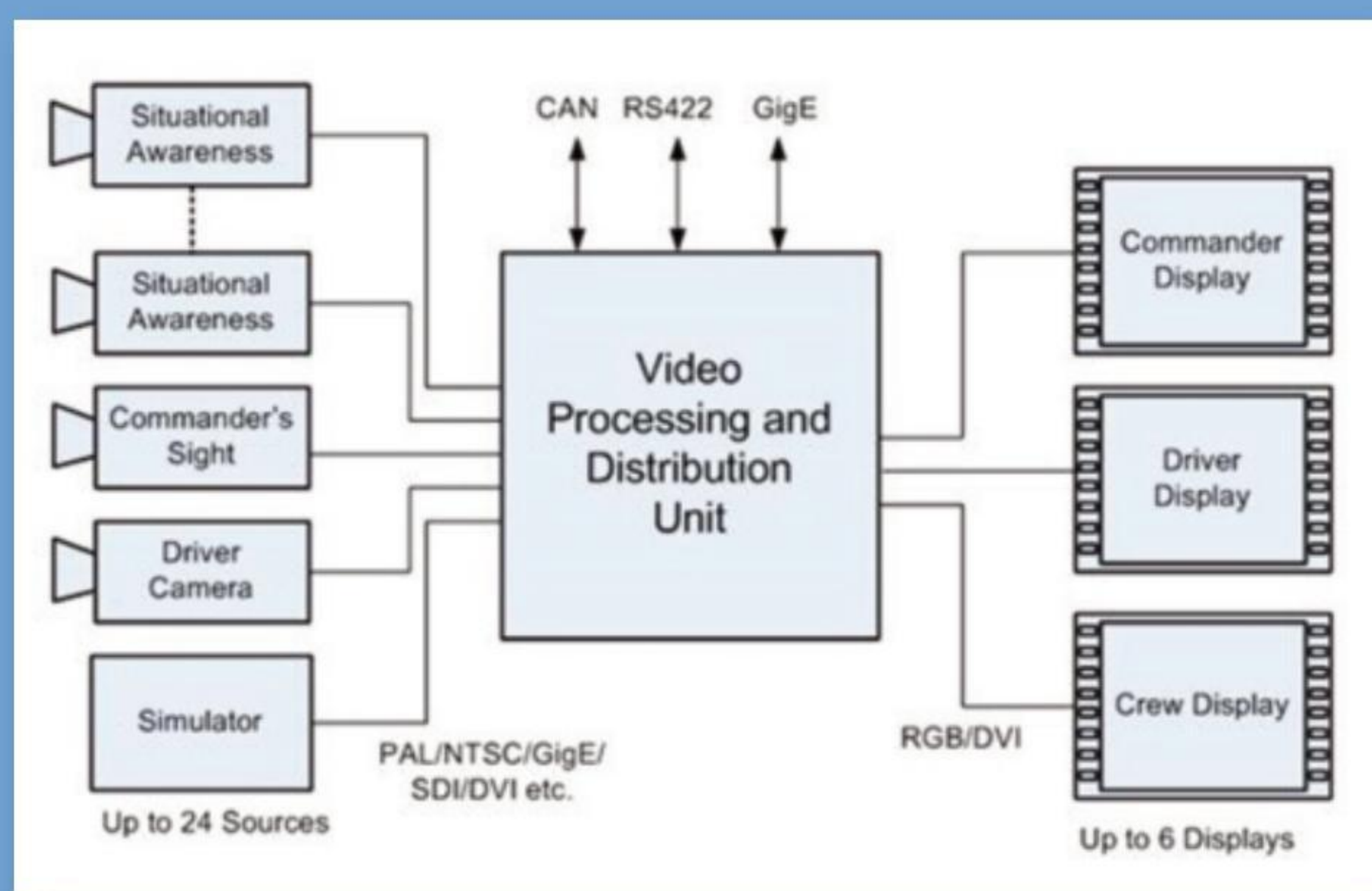
In today's modern, fast-paced world, situational information and data is everywhere and very necessary. The challenge is sifting

through the noise to find critical signals on which to focus. Operators need help in making sense of the video processing overload and help enhance their efforts with advanced image capture & video processing technology.

Vision4ce's 360° Situational Awareness Video Processor Distribution Unit (VPDU) solutions offer state-of-the-art technology, in comprehensive yet highly intuitive systems. Highly customizable, the Vision4ce VPDU systems are applicable to both retrofit and new sensors with the ability to integrate a multitude of sensor platforms, all controlled remotely by one or more users via standard IP networks.

With advanced command and control capabilities packaged in rugged, reliable platforms, you can be assured that your requirement is being resourced by the most advanced technology available today for fixed and scanning detection. The VPDU can support Intel latest generation multi core mobile processors, with a GPU to drive up to 6 output displays. It supports up to 24 diverse video analogue and digital video input





interface and has a flexible input architecture, which is modular and allows the VPDU to be tailored to support multiple video capture devices in digital and analogue formats as well as multiple communication interfaces such as Ethernet, serial & CAN Bus.

The Vision4ce VPDU is a rugged multiple channel video image processing computer used for processing and distributing video in system comprising multiple video sources which need to be processed and routed to multiple video displays.

All products can be customised for use in manned and autonomous systems.

Capabilities:

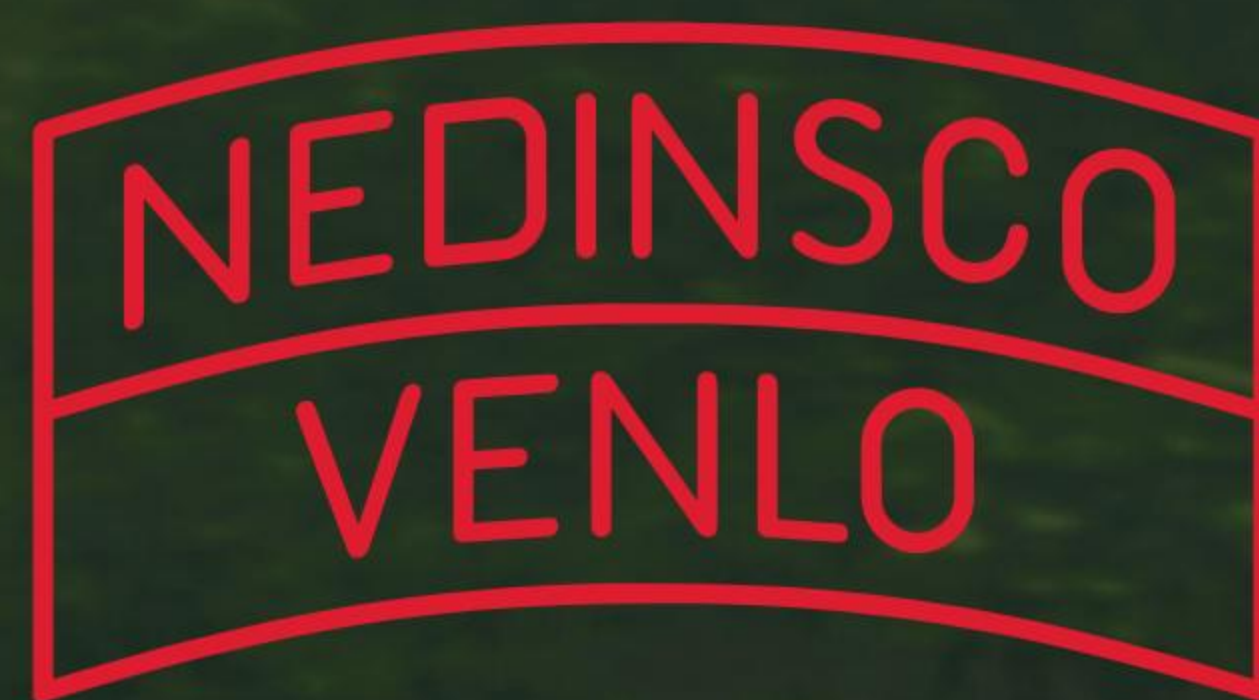
- Multiclass Classification and Object Detection
- DART, real-time, low latency target tracking
- Video Compression and Recording – H.264, H.265, M-JPEG
- Electronic Image Stabilisation
- Image Enhancement
- Camera Control
- Servo Platform Control
- Multiple, Parallel Processing Channels
- Multiple and flexible video interfaces
- Open architecture software
- FrameWorkx – open software image processing pipeline
- Support for Linux or Windows OS
- Qualified to military standards (including gun shock)
- Suitable for autonomous applications

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INNOVATIONS IN STABILIZATION TECHNOLOGY FOR ELECTRO-OPTICAL SENSORS



By Mr. Sjaak Baetsen,
Project Manager, Nedinsco



Nedinsco multi-sensor optronic units installed on an armored vehicle

Smaller, faster, cheaper components for armored vehicles

Miniaturization is a critically important driver of technological innovation. Moore's Law and the extraordinary scaling of semiconductor chips epitomizes the drive towards smaller, lighter, faster, cheaper components that require less power to perform the same tasks. The trend towards reducing size, weight and power consumption while gaining performance also drives the evolution of many mechanical and optical systems, and these factors are especially important in designing systems for armored vehicles.

STABILIZATION OF ELECTRO-OPTICAL SENSORS

An innovative concept in stabilization technology for electro-optical sensor systems is achieving these benefits with a design that is significantly more compact and

consumes less power than concurrent designs. Armored vehicles utilize (un)stabilized electro-optical sensor systems for aiming and targeting, surveillance, situational awareness, and for observation purposes.

When driving through rough terrain, the electro-optical sighting systems have to be stabilized in order to maintain a stable line of sight and keep track of the target. The traditional design has been to place these sighting systems on motorized stabilization platforms.

The system sometimes contains its own gyroscope, or alternatively it can receive signals from the turret's gyroscope. Software determines the degree of positioning correction required and controls motors to exert equal and opposite force to the impact of the environment in order to maintain alignment with the object insight

MINIMIZING WEIGHT AND POWER CONSUMPTION

The challenge is that the motors inside the platform need to be powerful enough to offset the effects of terrain pitch, roll and yaw of vehicle movement for the full mass of the electro-optical sensor system. In a typical arrangement where multiple sensor systems are used, the total mass adds up, and the stabilization motors need to be large and powerful to do the job.

Although the weight of this platform contributes only a small proportion to the overall weight of the armored vehicle, it is an important consideration in the design of electro-optical sensor systems. Any opportunity to reduce vehicle weight reduces fuel use and associated logistics, and has important advantages in transport and mobility on the battlefield. Moreover, the sighting systems are often attached to a tank turret or a Remote Controlled Weapon Station and the added weight increases the load when the turret rotates.

The power requirements of the motors inside the platform are also an issue. Two decades ago, a standard combat vehicle required only a 150 amp alternator to power its onboard systems. The introduction of all kinds of sophisticated electronics has increased the amperage requirements more than tenfold. Minimizing energy consumption of all components is an important priority to decrease fuel consumption and reduce the weight of needed power generation capability.

SMALLER AND LIGHTER DESIGN

The inefficiencies of the traditional approach is being replaced by a fundamentally new design of stabilization technology. Rather than employ motors to stabilize the entire electro-optical sensor suite the innovation stabilizes only the Line of Sight (LoS) of these sensors. Only very small motors are required to operate the moveable optical mirrors positioned in front of the sensors. The line of sight is stabilized by using two moving elements one for azimuth and one for elevation.

An essential aspect of this new stabilization concept is the ability to stabilize the line of sight of all sensors in a multiple electro-optical sensor system. The line of sight of all electro-optical sensors are merged together by optical components to create one line of sight.

The modular nature of this new design concept affords many benefits in addition to the dramatically reduced size, weight and power requirements. The stabilization system can support sensor systems of any size and weight without the need to increase the load capacity of the motors.

FASTER SPEED PROVIDES IMPROVED STABILIZATION

And the new design is not only smaller and lighter, it is faster too. Because less force is required to move the mirrors than the traditional approach of moving the entire sensor system, the stabilization system is more responsive and therefore more effective in providing stability.

This new stabilization technology was initially developed by Nedinsco for a Missile Guidance Unit containing a daysight camera and laser guidance system. The MGU is used on a wheeled armored vehicle and controls the missile during its flight. This new stabilization technology was developed to meet the stringent requirements of accuracy, dimensions and weight of this Missile Guidance System. The flexible, modular design has made this stabilization system suitable for any sensor system incorporating multiple electro-optical sensors.

ADVANTAGES OF THE NEW DESIGN CONCEPT

This new concept makes it possible to design a more compact SwaP optimized stabilization solution in situations with constraints typical of armored vehicles—limited available space and limited available power.

SIZE. The space savings are significant and critically important in cramped armored vehicles. The compact size affords more options for optimal placement on the exterior.

WEIGHT. Because the motors are only moving mirrors and not the entire electro-optical sensor system, the motors are smaller. The entire system, including its enclosure, is smaller, resulting in weight reduction of up to 50%.

POWER USAGE. Smaller motors draw significantly less electrical power.

STABILIZATION PERFORMANCE. The system is faster and more responsive because only the mirrors need to be moved. As a result, much higher stabilization accuracy and dynamic performance is achieved.

MODULARITY, FLEXIBILITY AND COST. The mirrors, electronics and stabilization software are modular, making the system flexible and adaptable for future requirements. New electro-optical sensors of any type and size can be easily incorporated to utilize the merged line of sight. Therefore development costs and hardware costs are significantly reduced.

LESS IS MORE

This innovative new design concept provides a significantly more effective and efficient stabilization method for multiple electro-optical sensor systems. By rethinking the basic architecture, the new design reduces negative attributes of size, weight and power consumption while enhancing stabilization performance through improved speed, responsiveness and accuracy.

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ABOUT CARGOSTORE WORLDWIDE

Cargostore Worldwide is the UK's leading supplier of ISO shipping containers for domestic and international projects. With offices in London, Abu Dhabi, Holland and depots across the globe we provide a seamless and fast service with the flexibility to meet any client requirement.

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With a freezer and chiller section running simultaneously. Movable partition wall and side-door for access to both sections. Available in 20ft and 40ft.



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- Kevin Cudby
Intermodal Director



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Guartel

Technologies Ltd

METAL & CABLE DETECTORS FOR MILITARY & LAW ENFORCEMENT OPERATIONS WORLD-WIDE



Guartel Technologies Ltd is an established company which has built its' reputation on the design, development and manufacture of high quality, professional metal, mine and command wire detection equipment, for use in Counter IED, EOD, WIT & Search operations. Guartel conducts a continuous programme of R&D to meet current and emerging threats. The company is ISO 9001:2008 registered and is security cleared by UK MoD.

KEY COUNTER IED AND SEARCH PRODUCTS

Buried/Underground Cable Detectors - WD100

The WD100, buried/underground Cable Detector is the only commercially available detector specifically designed to

detect surface laid and buried command wires used to initiate Command Wire Improvised Explosive Devices (CWIED).

Military Metal Detecting Probes - MD4

The military metal detecting probe MD4 is used by many NATO countries, it is rugged and simple to use. The detection capabilities allow the operator to locate small targets and to gauge the depth and size of objects such as victim operated switches. MD4 is self calibrating with operator zeroing function.

Military Mine and Metal Detectors - MD8+

Ergonomic, simple to use high sensitivity military metal/mine detector, the MD8+ employs the latest digital



Guartel Technologies – MD8+ Metal Detector

technology and high speed pulse induction which allow the detection of the smallest metallic targets.

Rugged Hand Held Metal Detectors - HD7

The rugged hand held metal detector HD7, is simple to use and is weather resistant and can be utilized indoors or outdoors. HD7 can be used for person search, personal area search and target confirmation. Alarm modes: silent vibrate, audio, visual/audio.

New Products

MD3000 Multi Role Metal Detection Kit, designed for use by police search teams and other investigative agencies, the MD3000 is a state of the art easy to use detector. The MD3000 has two inter-changeable search heads, a halo for general area search and a probe for use in undergrowth and narrow cavities.

Command Wire Detector - WD10

WD10 is a high performance passive command wire detector for use by CIED Search teams and IEDD operators. The detector is easy to use, having simple controls for power and pin-pointing a target.

Guartel Technologies Limited
Unit 8-11 New Forest Enterprise Centre
Chapel Lane, Totton, United Kingdom

+44 (0)20 7384 3001

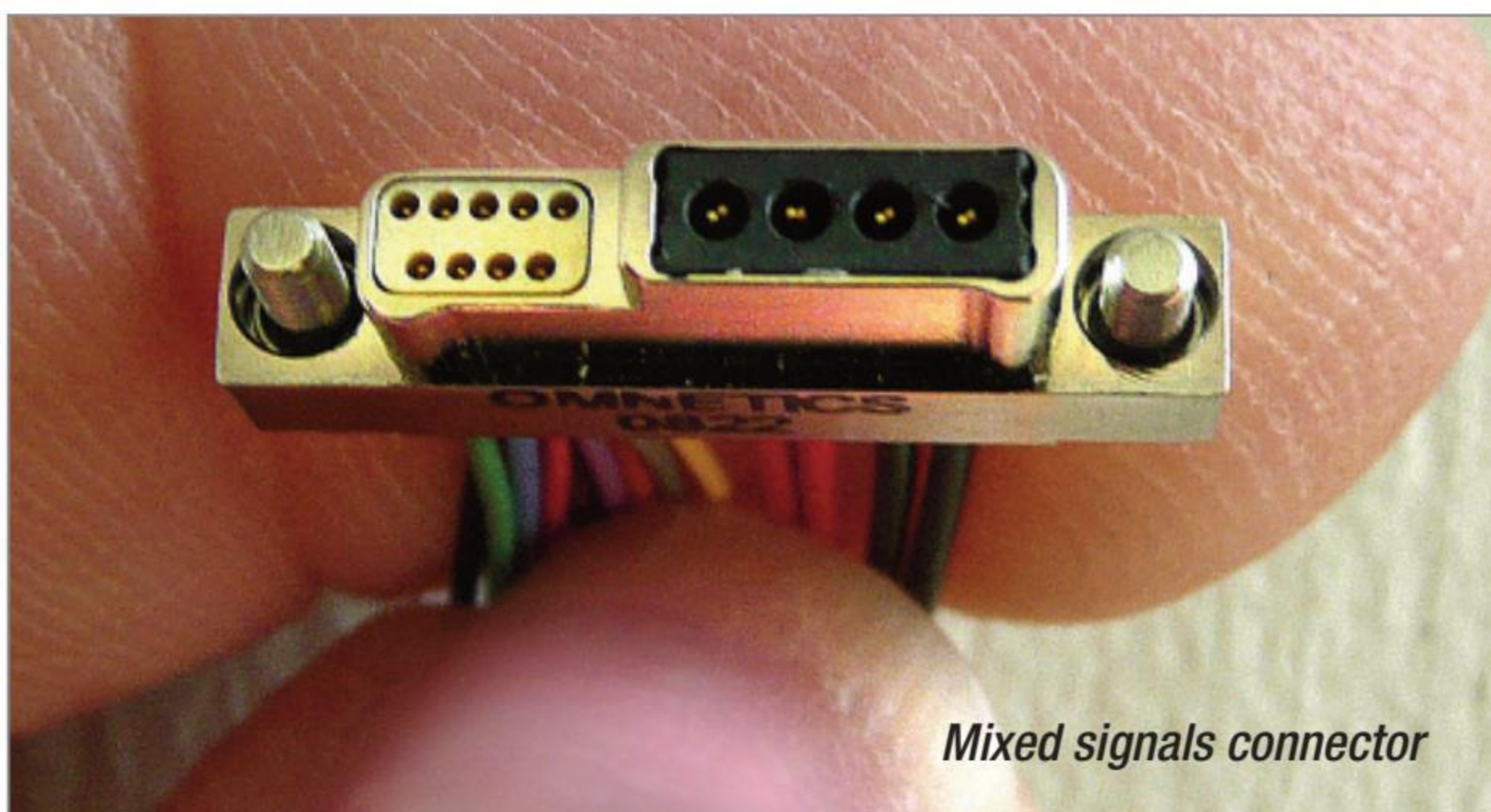
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Nano connectors & cables serve modernized rugged electronics

High speed signal technology is being adapted everywhere possible to serve defense, space, medical and commercial circuits.

Portability and outward utilization of sensor and detector chip technology has pushed the envelope as well as the functionality of today's circuitry. With sense and detection chip systems we are placing devices in and on highly active and portable devices. Signal acquisition and data processing is being done more at the source for accuracy and speed. The data is then being routed by cable to motor-drives, displays and or data collection libraries. Circuits and chip technology operate at 5.0 volts and less while current flow is going below 200 millivolts to sometime microvolts. Insulation voltages will be less than 50 volts in many cases. We see examples daily in circuits designed into unmanned vehicles, drone swarms or cube satellites. Remote controlled defense equipment from space to air to ground based rovers all depend on the newer circuit technologies for both electronic performance as well as mechanical resilience.



Mixed signals connector

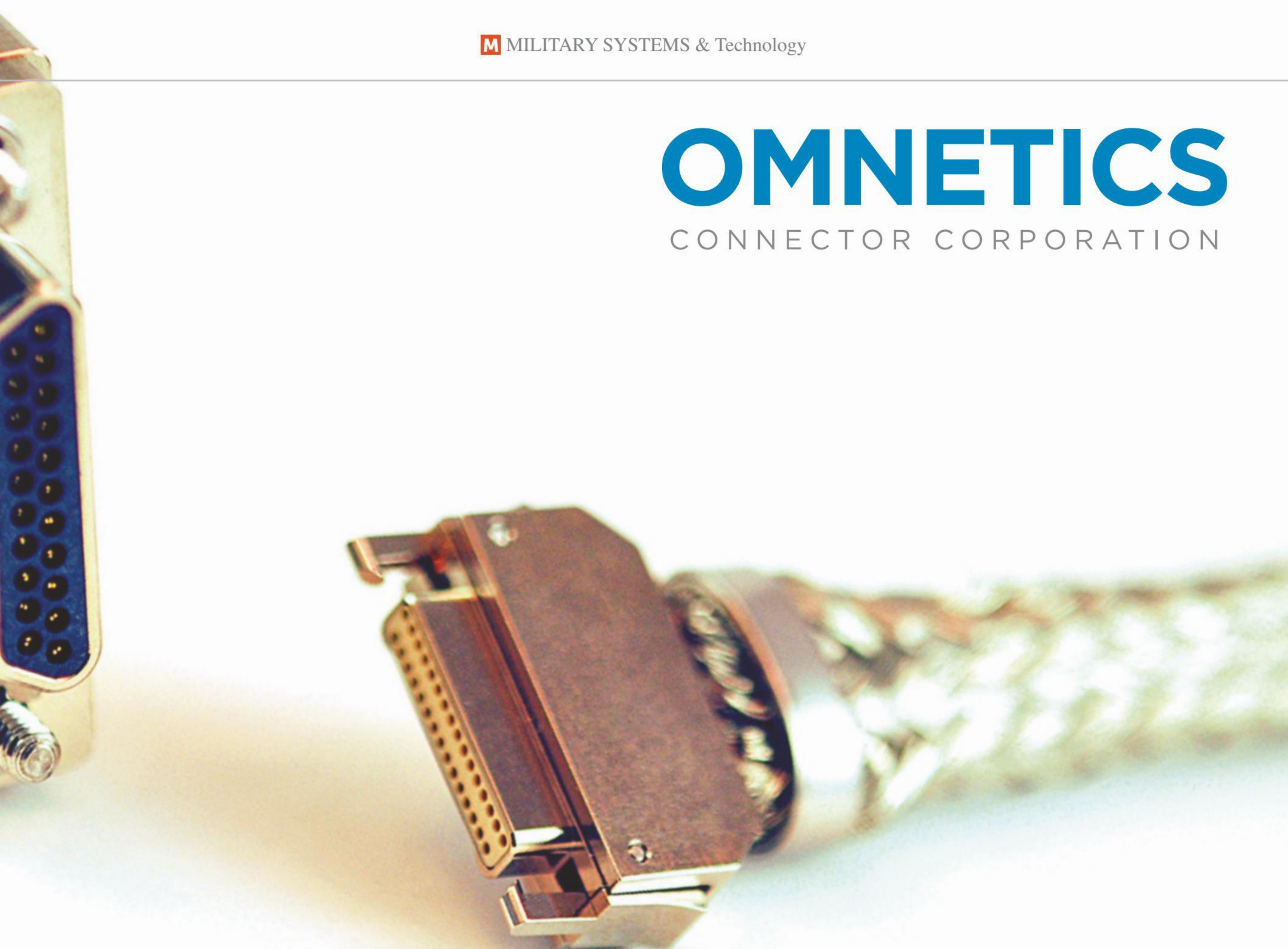
Fortunately, interconnect solutions are ready and available. The Nano-D has become today's reference for smaller, lightweight and rugged interconnections that can handle up to 30 AWG Teflon® insulated wiring. The Nano-D standard is set with a pin to pin spacing of .025" center line system compared to Micro-D spacing at .050" pitch. The Nano-D connector is available in formats that support PC board mounting in surface mount technology, thru-hole and edge card assembly as well as various wiring versions. The amazing thing about this Nano-D is it performs in rugged conditions and offers improved signal support.

It's worth noting that Omnetics nano connectors are tested beyond the military standard specifications to insure performance beyond today's view of circuit applications. Although the standards specification calls for at least 200 mates and de-mates, the Nano-D uses 17,200 ksi tempered BeCu spring-pin to socket interface that can be mated and un-mated over 2000 times. The connector resistance runs from 12 to 15 milliohms and only has a very low capacitance of 2.0 pf to 2.4 pf. These specs are ideal for the new higher speed, lower voltage signals they are supporting. We remember that as signal speeds increase, the wavelength of each signal is shorter and potentially more vulnerable to capacitance as well as shock and vibration. As signal speed continues to increase, the specialty designs will perform by increasing the distance from pin to pin within the connector insulator housing.

At the same time, designers are being challenged today to combine ruggedized high density, lightweight, cable and connectors with

OMNETICS

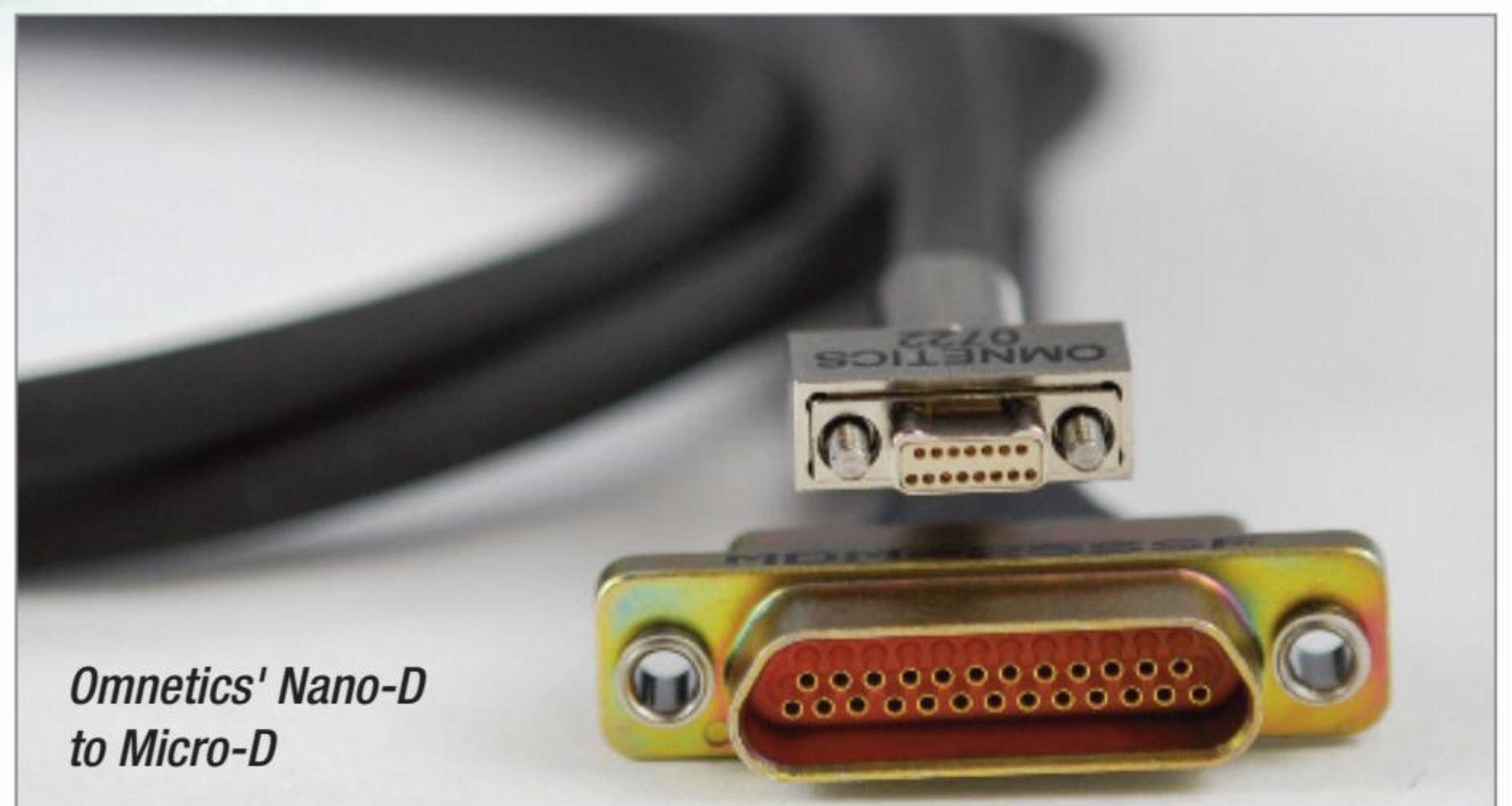
CONNECTOR CORPORATION



circuit speeds in the gigahertz range. Wiring systems of yesterday have been tested and proven in their rugged performance and many of them could be speeded up to meet the higher speed demands. But the needs have changed in many other ways; battery life has become a factor, cable diameter must be smaller and the wiring should have a rugged limpness and perform small bend radius when used in constant motion robotic devices, as well as be light weight to reduce drag on the electrical system.

Smaller connectors and smaller diameter wires place a demand on the cable design to avoid EMI from adjoining wiring or systems. Cable designs must include good shielding for each area of signal within the cable and may have two or three sections isolated from one another as well as an over-all shield system. This often happens as multiple applications are squeezed into tightly packed electronics. Special cable are often required and should be designed in concert with the Interconnection Engineer on the project. In addition to over-all cable shielding, complete EMI protection is accomplished to insuring a 360-degree cable shield to the metal connector at each end of the cable assembly. This allows a bleed-off path for any lingering electrical signal noise to be routed from the cable jacket to ground.

Standard Nano-D connectors are often readily available to meet many standard nano circuit design needs as there is a large variety of form and format to match PC to panel mount, to edge card and onto cable to cable interfaces. However, some new systems require unique modifications to the current standards. They must meet all



Omnetics' Nano-D to Micro-D

the electrical and rugged application standards but need also to be in different shapes or even include mixed signal options. For instance, including combinations of power or mixed signals within a cable, the system can be more compact. Quick adjustments to current standard Nano-D connectors are available as a modified standard process. Designers can contact the connector supplier and work together online using solid models to adjust shapes and cable loading but retain the quality and reliability of the standard design. This can significantly save development time and money while accomplishing an application specific interconnection for the new application.

Omnetics Connector Corporation
www.omnetics.com
sales@omnetics.com

Use of Latest Technologies in Military Defense

Any country may neutralise military threats and overcome any advantages that adversaries may seek by investing in defense research and technology. It also broadens policymaker's military options, including alternatives to fighting in pursuing the goals of supporting stability and preventing conflict.

SECTION 0000-000

AREA:
POSITION:
ANGLE:
STATUS:
HKG:
TASKS:
WARNING:
CORE DAMAGE:
RADIATION:
SECTOR STATUS:

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The use of latest technologies in military defense aid in the combat of unique challenges such as terrorism, which cannot be addressed by conventional warfighting troops, and they underlie the intelligence capabilities required to assess the threats that any nation faces.

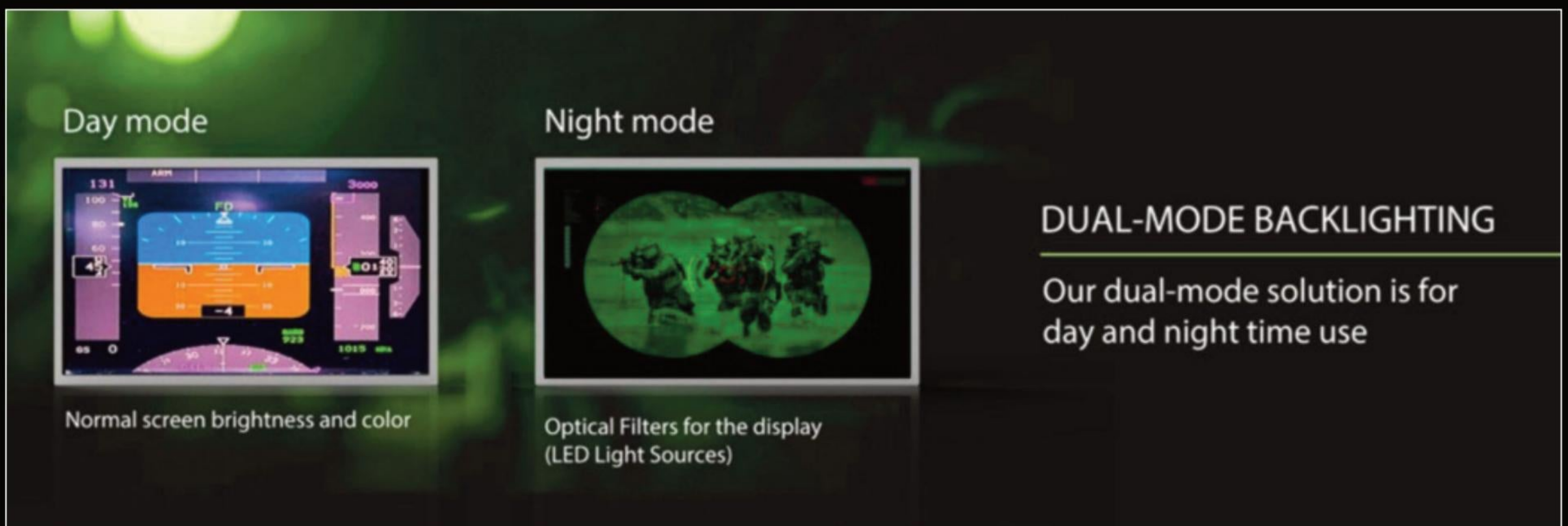
Here are the some latest technologies, currently being used in the military defense by the Display Technology Ltd.

Display Technology for Night Vision Imaging

A surge in demand for high-performance Night Vision Imaging Systems in combat and other applications such as policing and

civilian security (NVIS) has been observed in recent time. By emitting a small portion of dim light that is easier to see at night and these handy display solutions improve vision at night. Display Technology's broad array of military standard displays and embedded solutions includes Night Vision Imaging System displays.

The efficiency of NVIS imaging is determined on the display quality utilised in the system, as bad displays can make figures and images difficult to discern. That's where Litemax, a Taiwanese partner of Display Technology, comes in, with displays designed expressly for use in Night Vision Imaging. The LED backlight of Litemax displays is coupled with a unique NVIS cap filter. This enables for easy



switching between day mode (with 50% brightness turned down) and enhanced night mode. This function is known as 'dual-mode backlighting' by Litemax, and it allows for quick switching between day and night modes.

These Night Vision System displays allow for stealthy and effective display equipment functioning at night. These displays are used by military system designers for mobile radar stations and military vehicle operations. Standard displays can be too bright to use at night, which can make covert activities difficult. Having displays built solely for night use, on the other hand, can render equipment useless during the day.

The ability of the Litemax display to go from normal brightness in day mode to low brightness in night mode utilizing NVIS gives a valuable level of versatility ideal for covert military deployment. The NVIS display from Litemax also has a wide operating temperature range of 30 to 70 degrees Celsius and low power consumption. This makes the display ideal for lengthy periods of time outside, and it may be powered by portable batteries for use in the field.

Litemax is our partner in producing these fantastic displays for our military portfolio. Litemax Electronics, a Taiwanese display manufacturer, was founded in 2000 and is known for its high-quality, industry-leading display technology. Litemax has established itself as a trusted name for all of your display needs, beginning as a respectable supplier of sunlight readable industrial displays.

Litemax offers wonderful solutions for digital signage as well as superb devices for use in transportation and rail, in addition to military-use displays like the NVIS systems. These displays have been meticulously developed to be ultra-efficient, very dependable, and compliant with all applicable industry requirements.

We at Display Technology have a thorough understanding of the displays we offer and can help system integrators choose the best devices for their needs.

True compatibility and perfect reliability are critical in military applications. As a result, detailed advice on which displays fit the bill and meet the essential safety criteria for combat use is provided to military system integrators. We can assist you in pairing displays with embedded systems and selecting the appropriate power supply for safety and EMC.

Contact us today to learn more about how contemporary display technology may transform your application.

High Bright Monitors on a Naval Vessel

The importance of equipping today's warships with the proper technical equipment cannot be overstated. It is one of the largest platforms for transporting complicated weapons, equipment, and modern technologies.

The goal, according to Military Technology, is for all naval ships to be able to conduct long-duration operations with minimal human engagement using modern technology. The competition's core goal, according to Naval Technology, is to develop technologies that change the way the British Armed Forces approach decision-making, mission planning, and automation, with exploitation of a 'human-machine network that could work collaboratively on military platforms' being a key goal of the competition's second phase.

Display Technology Ltd knows the need of durable, reliable, and efficient equipment in Displays and Monitors after more than 25 years in the business and working with various MOD project-based applications.

Display Technology Ltd specializes on high brightness sun light readable monitors/displays to meet the present need for innovative technology. High-brightness displays range from 1000+ cd/m² to 4500 cd/m², with a wide working temperature range to ensure reliability in harsh environments.

www.displaytechnology.co.uk

DISPLAY TECHNOLOGY
A FORTEC GROUP MEMBER

SINCE THE LAUNCH OF THE NEW TOYOTA LANDCRUISER 300 IN THE SUMMER OF 2021...

...many vehicle converters around the world have been putting all their efforts into designing new armouring packages for this vehicle, to provide the best possible protection for Aid Workers, Police, Defence & Security Forces and Government Officials all over the world.

Parallel to the vehicle converters designing the armouring packages, TSS has been making good progress on the design of the Armour Mobility package for the LandCruiser 300.

The quality of the armouring plays a large role in the protection of the occupants against bullets and other ballistic threats. However, the mobility of the vehicle determines how long the occupants can make

use of that protection. Keeping on the move is key to the survivability of the vehicle.

TSS International specialise in the mobility of armoured vehicles. Over the past 10+ years the company has supplied thousands of armoured versions of the highly successful LandCruiser 200 with Heavy Duty Runflat Wheel Assemblies, Security Brake Systems, Self-Sealing Fuel



Tanks, Vehicle Intercoms. A complete package of products carefully designed and selected for the highest level of safety and security: Armour Mobility! Through close collaboration with customers and suppliers, TSS International's goal is to deliver a tailored package of mobility products, designed for strength, reliability and durability.

Continue reading below to find out more about how to ensure Armour Mobility:

- **TSS Heavy Duty Wheels** have been approved by TÜV for a 2250kg payload! Combine our 8,5x18" rims with Rodgard BPX Runflats and a heavy Duty Tyre of your choice, such as the Maxxis JRZ Bravo 275/70R18, to carry the weight of your vehicle's protection.
- The first TSS ProtecTank® for the LC300 has been delivered to one of our customers. The only true self-sealing fuel tank technology on the market has been tailor-made to fit the Land Cruiser 300 and to add protection and save weight in the armouring package.
- **MOV'IT® Security: Heavy Duty Brakes**, tailored to the increased weight and changed weight distribution. Consistent braking power with an OEM-compatible, integrated parking brake!
- **SKYDEX® shock mitigation products**: for that last bit of protection to pass the new VPAM ERV standard with Bio-Fidel dummy!

ARMOUR *mobility*

- **B&G® Intercom Systems**: Discretely installable two-way communication systems, with speaking power up to 250W! Customisable sirens and red/blue/yellow LED-lights are also easily integrated.
- **TSS/JRZ Heavy Duty Suspension**: high quality suspension systems for all budgets and driving styles. A KDSS-compatible version is also available!

TSS International takes pride in providing premium quality in all the products and services. Where possible, we test our products at renowned institutions such as TÜV, TNO, Beschussamt, and our quality management processes are ISO 9001:2015 certified by Lloyds.

For more information and more products, please

- visit our NEW website **www.TSSH.com**
- email us at **sales@tssh.com** or
- phone us via **+31 180 618 922**.



HMG Paints announce Defence Coatings Specification Service



HMG Paints, the UK's leading independent paint manufacturer, has announced a new coating specification service for the Defence industry. The new service will allow engineers and specifiers to identify and select the perfect coating for their requirements.

Def Stan Coatings Made in UK

Following a period of growth and development of cross-sector partnerships and international collaborations, HMG Paints' new service is aimed to take the hassle out of identifying and sourcing the correct Def Stan or NSN number for OEM and manufacturers projects.

"Since our appearance at the DSEI show we've seen a

number of enquiries from OEM's and manufacturers who are struggling to identify the correct product and also find one manufactured in the UK and that is available with a minimal lead time" commented Alan Sharples, Defence Sales Manager for HMG. *"The prime example is people unaware of the change from Def Stan 80-206, Def Stan 80-207, Def Stan 80-208 and Def Stan 80-209 to Def Stan 80-225. Our team at HMG are now equipped to advise specifiers and engineers and take orders which can be shipped immediately across the UK."*

80-225 IRR and CARC Topcoat

The Def Stan 80-225 system comprises of a choice of primers for ferrous and non-ferrous parts and an IRR and CARC, Chemical Agent Resistant topcoat, which is available in an assortment of colours suitable for military vehicles and non-aircraft equipment. Following their attendance at DSEI, HMG have seen an increase in demand for its Def Stan 80-225 product range and the product is now stocked and available for immediate despatch across the UK.



The new standard, which was introduced towards the end of 2018 and replaces Def Stan 80-206, Def Stan 80-207, Def Stan 80-208 and Def Stan 80-209. The HMG products in this range are free from Chrome VI, meet low VOC requirements, and are IRR and CARC resistant. As an agile UK based manufacturer, HMG Paints is able to provide products on demand, reducing extensive lead times previously experienced within the market.

Taking the hassle out of NSN Numbers

The new service is also aimed to help specifiers and engineers when it comes to identifying products via their NSN Numbers. The 13-digit NATO stock number (NSN) which is allocated to an item is used to identify it throughout the supply chain and HMG can now assist with paints and coatings related queries. The NATO codification system is used by the army, navy and air force and all items of supply going through the military supply chain must be NATO codified.

With HMG's unique position as a UK based coatings manufacturer, they are also able to work with customers to develop new products that can then be codified with their own unique NSN Number. 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.

"2021 saw us working with a number of companies struggling identify NSN's and Def Stans and ultimately to acquire paints and coatings which were previously imported from abroad" commented Alan Sharples.

"With more and more paint manufacturers offshoring production and decision making we feel HMG can provide a unique offering to OEM's and refinishers within the defence market with our specification service and with fast delivery of paint with all of our coatings being Made in Britain."

Alongside Defence Standard products, HMG produce a wide range of approved high-quality coatings for practically every purpose for the defence industry. Made in the UK, 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 plus CARC and IRR materials approved to UK defence standards.

If you'd like to book a meeting or require information on



the HMG Paints products or specification service you can email defence@hmgpaint.com and a member of the team will assist you.

To see a full list of HMG Paints products and services visit www.hmgpaint.com via the website you can also find out more about the company's history and partners.

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

www.hmgpaint.com





Defence Procurement Minister launches new Defence SME Action Plan from 4GD METAlab

Close combat technology specialists, 4GD, and their close allies, D3A and 2iC, welcomed the Minister for Defence Procurement, Jeremy Quin, at 4GD's research facility in Berkshire to launch the new Defence Small and Medium-Sized Enterprise Action Plan.

The new Action Plan sets out the department's priorities and aims to maximise opportunities for SMEs to do

business with the Ministry of Defence by increasing access to information, lowering barriers to market entry and fostering better collaboration.

The Plan lists a number of measures that would allow companies to bid for more work and improve procurement speed. This includes policies for opening supply chains further, supporting acquisition teams with early market engagement and raising commercial assurance processes. It also includes policies that set social value criteria and environmental standards.

The Minister for Defence Procurement, Jeremy Quin, said: ***"SMEs deliver vital skills to defence, helping keep our Armed Forces safe and improve our battle winning capabilities. Our new SME Actions Plan will increase engagement with the SME sector, and reduce barriers to better utilise the expertise and innovation these organisations offer."***



The veteran-run SMEs work closely with the British Army to drive performance improvements via accessible, ultra-realistic urban warfare training.

4GD's SmartFacility, in service with the Army's 16 Air Assault Brigade, offers a range of special effects and monitoring features and can be upgraded to also include data capture and analysis, smart-targets and a synthetic environment that creates a life-like world of digital assets for soldiers to interact with.

The facility's synthetic combined arms training capabilities are delivered by training experts, D3A, who introduce operational hardware interfaces that interconnect with digital assets, with actions taken in the virtual domain having an effect in the real world, and vice versa.

Rob Taylor, Founder of 4GD, said: ***"We were honoured***

to welcome the Minister for Defence Procurement, Jeremy Quin, to our METAlab research facility, where our technologies are developed by veteran soldiers for serving personnel. The government continues to demonstrate its commitment to innovation in defence and is building a collaborative environment to enable specialist SMEs like 4GD to thrive."

2iC is a leader in digital interoperability that provides information sharing software, linking together comms systems and enabling two-way communications in environments with low-power computing. The company played an instrumental role in the development of the SME Action Plan.

www.4gd.co.uk

NAVIGATION WARFARE



Space technologies, -data and -services have become an essential part of the daily lives of European citizens, but safety-critical applications in the area of national defence and internal security also depend on these technologies. However, the greater the dependence on Positioning, Navigation and Timing (PNT), the greater the risk of unintentional and intentional disruptions and interference. Space, or more precisely space technologies, have become a strategic field of operations, in times of peace and crisis, beside land, air, sea and cyber. The development of new as well as the modernization of existing Global Navigation Satellite Systems (GNSS), which started in recent years, illustrates this fact. The European satellite navigation system Galileo was developed, among other reasons, with the aim of being independent of other states (i.e. USA, Russia, and China) in the field of global positioning.

The goal of Navigation Warfare is the geographically limited disruption of (satellite-based) PNT information of an enemy, while ensuring the resilience of the own systems. The use of interfering transmitters in the civil environment is still mainly limited to jamming.



However, since the use of GNSS and PNT will continue to increase in the future, it can be assumed that jamming and spoofing - the deliberate manipulation of PNT information - will continue to increase. Navigation Warfare would therefore also affect the use of navigation systems in the public domain and for each individual.

The consequences of a GNSS interference attack are, in addition to a total loss of PNT capabilities, also increasing the own risk, collateral damage and leadership problems and were examined during R&D projects and successfully demonstrated, among other locations, at the military training ground Seetaler Alpe of the Austrian Federal Armed Forces. This unique ability to perform GNSS interference test campaigns in reality and to develop new technologies and procedures based on the test results has given Austria international prestige.

The results of those projects show that for a successful PNT attack, in addition to a deep understanding of GNSS and sophisticated algorithms, the capabilities of the target PNT applications must be taken into account as well. Governmental authorities, armed forces, system integrators and GNSS equipment manufacturers should be aware of the danger caused by GNSS signal interference. They should get the possibility to test their equipment in a protected and realistic environment to assess vulnerabilities and improve equipment in order to better tackle GNSS interference.

So, they would be able to harden their GNSS-based infrastructure against jamming and spoofing attacks.

AJ+S

Advanced Jamming + Spoofing System

- Mobile and sturdy system for navigation warfare scenarios in the field
- Easy to use system to test GNSS equipment against GNSS interference
- Covers a wide range of jamming and spoofing scenarios
- Supports synchronized attacks via built-in GNSS receiver
- Satellite data via built-in GNSS receiver or OHB's assistance service



With AJ+S it is possible to assess the vulnerability of existing GNSS equipment and the performance of its countermeasures in a protected environment.

New L-Band RF over Fiber Solution for Air Force Satcom Telemetry



The Air Force Research Lab (AFRL), in the USA, is a scientific research organization that is responsible for planning and executing the US Air Force (USAF) science and technology program in order to improve and develop new products and services.

The AFRL approached RF over fiber manufacturers, ViaLite Communications, to deliver a solution for a satellite communications downlink, transferring the L-Band signals through the ground station complex.

ViaLite's L-Band HTS links, in the standalone Blue OEM module format, were selected by AFRL for integration into their system.

Compact, single link and available in RF bands up to 6 GHz, the links were an ideal fit. They can be operated as either transmitters or receivers and are easily mounted into existing equipment. AFRL explained that they'd decided on the links based on their performance, best in class quality and reliability.

Craig Somach, ViaLite Director of Sales, said: ***"We are pleased to continue supporting AFRL; helping with the advanced satellite and terrestrial infrastructure they operate across multiple satellite transponders and locations."*** Craig and the team were also on hand to provide service and support to AFRL during the equipment installation process.

As well as OEM module format, the links are available as rack chassis cards (for use in ViaLite 3U and 1U rack chassis units), as Yellow OEM modules (designed for system integrators and equipment manufacturers to build into their own designs) and in the ViaLite Blue2 module which houses two links and can be setup to be a dual transmitter, dual receiver or transceiver.

For more information on ViaLite RF over fiber, please visit www.vialite.com.





WHEN THE DESIGN MATTERS,
PEI-Genesis DELIVERS.

Whether you're sourcing parts for
military aviation, tanks and ground vehicles,
UAVs, body-worn equipment, or ships,

PEI-Genesis has what you need.

As a value-added supplier, PEI-Genesis is focused on assembling custom and standard Mil-Spec military connectors for quick turnaround to help you reduce your acquisition cost and lead times, simplify your assembly, and improve the quality and reliability of your military designs.

Using D38999 connectors in challenging environments



A look at the features that have made D38999 connectors so popular for decades



Emily Rowe - European Product Manager - PEI-Genesis

Whether they're used in a commercial aircraft or onboard a military vehicle, not many electrical components are subjected to extreme conditions like connectors are. Here Emily Rowe, European Product Manager at mission critical electrical connector specialist PEI-Genesis, speaks to Military Systems and Technology about the benefits of using D38999 connectors in these applications.

Connectors must endure extreme conditions on a regular basis, especially those used in aerospace and military applications. Often subjected to rapid temperature changes or constant vibrations, impacts and signal interference, they must be robust enough to continue operating reliably and safely under these



conditions to ensure their users can have 100 per cent trust that the product will get the job done.

Take the industry standard D38999 connector for example. This is a military-specification electrical connector that was originally designed in the 1970s and is now on its third-generation design. The main reason the D38999 connector soared to popularity is that it offers a much higher density of contacts than its predecessors — 128 contacts compared to only 19 for 5015 connectors.

Like similar connectors, it's comprised of a few basic components: a hard outer shell, a neoprene rubber insert with holes to house the pins or contacts, and sometimes a backshell on the outer housing that provides additional shielding and durability. Although, one benefit of D38999 connectors is the wide variety of customisation options it can offer such as different shell types, materials, finish and insert arrangements. This makes them appealing to more customers and particularly those in industries that often require a bespoke solution, such as the military and aerospace sectors.

Meeting industry needs

In military applications, there is a growing need for shielding and durability, with electrical connectors expected to be in service for decades. This is another area where D38999 connectors shine. With life spans between 500 and 1,500 mating cycles, they can last for up to 30 years depending on the application.

Many customers from the aerospace and military industries require custom components for their applications and D38999 connectors facilitate this since their backshells and contacts are easily customisable. For example, backshells can be supplied in aluminium, stainless steel or composite materials depending on the requirements. Newer composite options are growing in popularity because they are lightweight and offer high performance levels in harsh environments. They are also REACH compliant and QPL qualified for use in military applications.

The customisation options available with D38999 connectors is

causing them to grow in popularity in other industries where they were not widely used before, such as the industrial, marine and automotive industries.

For every new application where these connectors are used, there's something new you can add or change to make it robust and reliable for that industry. All that is left is to choose a reliable connector supplier to meet your demands and, where necessary, provide guidance on the best solution available.

PEI-Genesis provides an extensive range of D38999 connectors from Amphenol, ITT Cannon, TE Deutsch, Souriau Eaton and Conesys. Furthermore, it also stocks large volumes of component parts and can build millions of connector types while offering lead times of just 48 hours from the moment you place your order.

Not only that, but it can also offer standard solutions or work with customers to create something bespoke for their specific application using its in-house team of design engineers. This is in addition to the fact that it supplies a wide range of accessories for D38999 connectors such as protective caps, backshells, contacts, nut plates for receptacles and tooling.

To learn more about the range of D38999 connectors that PEI-Genesis supplies or to discuss a custom connector solution, visit

www.peigenesis.com



PEI-Genesis™

What are server racks?



[Server racks](#) are used to house and transport technical and IT equipment. The category of server racks covers a number of varied products. It includes open or partly open framed cabinets into which mountable servers can be inserted, perhaps as part of an office's IT infrastructure. On the other hand, server racks can also be highly secure enclosed cases suitable for transporting advanced IT and technological equipment in remote or challenging environments.

What are the different types of server rack?

Server racks come in different sizes which are suitable for different kinds of equipment and uses, with the most common standard size being 19". However, in many cases server racks are customisable. These [bespoke racks](#) are designed to fit the specific shape and measurements of the equipment they store, while still allowing for wire connections and airflow. An example of a bespoke modified server rack would be the modular format [Aeroflex ERack developed for BAE Systems and the RAF](#) by CP Cases.

Some server racks, called open framed racks, do not enclose the equipment on all sides and therefore provide flexibility and accessibility for cables. These are often found in secure server rooms. Locked or enclosed server racks have solid sides and can be locked to provide a higher level of security. They are generally more expensive, but they can be used in non-secure locations or for transporting important equipment. Rugged rack servers are the sturdiest kind of server storage, and are often manufactured to be shock absorbent and protective.

What are the advantages of using server racks?

Many of the benefits of server racks are specific to the contexts in which they are used and the specific kind of rack. In a data centre environment, operators rely heavily on the use of server ranks in order to store lots of servers and IT equipment in one place. Being able to stack technologies one on top of the other in a server rack reduces the floor space needed to store IT equipment, and therefore provides a cheaper solution.

Some server racks are designed to provide high levels of protection for delicate equipment. For example an [Amazon Rack](#) can provide high resistance to shock and impact while protecting delicate satellite equipment. Server racks are designed for the storage and usage of computing and electronic equipment so they allow space for wiring, and they often have built-in cooling functions in order to keep equipment in good working condition.

How to cool server racks

One of the greatest challenges when storing large amounts of IT equipment is preventing overheating. This is particularly a concern for companies and organisations who operate in locations with hot or unpredictable climates. It's therefore important to ensure that server racks have strong climate control features.

While some server racks may have built-in cooling systems, in many cases it's necessary to customise or use additional equipment in order to create or enhance these features. Luckily, there are [climate control systems](#) available which can be added to server racks or used in conjunction with them in order to keep equipment in good condition.

Get in touch

[Contact us today](#) to talk about your requirements and our friendly team will be glad to hear from you.

[Our products](#) are available in a wide range of standard sizes, and our UK-based design team can create a custom solution to meet (almost) any application your product requires.



Why buy our ERV3?

Our reliable and innovative design ensures complete protection of 19" rackmount electronics.

MIL-STD-810G accredited enclosure and chassis, with weatherproof protection for the interior rated IP65...

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Sea Survival Training for Maritime Aircrew

Training aircrew is an expensive activity especially for those who have to parachute or escape from their aircraft in a maritime environment where there is major additional cost.



**Survival
Systems
Limited**



The parachute and maritime aspects add dramatically to costs especially when combined. Frequently this cost escalation involves uncontrollable costs and delays caused by uncertainty of delivery due to variables, usually weather related but serendipity generates others, which can be eradicated using a synthetic nevertheless extremely realistic and consistent training and testing environment. When all is said and done this training like all training has both direct and indirect costs and reducing them has to be of benefit.

To run a safe training activity with all the necessary safety precautions involves a large number of people. For people outside the training permanent staff these have to be contracted in or borrowed from elsewhere as does their special equipment. So the safety boats they use, the rescue swimmer/divers, medical staff, ambulances, safety helicopter, rescue training helicopter, all have to be either brought in or diverted from other tasks. A large area of water has to be cleared of civil pleasure and working boats and once clear policed. Couple all this with taking the trainees away from flying training for the duration of the training and one can see how quickly the costs escalate. Throw in bad weather, facility or equipment non availability, we have all been the victim of helicopter gremlins, and the costs continue to escalate and there is also a considerable element of uncertainty added to the whole process. This tends to blow a hole in flying training programmes and thus the throughput of students, a major concern for flying trainers and consumers worldwide.

When one comes to look at refresher training the situation is even worse. Students have to come from far away to be brought back up to standard and confirm their competence at routine drills such as being dragged by their parachute, getting into their own or even a communal dinghy and being winched up from the water or a dinghy.

How much better if this could be taught and practised in the same way as helicopter crews are taught to egress a sinking or sunken helicopter. Those same crews also have to go and do realistic dinghy retrievals and drills. They too are likely to experience similar delays and frustrations as fixed wing air crew. How much better if egress training and survival, SERE, training could be collocated.

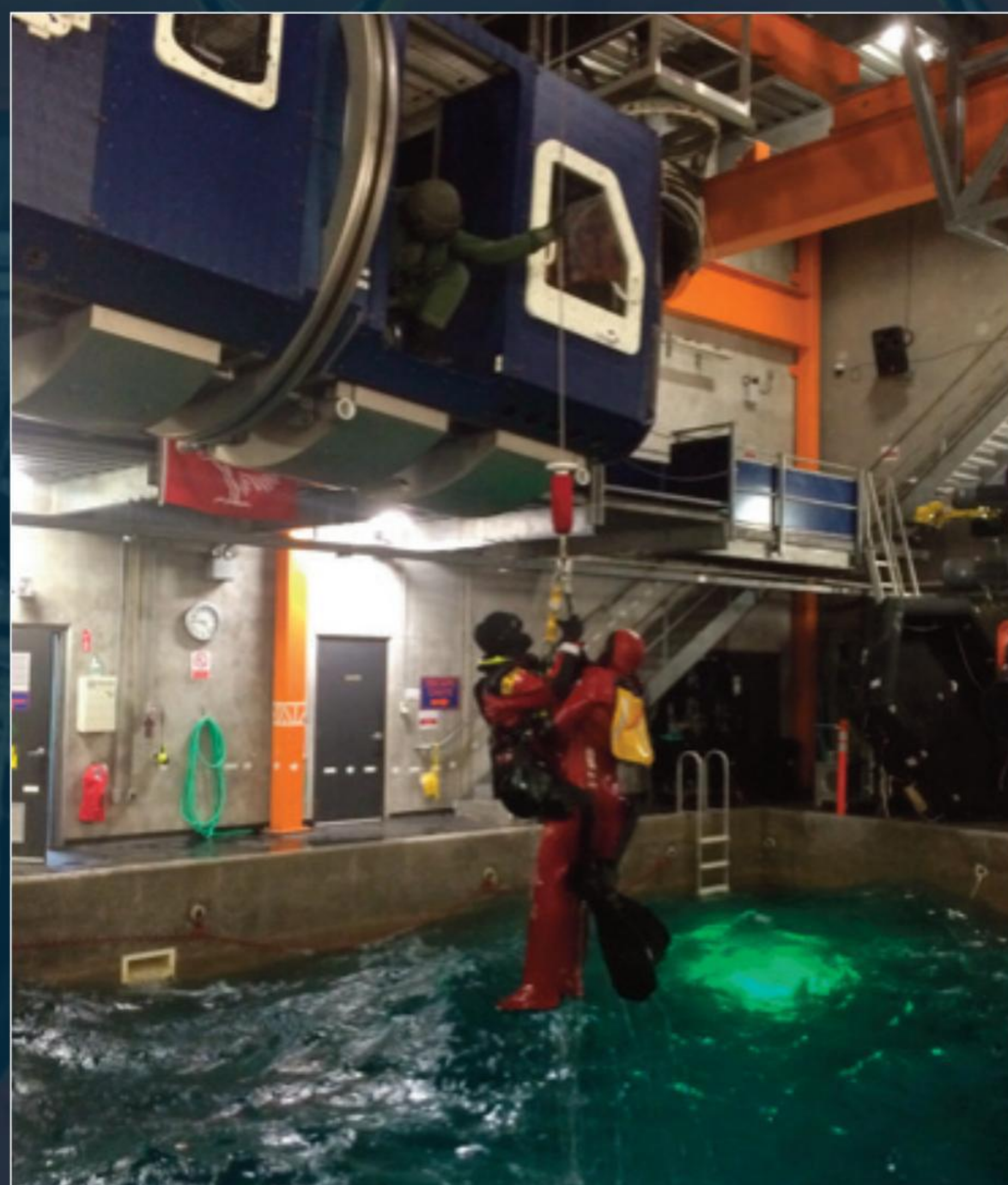
Depending on weather conditions the end result of all of this is inconsistent training. One day trainees could be subjected to very rough seas, high wind and difficult light conditions the next

flat calm and the outcome from both is the same qualification. What trainers and examiners want is common standards, consistent training and tests which won't cause unnecessary failures with more time wasted as students do additional runs and that are a fair test of skills taught prior to certification as fit to fly.

Survival Systems Limited (SSL) has a great deal of expertise in provision of Underwater Egress Training (UET) for rotary and fixed wing pilots and aircrew through the use of SSL's manufactured, high-fidelity Modular Egress Training Systems (METS®) and integrated Personnel-Rated Lifts. Delivery of survival training includes elements such as dinghy and helicopter winching drills. SSL also has a lot of experience in maintaining and upgrading existing facilities. The latest upgrade and maintenance has recently been carried out in Saudi Arabia. Sometimes this work is carried out directly with the end user, sometimes through their own representative, and at others through 3rd parties. Saudi Arabia's was direct with SSL's client, Fire & Maritime Training Centre (FMTC) Safety.

Previously working on the French Navy (Marine Nationale) / CESSAN design of its retrofitted Water Survival Training Center to become a full maritime aircrew SERE and survival school, SSL outfitted Marine Nationale's Survival Training Simulation Theater (STST™) with its simulation equipment. Such simulators include SSL's Modular Egress Training Simulator (METS®); integrated Personnel-Rated Lift; Personnel Rescue Hoist, and Parachute training simulators. Yes there was an initial capital outlay. However the French rapidly appreciated that the savings against a combined capital and operating budget using the existing at sea training were so considerable that there was no economic sense in continuing with the existing system and opted instead for the more economical SSL simulator solution. It says volumes for the French procurement system that they were able to take such an holistic approach.

Where there are existing facilities it is usual for SSL to graft onto these and through added infrastructure, towers, machinery and equipment, water, etc. and the necessary environmental training aids including wind, rain, sound & lighting effects (moon, starlight, strobe, emergency, electric storms etc) waves etc., from a library of facilities and enabling technologies provide a very realistic environment to train in. Where money is



not available "in year" the pool can be fitted "for but not with" and items fitted as the money is available. That having been said whenever they are fitted they are hugely appreciated for their realism. They all deliver realistic consistent training and testing conditions to provide an effective regulatory regime that is simply not possible in an open water situation.

The variety and where required the complexity of the training can be matched into training progression or role requirements. Thus a trainee pilot can be trained to the minimum standard required to enable their over water flying training to progress. As their training becomes more demanding so too can their SERE and water survival skills training and if necessary their group training. The point is it can be tailored and controlled to facilitate rather than drive the schedule. Costs can be contained and flying training is not delayed or driven into overruns causing a delay or hiatus.

Standardized and documentable training provides the benefit of an enduring capability that relieves the requirement for uniformed delivery. With established training methodology delivery within a safe, contained, and controllable Survival Training Simulation Theater (STST™), this capability can be easily civilianized. By making available its proven simulators and facility design expertise SSL continues to facilitate the option of in-house or outsourced training delivery to paraphrase the company mission to effectively "use technology" to "enhance and preserve lives".



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padlocking

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Based in the heart of England, our 70,000sq ft premises has the facility to produce large order volumes using a wide range of manufacturing techniques and the latest design software packages. Trifibre is able to produce the highest quality products consistently with short lead times at very competitive prices.

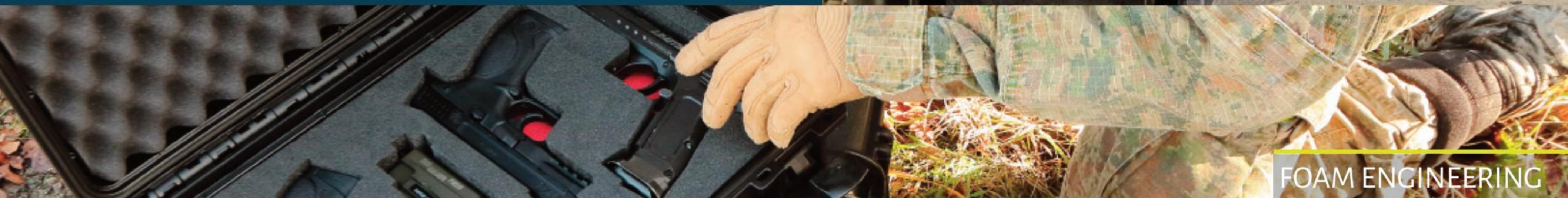
" We are proud of all the work we do, be it large corporate supply, or a simple box for personal storage. Our decades of experience means we're best at what we do. "



CUSTOM ROTATIONAL MOULDING SERVICES



INJECTION MOULDED CASES



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BESPOKE FLIGHT CASES



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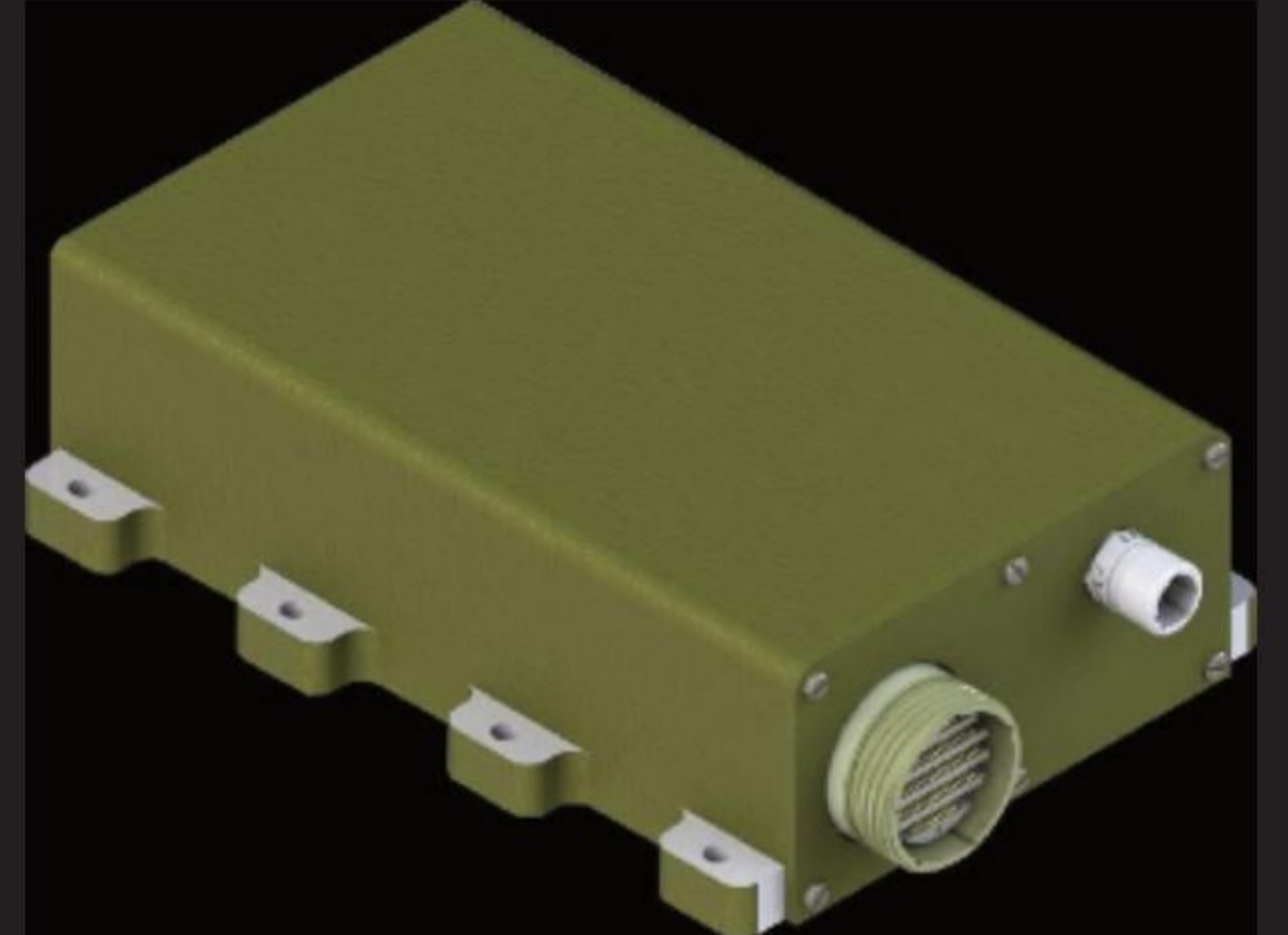
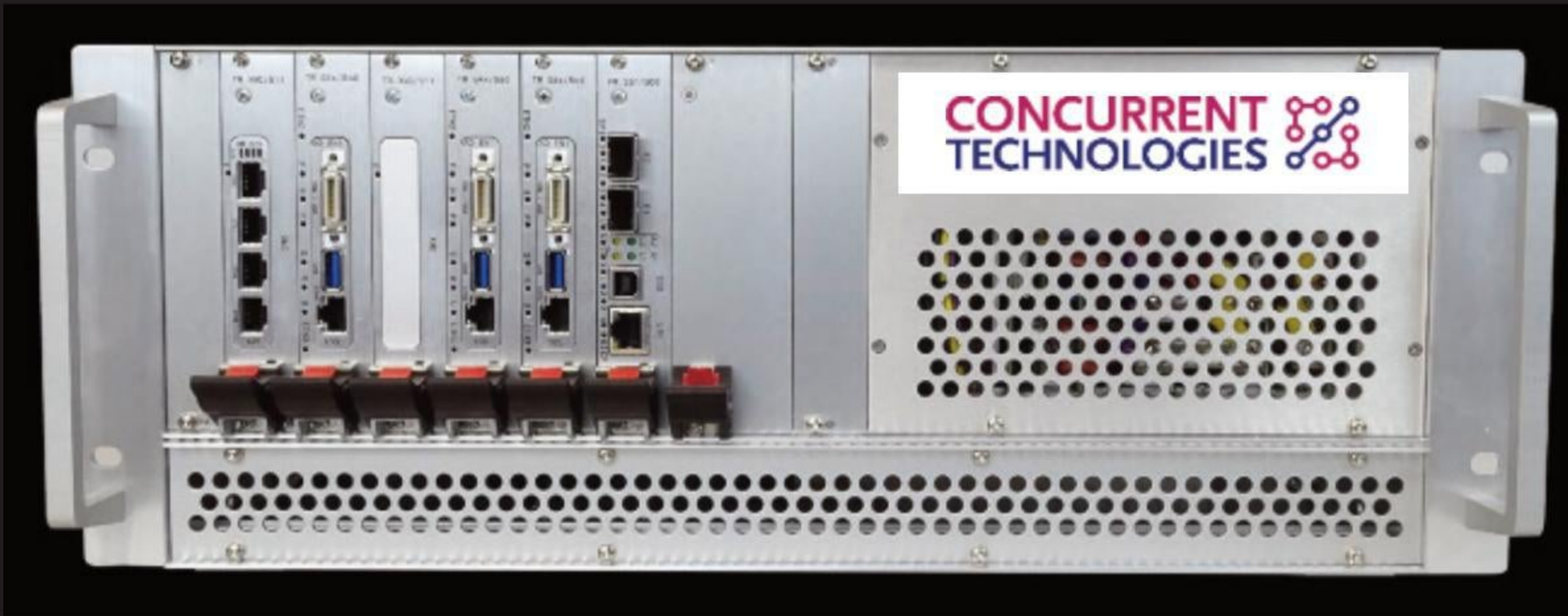
TEXTILE ENGINEERING

CONCURRENT TECHNOLOGIES



*Powerful Processor Solutions
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Maritime Special Operations Underwater Capability



An Interview with Paul Haynes,
Head of Special Operations
Capability at JFD



What 21st century challenges face maritime Special Operations Forces when planning Tactical Diving operations?

Deploying Special Operations Forces (SOF) has always presented significant challenges and these challenges are further intensified when insertion and extraction is undertaken at sea.

Modern land, sea and airborne surveillance systems are becoming increasingly sophisticated, with the ability to reach deep into the littoral zone. As a result of this, the viability of inserting a Tactical Diving team via surface raiding craft to within a realistically achievable swimming

distance of an objective is decreasing rapidly, as although discrete, such craft may be readily detected.

This increasing threat requires surface or subsurface SOF support vessels to remain further offshore presenting maritime SOF planners with the challenge of how to cross the expanding 'water gap' discretely, covertly and quickly.

How can maritime SOF cross an expanding 'water gap'?

To mitigate any compromise potential, maritime SOF are increasingly employing Tactical Diving Vehicles (TDVs) to extend the subsurface range of a Tactical Diver (TD). Although not a new means of transportation, with the miniaturisation of navigation and sonar systems, together with significant increase in battery power density, these crafts are becoming increasingly capable. As a result, larger TDVs are not only able to transport maritime SOF but can also act as surveillance, reconnaissance, target acquisition and stand-off attack platforms, greatly enhancing maritime SOF capability.

What TDV solutions do JFD have for this market?

JFD Shadow Seal is a four-man free flooding submersible, which incorporates advanced on-board sensors, navigation, life support and communication suites designed to minimise Operator fatigue. Providing safe and accurate positioning day and night, Shadow Seal is able to operate on the surface, semi-submerged and fully submerged. In addition, its relatively small size offers the potential of it being carried by smaller diesel submarines typically employed by many navies.

For the rapid over the horizon long range transportation of a larger maritime SOF team, JFD offers the Carrier Seal. Operated by two crew (craft Commander and Driver), Carrier Seal can transport an additional six SOF operators at high speed on the surface before switching to semi-submerged mode to reduce its signature. When the tactical situation or



threat demands, it can then fully submerge and travel long distances sub-surface.

Driven by a diesel engine and water jet at the surface and electrical batteries/thrusters when sub-surface, Carrier Seal incorporates a highly advanced navigation system along with an electro-optical sensor suit mounted on a retractable mast, which is able to capture surface reconnaissance imagery whilst the craft remains submerged. In addition, medium and large calibre machine guns may be mounted to provide a level of self-defence and/or to enable Carrier Seal to be employed as a stand-off attack or fire support platform. Both the Shadow Seal and Carrier Seal may be readily deployed by land, sea or air and delivered into the objective area by a range of support vessels and platforms.

What considerations need to be made for Life Support Systems for TDV operations?

Closed-circuit oxygen rebreathers have been utilised since World War Two and are predicted to remain the main type of underwater life support system for Tactical Divers. Technologically simple and robust, they are precisely what the maritime SOF Operator requires.

Typically, the Tactical Diver wears the rebreather on the front, as this is often the best location for long distance subsurface swimming. However, using TDVs to cover long distances often requires back mounted breathers that provide a clear field of view, unhindered use of TDV controls and the ability to lie flat when using smaller TDVs.

What Life Support System solutions do JFD offer?

JFD provides a range of innovative and highly capable Tactical Diving Life Support Systems (LSS) that are operationally proven globally and optimised to meet the evolving demands of today's Tactical Divers. Enforcer is a lightweight compact design TD LSS optimised for rapid deployment, high tempo shallow water, short duration mission profiles such as Maritime Interdiction/Maritime Counter Terrorism. Using a Carbon Dioxide solid cartridge absorbent greatly simplifies and accelerates pre and post-dive procedures.

Shadow is a long endurance TD LSS that offers unparalleled levels of mission flexibility and operational capability, used by maritime SOF globally. Recent war fighting upgrades include integrating life support with mission critical equipment, including a rapid clip-on/clip-off interface with ballistic protection/equipment load carry vests and ballistic protection helmets.

The use of 100% oxygen, however, limits the maximum diving depth. Therefore, the depth capability of Shadow may be enhanced using an Excursion upgrade kit, enabling diving to 30m using a nitrox gas supply. Alternatively, the use of nitrox may be used to extend diving duration beyond the typical 4-hour single oxygen exposure limit, thus facilitating extended duration TDV operations.

Shadow Back Mount (BM) is the latest upgrade to the proven rebreather, which adds further capability to suit a wider variety of mission profiles. Developed under the 'Swim & Fight' principle of Tactical Diver performance enhancement, Shadow BM is optimised for TDV and land warfare operations. Being back worn, Shadow BM readily facilitates a seamless transition from subsurface to land phases of an operation, enabling operational equipment and weapons to be immediately accessed once at the water-land interface.

The Shadow BM is also capable of safely supporting extended duration TDV operations, with an unparalleled duration capability. At low breathing



rates typical of TDV use, the CO2 absorbent canister provides up to a five-hour duration in cold water and longer durations are possible in warm waters.

How did JFD facilitate the development of the Shadow BM?

The development of Shadow Back Mount was driven by maritime SOF requirements. The two main operational drivers were the need to optimise the LSS for TDV use and to readily facilitate the transition between subsurface TD operations and land warfare, enabling operational field equipment and weapons to be immediately accessed at the water-land interface.

JFD has a core team of former maritime SOF Operators who support the Research and Development department. Combining the engineering life support expertise with extensive SOF operational diving experience has resulted in a highly capable TD LSS, which is now entering service with various SOF teams.

How did the Shadow BM perform in trials?

JFD designs and manufactures 'state of the art' LSS unmanned laboratory testing facilities capable of testing equipment to a depth of 500m. Prototype and pre-production Shadow BM units were first unmanned tested in JFD LSS test laboratory located at the JFD National Hyperbaric Centre in Aberdeen, Scotland. Here breathing performance was evaluated against international standards for underwater breathing apparatus, as well as canister Carbon Dioxide endurance under a range of depths, diver work-rates and water temperatures.

In additional, to verify equipment performance, independent unmanned testing was also undertaken by a third party underwater breathing apparatus test laboratory. Once unmanned testing was completed, the next phase then was to move onto manned test diving by experienced former SOF divers, first in the JFD test diving tank, before progressing to open water diving where free-swimming and TDV use was assessed. Throughout this process, final form, fit and function modifications were made before finally introducing the system to the market.

User evaluation forms a critical element of introducing new underwater breathing apparatus into service, therefore nations who adopt JFD LSS typically undertake many weeks of operational testing and where they have the ability, their own unmanned testing before finally adopting the equipment into service.

www.jfdglobal.com

CBRN RESURGENT OR RETHOUGHT

Always the afterthought of defence and security CBRN is usually downgraded in importance and until the threat is staring you in the face often forgotten completely.

Two pieces of evidence of this sentiment are; officers charged with counter CBRN and CBRN defence across any ministry almost anywhere in the World are frequently a rank below those running other branches in the ministry/HQ and the threat assessment is, always, that CBRN is unlikely to occur and it will be difficult and have a major impact.

These examples are something that Lutra Associates and particularly its CEO have been arguing against for decades. The first equates to the thought process of, "It's too difficult so let's put a junior in charge so we can tell them to be quiet". Then, "we said it was difficult", and "because we have done nothing about CBRN" it is. It's a self-fulfilling prophesy. Thinking Lutra has condemned vociferously for years.

The second reality is; YES CBRN is difficult, made more so by unstructured, ill-informed thinking and, NO you are wrong, it happens frequently. To justify the use of sand as a pillow and hide from the frightening bogey man defence commentators insist that CBRN is unthinkable and will worry the civil population. Lutra argues this is absolutely wrong. Airbrushing history is a wonderful tool for justifying not facing up to reality.

Words capturing major incidents in the UK within the author's memory: Litvinenko, Salisbury, Markov, Covid. Add some other place names Kuala Lumpur, Syria (at least 5 times), Tokyo, Kurdistan, CBRN all. It does not matter how you arrange the initials or the names or the locations it's always difficult. It's especially so if you are unprepared because you, of whatever political hue, chickened out of the decisions on spending and preparation.

It's always damaging because by relying only on off the cuff response rather than preparation and planning you come off the rational rails and are forced to behave in an unstructured and ill-judged way simply to be seen to be

doing something. Not preparing and relying on hot planning is the thinking virtually every UK government again of whatever hue, has been guilty of which resulted in the Covid crisis being worse than it needed to be. Ministers and officials have repeatedly ignored the warnings and the lessons and thought they could cuff their way out of the danger.

Failing to think the unthinkable is inexcusable, failing to act to try to prepare for the unthinkable is a failure of vision and leadership coupled with, arguably, cowardice on the part of our leaders and officials. "Kick it into the long grass and cover me with more sand please. I will be promoted or retire and I won't have to think nasty thoughts again".

The fact is it does come around and it gets more difficult because between events we allow the target; our civil population, our armed forces or individuals to relax in the false belief they are safe. In the authors working life in the CBRN field we have had to deal with the threat of ordinary 'flu, SARS, MERS, Covid-19, Ebola, Smallpox, Foot and Mouth, Newcastle Disease, Botulinum, Chlorine, Ricin, Sarin, Anthrax, Novichok, Mustard, Polonium and at least 4 assassinations. It has all been messy, chaotic, taxing (in every respect) expensive and draining to deal with. Failing to prepare is always more expensive in every respect: financially, economically, mortally and morally. Failing to prepare also eats up your credibility.

We all hope they will not come to us but to the saying that "the only certain things in life are taxes and death" should be added the rider "and CBRN will make both bigger and happen sooner. The Treasury will make it worse because it will hinder the far sighted spending the money they know is necessary". In the UK the author has taken part in at least 4 major exercises, probably more, centred on pandemics, all with trans-Atlantic elements, where the lessons identified included; we need to stockpile IPE, train on it, identify local sources of manufacture, the need to think big numbers and long term and to think differently. Cometh a not particularly lethal or virulent pandemic, guess what we had not done. "All of the above" to quote General Schwarzkopf.

Had it been Ebola or Marburg Virus or Smallpox or Pneumonic Plague in all probability I would not be writing this and you would not be reading it. Not because they could not be dealt with but we are neither prepared for them nor would we have had the leadership and expertise (Profs. Whitty, Van-Tam and a few other honourable exceptions, The South Africans for example, excluded) to deal with it. We have fallen back on the first available straw to clutch at and will do so again unless we change. It is for others to discuss genetic manipulation of these and other threats.

We accepted the wildly imperfect modelling we were saddled with, because not enough money had been spent developing models with enough variables to give realistic best and worst case scenarios with local factors considered.



In fact those models are available but because they were “not invented here” were largely ignored. The same is true of detection systems capable of providing containing intelligence of biological outbreaks, epidemics and pandemics, or radiation and chemical incidents. The latter equipment provides the intelligence which informs the former, the prediction. Both are possible now.

So where to now? Lutra has long argued that it's time to rebuild the response starting with the concept. First accept it needs money and then a common threat picture. Probability prevents finding solutions and dealing with every individual substance/organism but there are certain constants; protective equipment, generic drugs and medicines, medical supplies, emergency temporary hospitals are all possible targets for stockpiling. There needs to be a cross party action across the political spectrum identifying and agreeing threats, requirements and irredeemable stock levels that will be financed regardless of who is in power, and it needs to be driven deep into society as a whole. Probably, critically, in UK the NHS needs removing as its controlling body. The controlling body needs to be given commercial and political freedom, allowed to purchase as it sees fit based on resilience, including that of its supply chain, so it requires sovereign capability, with the ability to release time expiring equipment to regular hospitals, care homes, charities and NHS supply lines on payment. The aim is to have “stuff” available without the unseemly scramble of sending aircraft hither, thither and yon to pick up a few boxes of inadequate (and substandard?) supplies. Compare IPE and medical supplies procurement, run by government officials, with vaccines and medical respirators run and provided by non-government servants prepared to challenge the status quo.

Internationally we need agreements on openness and control of research and banning of illegal laboratories and control substances and manufacturing materials for the biological regime to match or better those for the chemical and radiological arenas. Determination is needed to coerce the recalcitrant and introduce efforts to contain and control those outside the law. These are big, but necessary, asks. They have to be made.

Lutra believes this implies three things firstly money needs to be spent, second an industrial strategy of self-sufficiency and thirdly a determination to identify and know about the potential UK based suppliers who can fulfil both routine and emergency (surge) requirements. This latter need may well mean a change in procurement strategy and method. It will certainly mean taking industry more into the government's confidence. This latter aspect is important because the likely suppliers won't be the big primes but the smaller so called small even micro enterprises.

This is probably not a culture familiar to civil servants. It would probably have to be staffed by secondees from industry who are used to operating on their own initiative outside the government framework and are used to setting up supply networks

It is not just supply that needs a shake-up. Throughout the Covid incident and in other activities such as the foot and mouth outbreak or security of the London 2012 Olympics whenever there has been a need for extra hands and bodies in recent years there has been a need to fall back on the armed forces and volunteers to undertake difficult or labour intensive tasks. Getting the volunteers marshalled and organised is time consuming and time



wasting. How much better to have those people registered, organised and in some instances ready trained. Lutra believes this argues for something like a civil volunteer corps, short of a civil defence corps but with skills that can be deployed in support of the emergency services or the NHS or major event organizers. The role of the WRVS in the Second World War being a good example. Having that group known about and organized so suitable labour and skills can be selected, notified and deployed has to be a good idea.

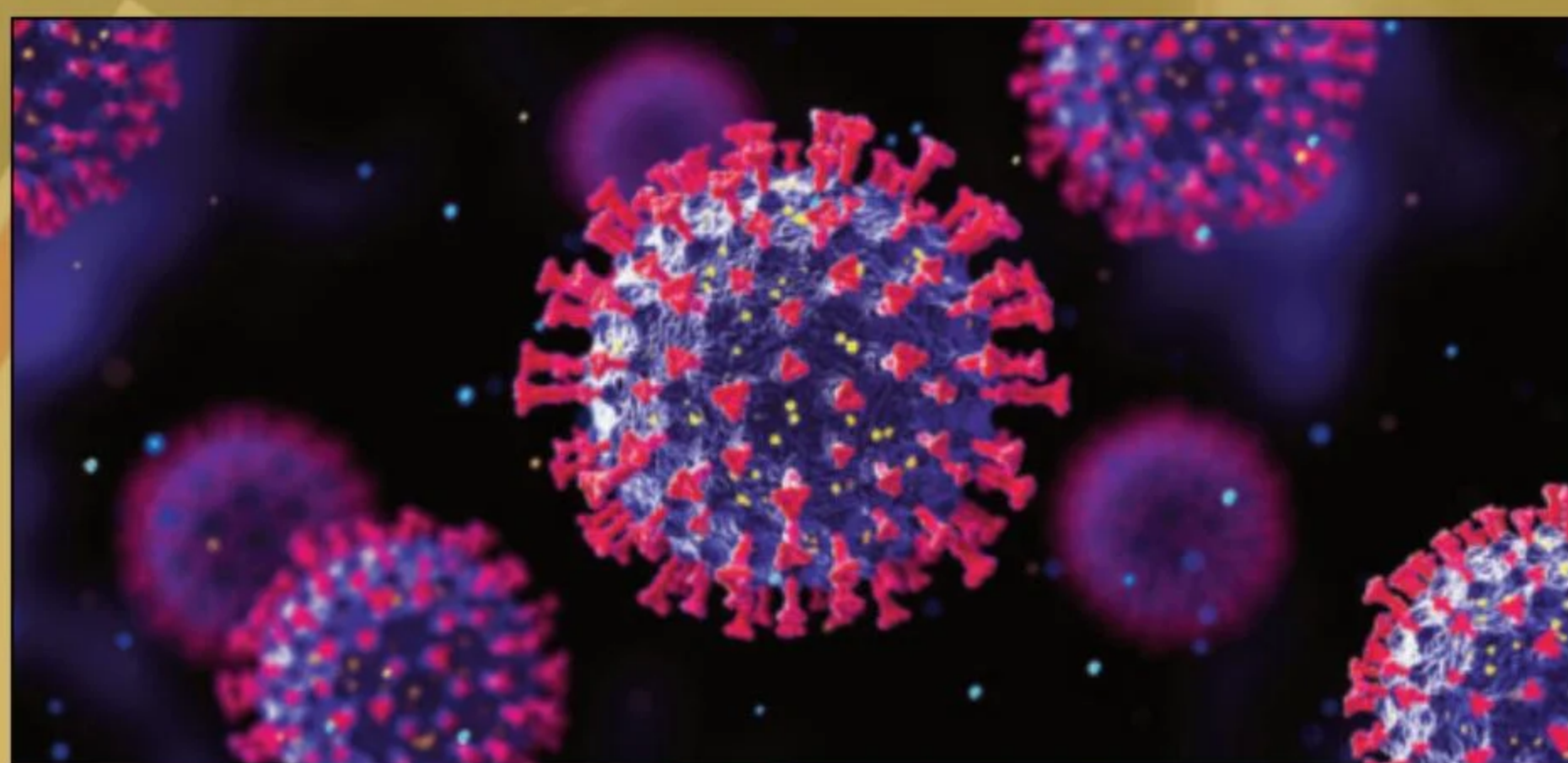
Obviously there are areas in countering CBRN where this sort of task would be beyond volunteers' skill sets, where more utility is needed, e.g. decontamination, treatment centres, stretcher bearers, cordon staff, security etc. For the more complex tasks, especially CBRN, a semi-professional civil defence group of paid trained people may be needed. Post the Salisbury Novichok incident more members of the police were seen in the city than for some years. Quite right too but too many of them were standing on cordons. Why not have and use a civil defence group trained to assist?

There is an endless list of roles companies can undertake in CBRN. These would be over and above the tasks for civil defence. Mention has already been made of manufacturing but there are roles such as: running and administering operations rooms, decontamination and maintenance of equipment, where framework contracts can be used. Pre-negotiated so that in the event of an emergency equipment can be taken to a local pre-registered company with a contract already in place so it can be maintained and returned to service without there being a need, when time is tight, to go through the tedious, time consuming, commercial and competitive procurement processes beloved of the Treasury/Civil Service culture.

A little imagination will highlight and identify the sort of things that need doing in preparation for a major incident. Incidents must not take us by surprise. Some involve using individuals, others companies, nearly all a change of thought process. It is not a difficult concept. It is already used by forward thinking countries such as Singapore and Sweden.

It just needs people capable of thinking and operating outside the straightjacket of rules and a “we have never done it that way before” mentality. If one looks back to the ingenuity and drive that allowed every person in the UK to be issued with a respirator in 1939 in time for the outbreak of war in 1939 it's possible to see that things can be done. It's an issue of will and intent.

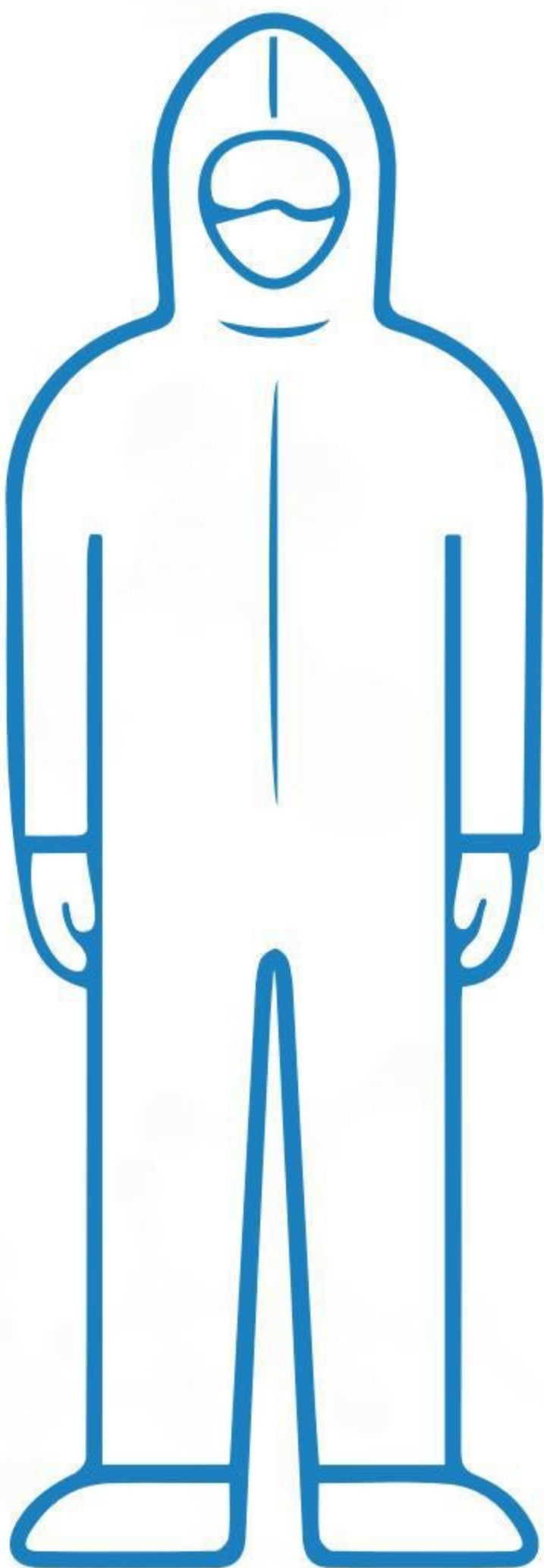
Let's identify the issues which will help us to adapt and prepare and do just that. Of course we could drink another cup of tea and find another bucket of sand and throw even more money at our unpreparedness.



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	CWA PROTECTION	BREATHABLE	AIR PERMEABILITY	WEIGHT BURDEN	HEAT BURDEN	AEROSOL	FIRE RETARDANCY	ANTIVIRAL
KESTREL	High	High	Medium	Low	Low	High	High	None
FALCON	High	High	Medium	Low	Low	High	High	None
PHOENIX	High	High	Medium	Low	None	None	High	None
KITE	High	High	Medium	Low	Low	High	High	Low
CETAN	High	High	Medium	Low	Low	High	High	None
VIPER	Low	Low	None	Low	Low	High	None	High
OSPREY	High	High	High	None	None	None	None	None

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unival group GmbH, a German security systems manufacturer and integrator, has announced expansion of its range of Mobile Security integrated checkpoint solutions.

Based on successful products' reception and growing demand for mobile screening solutions, the company made a commitment to further expand its range of mobile screening systems to cover additional market segments and demand variation.

A number of versions of the original MSS product have now been developed to ensure that various customer groups and their operational needs can be covered by unival's Mobile Security product range. The products remain flexible and adaptable which allows the organizations to tailor-fit the system to each end user and required operational environmental. Such level of flexibility, together with unival's expertise and comprehensive approach to project management ensures that a gap or requirement is tackled with maximum precision.

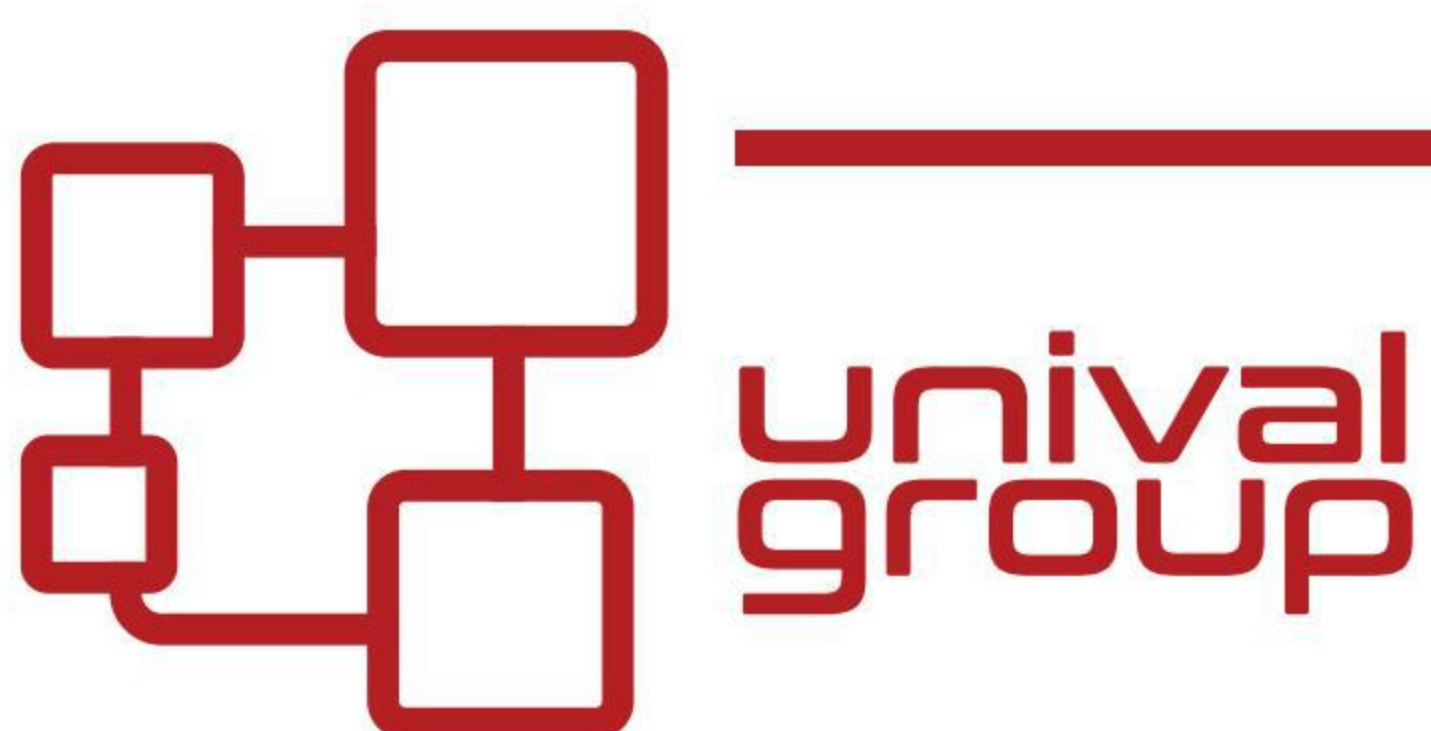
As different scenarios require different solutions, the range of unival Mobile Security systems gives law enforcement agencies the possibility to find the right match for their security needs and further tailor the selected model to their operations, without any compromise.

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Quartz crystal oscillators are the frequency source of choice for a variety of functions in virtually all military and aerospace systems.

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Shock and Vibration Effects

For oscillators used on mobile platforms, vibration and shock effects can be significant. While crystal oscillators can be designed to withstand extreme levels, these effects can be the limiting factor that determines the achievable performance in any given system.

Random vibration, for example, will show up on the output spectrum of the oscillator as an increase in the noise floor. The amount of degradation is determined by (1) the level of vibration and (2) the acceleration sensitivity of the oscillator. The effect can range from barely noticeable to catastrophic. The severe vibration experienced on a missile system or other airborne platform can cause phase noise to degrade by as much as 50dB to 60dB.

Temperature Extremes

The temperature conditions often present in military and aerospace environments are another critical factor that impacts signal source performance.

The frequency vs. temperature characteristic of the oscillator will be determined primarily by the quartz crystal itself. Most MHz range crystals are cut to conform to a temperature curve in the "AT" family of cuts. The temperature coefficient of these crystals is relatively flat compared to other passive components. Even over the wide range of -55°C to +125°C, the frequency error can be as small as ± 20 ppm.

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Radiation Environments

When a device will be deployed in space, some level of radiation tolerance is required.

For satellites deployed in Low Earth Orbit (LEO), radiation tolerance of up to 50 krad(Si) TID (total ionizing dose) is required. TID is a cumulative deteriorating effect over time at some rate.

Deep space and other missions will require a tolerance of 200 krad(Si) TID or greater. Single Event Effects that can occur randomly – due to impact with a heavily charged particle – must also be taken into consideration.

Oscillator design for radiation tolerance also demands close attention to all the components that are used in the device. While most passive components are inherently radiation tolerant to a high level, some commercial semiconductors are sensitive to TID levels of only a few thousand krad(Si).

Radiation hardened devices are manufactured with special processes and are extensively screened and tested on a lot-by-lot basis, with an attendant increase in cost. The trend for commercial LEO satellite systems, for example, is to carefully evaluate and test lower cost COTS (Commercial-Off-The-Shelf) components to find designs with acceptable performance. This approach requires a certain level of risk acceptance that may not be appropriate for military and related applications.

Please visit www.greenrayindustries.com for additional resources and information about frequency control solutions for military and aerospace systems and applications.





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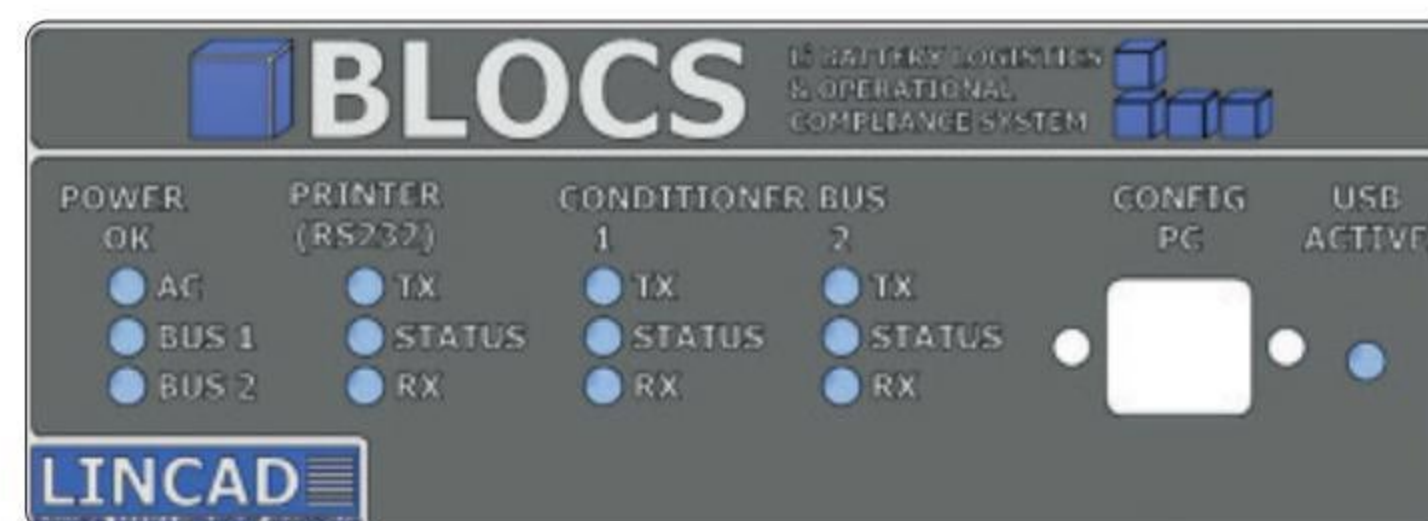
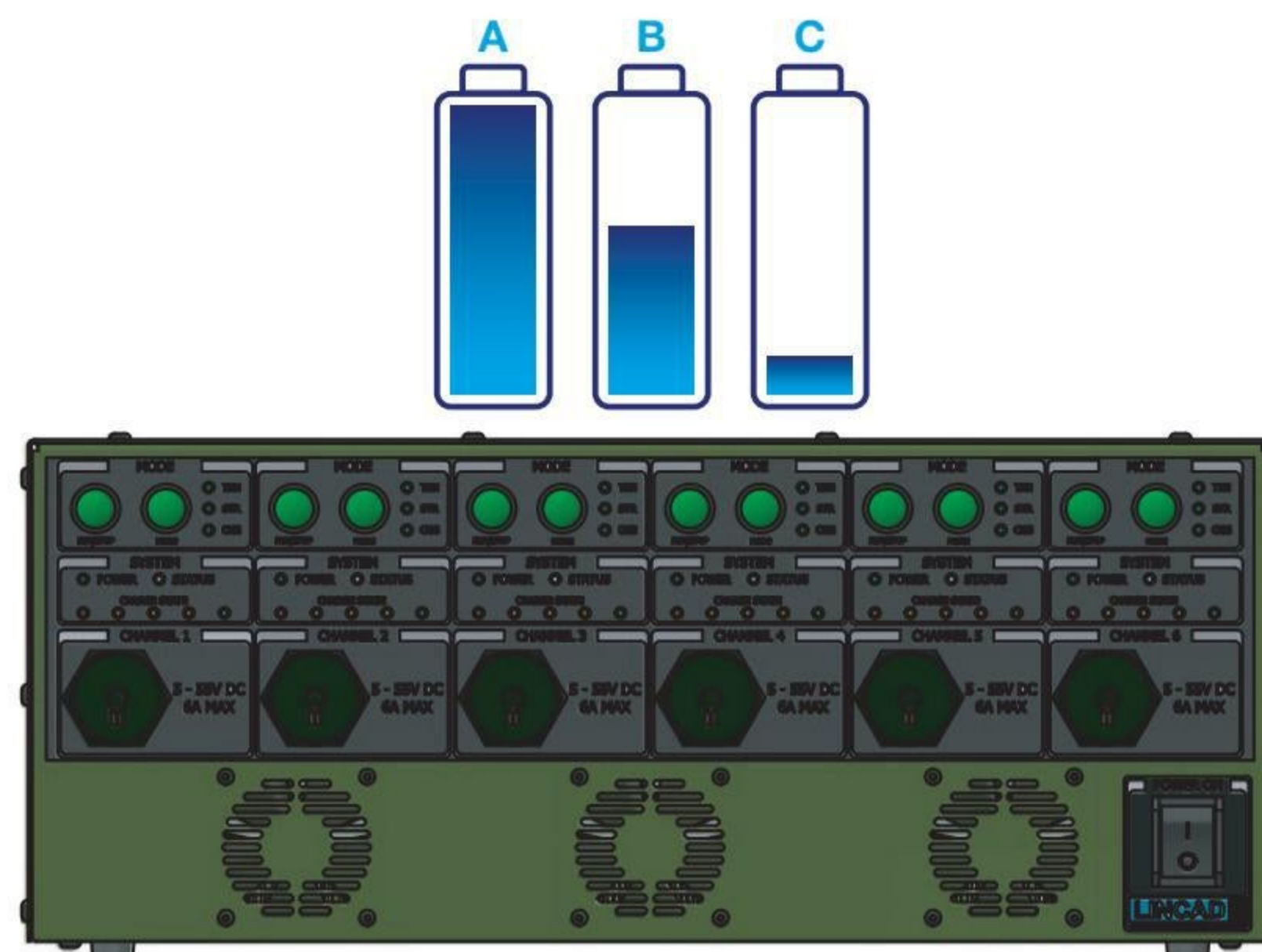
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**Lincad's BLOCS label printer makes
global transportation of military
batteries easier than ever before**

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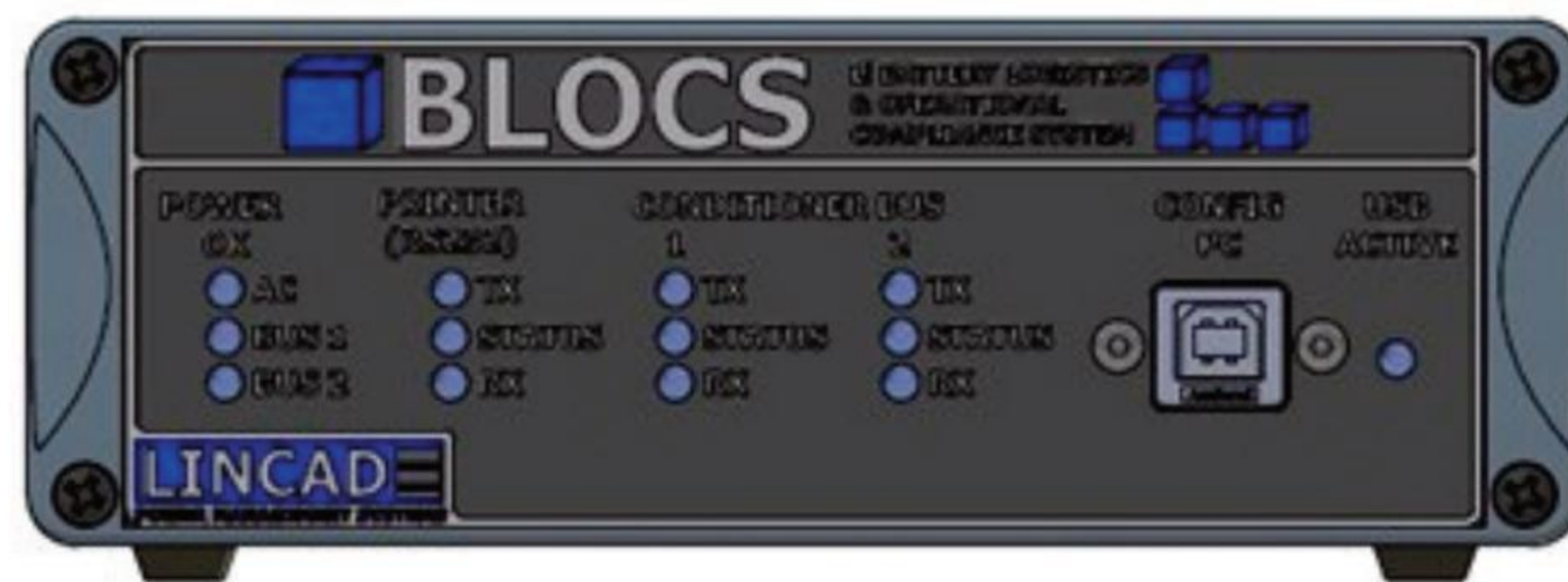
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Lincad's BLOCS label printer makes global transportation of military batteries easier than ever before



Lincad has developed an innovative battery logistics and operational compliance system (BLOCS) that allows label printing of battery state of charge.

It connects directly to compatible in-service Lincad battery conditioners and chargers and enables batteries for military equipment to be transported safely around the world with ease, in line with IATA regulations.

The BLOCS label printer automatically prints a status label for each battery being charged or discharged, showing accurate state of charge data and other battery information. The system

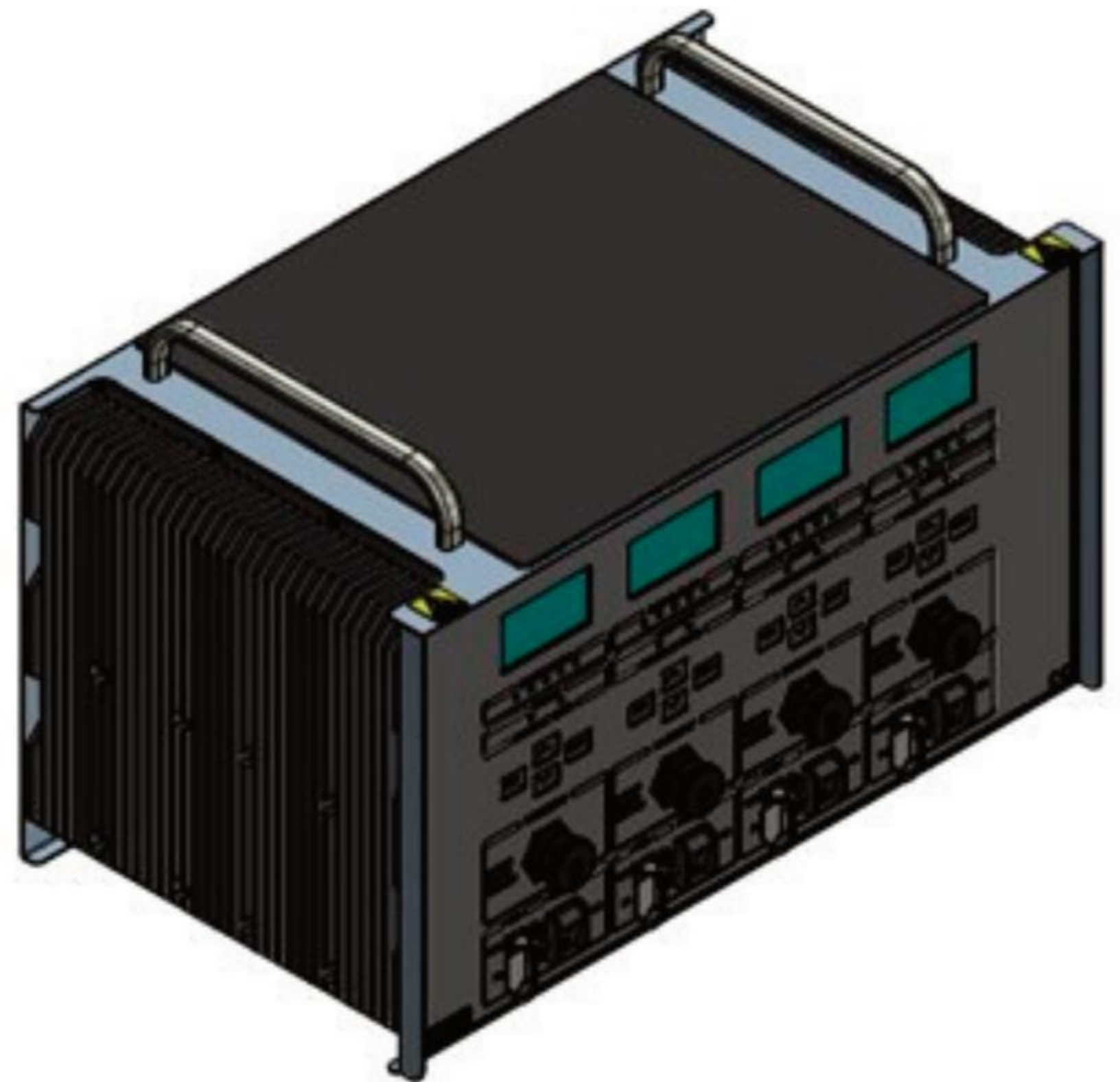
allows up to 16 conditioning devices to be connected at the same time for rapid processing and a streamlined logistics process. Using Lincad's six channel Armada conditioner, up to 192 batteries can be processed simultaneously.

IATA regulations require that lithium-ion batteries have a state of charge of 30 per cent or less when transported by air. The BLOCS label printer system ensures that batteries being transported

for mission critical defence purposes comply with these stringent regulations. The system is available as a factory add-on option and works as an automated, stand-alone process that does not require any external inputs once set up.

The system allows different conditioner and charger types to be used simultaneously. This provides maximum flexibility to suit the logistical demands of defence sector end users. The printed status labels provide accuracy and full traceability back to each conditioned battery.

Peter Copplestone, Operations Director at Lincad says: ***“Our versatile and highly efficient label printing system has been specifically designed to meet battery charging and management demands of our own lithium-ion LIPS battery suite, as well as batteries of other electro chemistries. This means that our customers can not only rely on Lincad for rapid, accurate, up-to-date state of charge status labelling for***



Lincad products, but also for batteries from other original equipment manufacturers. Such versatility is especially critical for defence equipment that needs transporting to front lines and other demanding military environments.”

Lincad has worked predominantly in the defence and military sectors since it was founded over 35 years ago. Key customers include the UK MOD and defence prime contractors, along with other armed forces around the world. As well as the BLOCS printing system, Lincad supplies a wide range of bespoke rechargeable batteries to customers in the defence sector, including its popular LIPS (lithium-ion power system) collection. These are heavy-duty batteries, capable of withstanding hostile environments and demanding applications. Lincad’s products and solutions provide a sought-after, military grade performance that can be adapted for other sectors too, including commercial, medical and industrial.



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MILITARY & DEFENCE FOAM PACKAGING

Thinking outside the box to meet defence requirements

Military foam packaging demands a much greater attention to detail than commercial packaging solutions. A large amount of military cargo requires careful packaging and handling due to the sensitive materials. The equipment must be protected from physical impacts, climate changes and any biochemical hazards too. Military equipment is often transported around the world, which is why the defence foam packaging needs to be of the highest quality to ensure safe transportation.

Kewell Converters take into account the likelihood of physical impact and others factors in the transportation of sensitive goods. That's why our military foam packaging is produced to the highest possible standard and we take all of these things into consideration. Our expert team has a great deal of experience in producing military foam packaging for all kinds of purposes.

OUR MANUFACTURING PROCESS

We understand the needs for high-quality military foam packaging and manufacture products for this purpose. Kewell Converters Ltd. manufactures foams that meet or exceed the following military requirements:

- *Foam for general purpose packaging.*
- *High density foam for general purpose packaging.*
- *Foam for explosive compatible packaging*



Fill out our online form for a quote on your defence, aviation or industrial packaging requirements. You can also order free samples from us.

MILITARY FOAM APPLICATIONS

We supply high performance protection for applications such as helmet inserts or aircraft ejector seats. In addition to which we supply packaging, case inserts and bespoke foam parts for applications such as ordinance packing & protection, weapons carriage and bespoke designed flight cases and inserts machined to fine tolerance when accuracy is critical. Our engineered military foam is perfect for these applications as it has a number of properties that make it the ideal material. This includes the low mass, energy absorption, durability, strength under compression and tension that engineered foam packaging offers.

Static dissipative and conductive foams also find many applications in the military sector.

MILITARY GRADE FOAMS FOR PROTECTION, PERFORMANCE AND DURABILITY

Advantages

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- *Long-life durability*
- *Low odour*
- *Explosives compatible*
- *Static dissipative and conductive*
- *High impact resistance*
- *High tear strength*
- *High tensile strength*
- *High resistance to compression set*

At a glance

STANDARD	DESCRIPTION	MOD GRADE	PRODUCT
DStan 81-116/3 Type GP	"Expanded polyethylene sheet - general purpose"	Grade A	Plastazote LD24
		Grade B	Plastazote LD33
		Grade C	Plastazote LD45
DStan 81-116/3 Type QX	"Expanded polyethylene sheet - explosives compatible"	Grade A	Plastazote LD24
		Grade B	Plastazote LD33
		Grade C	Plastazote LD45
DStan 81-124/2 Type QX	"Expanded polyethylene sheet and mouldings, explosives compatible"		Plastazote LD33
DStan 93-101	"Expanded polyethylene sheet, high density, for general purpose"		Plastazote PK80
DStan 81-125/3	"Electrostatic conductive foam sheet"		Plastazote LD50CN
DStan 93-117	"Static dissipative low density. Polyethylene foam"		Plastazote LD40SD
DStan 81-119/3	"Cross-linked expanded ethylene-vinyl acetate sheets and mouldings"		Evazote EV50
			Evazote VA25

For 'mission critical' packaging

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- *Missile cradles*
- *Weapons case inserts*
- *Rifle case inserts*
- *Ruggedised case inserts*
- *Electronics device protection*
- *Flight case fitments*

For high performance protection

- *Personnel protection*
- *Body armour*
- *Helmet inserts*
- *Aircraft ejection seats*
- *Tool control inserts*
- *Sleeping mats*
- *Buoyancy devices*
- *Punctureproof' marine fenders*

For the very best defence foam packaging then speak to us about the right foam application for your military foam packaging or aviation requirement. Our defence foam packaging is made out of the highest quality closed cell foam materials. Major international aviation and defence OEM's trust Kewell to deliver and you can too. So, when failure is just not an option Kewell Converters are here to help!



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UKAS ISO17025 accreditation for the new team at Wiltshire Ballistic Services and MS Instruments Partition Panel System attracting interest

MS Instruments' partner company Wiltshire Ballistics Services and the associated Wiltshire Shooting Centre, based in Devizes, has implemented some exciting new developments and upgrades.



These have all contributed to an enhanced customer experience for all range users whether they need ballistic trials or are civilian customers of the Shooting Centre and shop.

UKAS ISO17025 for Wiltshire Ballistic Services

There have been a number of significant and major upgrades to the infrastructure and instrumentation in the ballistic test range. The upgrades include two high-powered extraction/filtration systems being installed, enabling the Ranges to do more extensive continuous weapon firing trials and limiting any external emissions. Ultimately, all the improvements and additions have resulted in Wiltshire Ballistic Services being awarded UKAS ISO17025 Laboratory standard for a number of international standards. The Range has held this standard in the past and it is proud to have regained this accreditation. The Company has always operated in accordance with the standard throughout, but this formal re-accreditation will go some way to assisting its customers in their business development plans and is a credit to hard work that the team at the ranges has put in. In addition, Wiltshire Ballistic Services is working towards the ISO14001 Environmental management standard, and aims to be carbon neutral by 2023.

Wiltshire Shooting Centre – Shop and shooting ranges

These developments mean that the ever popular Wiltshire Shooting Centre now has 5-lane 25 yard, and 5-lane 50 yard shooting ranges for air pistol, air rifle, FAC air rifle and .22/.17HMR rimfire. It has introduced a new membership structure with reduced fees and It can now offer facilities for home-loading/full bore testing while the shop itself has an increased range of quality clothing and is proud to be the South West's supplier of Yew Tree Fieldsports lead free Non-Toxic bullets. For corporate/business days out, Shooting Experience Packages are now also available.

MS Instruments Partition Panel System

MS Instruments' Partition Panel System (PPS) continues to attract interest from customers around the world. To help facilitate a better understanding of the system for potential customers and to demonstrate the near endless different configurations possible, the Company hopes to set up a small section of PPS inside the newly refurbished tunnel range by mid-2022.



A partially completed CQB Shoothouse made from PPS

To view the video of PPS please see:

<https://www.youtube.com/watch?v=6P6F7CpoJLM&t=84s>

For WBS trial enquiries please email:

Mark.blanchard@msinstruments.co.uk or

Paul.everington@msinstruments.co.uk

or call **01380 721644**

For Shooting Centre enquiries, please email

WBS-Sales@msinstruments.co.uk or call **01380 727282**

Or visit one of these websites:

<https://www.wiltshireballistics.co.uk/>

<https://www.wiltshireshootingcentre.co.uk/>

<https://www.msinstruments.co.uk>



INVESTORS SEE THE SENSE AND VALUE OF GREEN DEFENCE

PlastPack Defence (PPD) of Denmark secures investment from major Danish Innovation Investment Institution. Expands marketing operations.

A recent announcement from PPD shows that, like Ministries of Defence, investors are seeing the value of investment in PPD's plastic Lightweight Ammunition Cases (LWAC) that use environmental criteria to save money and increase operational capability as well as make environmental contributions. The investment by The Spring Nordic Fund, via the investment company Impagt Invest Sjælland A/S owned by Andel A.m.b.a. and Sparekassen Sjælland-Fyn a major consumer owned Danish investment company and bank respectively is being targeted by the PPD owners and board on marketing and market and business development.

The investment follows intense negotiations, examination of PPD's structure, existing investment and business plans. Note was taken of existing customers, market projections, ecological pressures and public sentiment. Key to much of this is the ability of PPD to help meet aspirations for Net Carbon Zero by 2050 (NZ50). Critical to that is the ability of PPD's LWAC to make a major and lasting difference now, almost without waiting.

The major change that LWAC brings is weight saving in the packaging,

storage and transport of ammunition. Concentrating initially on Small Arms Ammunition(SAA) usually taken to mean 5.56mm, 7.62mm and 0.50" calibres, the most common and largest market for cases the LWAC M2A1 case saves almost 2kg over the steel equivalent. That translates into a greater than 10% weight saving per box.

The implications of this on military logistics and costs are profound. On the most commonly used logistic load hauler (a 6t) vehicle and the one most commonly used for tactical resupply it is an extra layer of boxes per pallet. That rapidly equates to fewer trucks. There then follows a long list of fewer items and activities, all of which equate to considerable cost savings; manpower, training, barracks, barrack maintenance, shipping space for overseas deployment. One can soon see the environmental benefits; less fuel, whether fossil or electric, lower heating bills, less rations, less journeys which mean less exhaust and collateral pollution such as tyre and brake dust, major causes of urban pollution. The list is enormous. The financial business case in simple costs is irrefutable. The whole life costs present a stronger irrefutable argument. To try to maintain the status quo against these savings and benefits is simply unarguable but there are military Luddites who will.

Let us then look at additional benefits. By changing from steel to LWAC cases the operational capability of the armed forces improves immeasurably. Armoured Fighting Vehicle and battlefield helicopters gain range or endurance or combat power as a result of less weight or greater load. Logistics in the field become easier, the result of using less fuel but perhaps more importantly smaller convoys and vehicle packets to haul





the ammunition and the logistic elements occupying less space on roads and in suitable locations.

Other benefits are equally important but perhaps not as obvious. Only an Infantryman would appreciate what 3.3kg is to carry for 96 hours but that is the weight saving for every infantry soldier on a typical patrol in Afghanistan and in similar future operations.

However less obvious will be the savings in medical costs and disability pensions from not having to lift and carry steel containers. The result of this has been new Health and Safety legislation. New regulations mean that the amount of ammunition in a steel case will have to be reduced to prevent the package being over the newly prescribed upper limit for single person lift and carries. That incidentally means more steel boxes, more trucks more more more. Resupplies at night, and they will still be predominantly carried out at night, close to the enemy will be quieter. This coupled with smaller logistic convoys will reduce casualties making the available logisticians more effective. The US have done some superb work showing the human cost of every kg of weight carried by logistic elements in the combat zone. The military business case like the financial and environmental ones is also irrefutable.

Against this backdrop what then for PPD's expansion? Two markets have been identified for additional activity; Central Europe and the Sporting and Hunting worlds. Additional people have been hired to concentrate on these areas.

Central Europe is a relatively simple equation/business case. These countries are modernizing their armed forces and are not beholden to using equipment approaching a century in service. They want to address more efficient, less environmentally damaging better equipped armed forces and hence are exploring going down the LWAC route. Supporting this exploration is a key objective of the expansion.

The Sporting and Hunting market is interesting. There are two elements to this.

Cost; shipping and moving ammunition is expensive. Weight equals cost so any saving is important in a price sensitive market.

Utility; Hunters and sporting shots are not blessed with the fitness levels or the mechanical handling equipment the military are. Thus anything that helps the often less fit civilian shot carry and manage his ammunition is welcome on either or both ease of carriage or quantity grounds.

Then there are the myriad other uses LWAC can be put to. We all know ammunition cases get put to many other uses. Well LWAC does all of those jobs and a few more. Carrying sensitive munitions is more easily



accomplished in LWAC. Electronic and electrostatic issues make LWAC ideal for carrying sensitive electronic components protecting them as well as not damaging them by their material and make up.

Napoleon is reputed to have said "an Army marches on its stomach". Nothing lowers morale quicker than poor rations. A number of Special Forces and indeed main force units are already using LWAC to store and carry their rations. Why not? They are lightweight, waterproof and float. The options are wet, soggy or short rations. Civilian adventure groups are doing the same. Some of the images in this article are taken from the Danish Veterans trips across Greenland in temperatures of -40°C and around Bornholm.

The Danes have sourced a series of conference packages of different sizes and sustenance (more biscuits!) which allows them to order tea, coffee and biscuit sets for conferences in combat zones. Fully NATO stock numbered guess what they are packed in (the other images). LWAC offers lots of ways of getting to NZ50.

www.ppddk.dk



PlastPackDefence



Maintaining wheeled vehicle mobility with **TYRON** Runflat

Tyron Runflat has become the first supplier in the UK to begin deliveries of complete wheel/tyre/runflat assemblies using the new Michelin X Force ZL16.00r20 tyre.

The deliveries, which began in January, will fulfil the second batch order from NP Aerospace for the UK Ministry of Defence's (MoD's) Protected Mobility Engineering & Technical Support (PMETS) programme. Under this programme, NP Aerospace is carrying out an upgrade of the British Army's Ridgback and Mastiff vehicles by installing an industry package of equipment that will improve off-road mobility for the vehicles deploying to Mali for Operation NEWCOMBE.

The work is being carried out in order to enable the heavy armoured vehicles that make up the Army's protected mobility fleet to operate in challenging operational terrain and keep British Army soldiers safe on deployment.

As part of the range of new systems - including new independent suspension systems, upgraded driveline, steering and braking systems, central tyre inflation systems (CTIS) and increased diameter tyres - the vehicles will be fitted with Tyron's complete wheel assemblies consisting of its All-Terrain Rubber Multi-Piece (ATR-MP) runflats, wheel and the Michelin X Force ZL16.00r20 tyre.

Deliveries under the first batch order were completed in early 2021, and this second order highlights the continued demand for increased mobility and safety for military vehicle fleets; and reflects the wider trend among armoured vehicle users who are looking to maximise the utility of existing fleets by applying tried and tested technology to enhance flexibility and capability for current and emerging operational theatres.

Tyron's ATR-MPs will contribute to increased mobility and safety for the vehicle fleet, while also supporting simplified logistics in the field.

"As the ATR-MP is a multi-section runflat, it does not require any special tools or a hydraulic press to insert and remove the runflat when replacing the tyre, meaning it offers a huge advantage over single piece systems that require both of those things," Peter Simson, Director, Tyron Runflat, said. ***"In fact, in many cases when a single piece runflat needs to be replaced following a tyre strike they have to be flown to another country where bases are equipped to handle the repair. This means vehicles and their crews may endure significant downtime whilst repairs and replacements are sourced."***

Wheeled 6x6 and 8x8 vehicles have dominated during operations in recent decades over their tracked counterparts, thanks to their advanced mobility and ultra-maneuverability in extreme terrain. However, one of their biggest vulnerabilities is susceptibility to tyre-strike, whether via ballistic attack or simply rapid deflation. In environments where this is a constant threat, equipping these vehicles to retain mobility and return to base safely is critical in ensuring the strategic safety and protection of personnel and the mobility of ground forces.

Tyron's All-Terrain Runflats are designed to counter this exact threat, by giving a wheeled vehicle with one or more tyres deflated the potential to continue to manoeuvre to a place of safety, over any terrain. They enable the vehicle to maintain mobility during and after tyre deflation, allowing the driver and crew to continue the mission safely and return to base. The runflat guarantees beadlock, which prevents the tyre spinning on the wheel when deflated, enabling the vehicle to continue moving at speed in full compliance with on and off-road Finabel standards. The system is also fully compatible with CTIS and standard wheels, maximising its flexibility for the military market.

Key to Tyron's work on this programme was delivery under significantly reduced timescales, with the first wave of re-engineered vehicles delivered in just over 80 working days.

"Our ability to meet this expedited timescale was central to the selection of our ATR-MP for this programme," Simson said. ***"In fact, we were able to dispatch the initial systems to the prime within 24 hours of receiving the request - thanks to our flexible outlook we have the ability to respond to requests such as these quickly and efficiently."***

"We are extremely pleased to have now received this second batch order, which we were able to fulfil quickly, and look forward to future orders."

It has been a busy start to the year for Tyron, which has also doubled production of its All-Terrain Runflat (ATR) Carbon system as it prepares to deliver full vehicle sets to an international armoured vehicle manufacturer. This second order for the ATR-Carbon system includes full sets for the vehicle prototype, test vehicles and the first vehicle batch.



The patented ATR-Carbon is a redesigned version of the ATR-MP. It has a carbon fibre spine in place of the ATR-MP's metal spine, which reduces the total runflat weight by 40 percent - resulting in a 250kg unsprung weight reduction on an 8x8 armoured fighting vehicle - making it the lightest rubber runflat on the market.

By helping to reduce the overall weight of the vehicle, the ATR-Carbon improves rotational mass, meeting growing demand for lightweight solutions for military vehicles, particularly hybrid and electric vehicle armoured vehicles. It also retains the operational advantages of the original system, enabling vehicles to retain mobility and return safely to base following tyre strike caused by ballistic attack or rapid deflation.

"We have focused on innovating for our customers to help them reduce the weight of their vehicles," Simson said. ***"This not only increases agility, but makes these vehicles much easier to transport by air despite the up-armouring and addition of Active Protection Systems to already heavy vehicles."***

"Additionally, with forged aluminium also reducing mass compared to traditional steel wheels, we believe that future non-metallic developments that give improved blast protection whilst reducing weight will further enhance vehicle dynamics."

For more information on the range of Tyron Runflat solutions please email: peter@tyron.com
Web: **www.tyron.com** +44 (0) 1509 377677 or +44 (0)7741 635699



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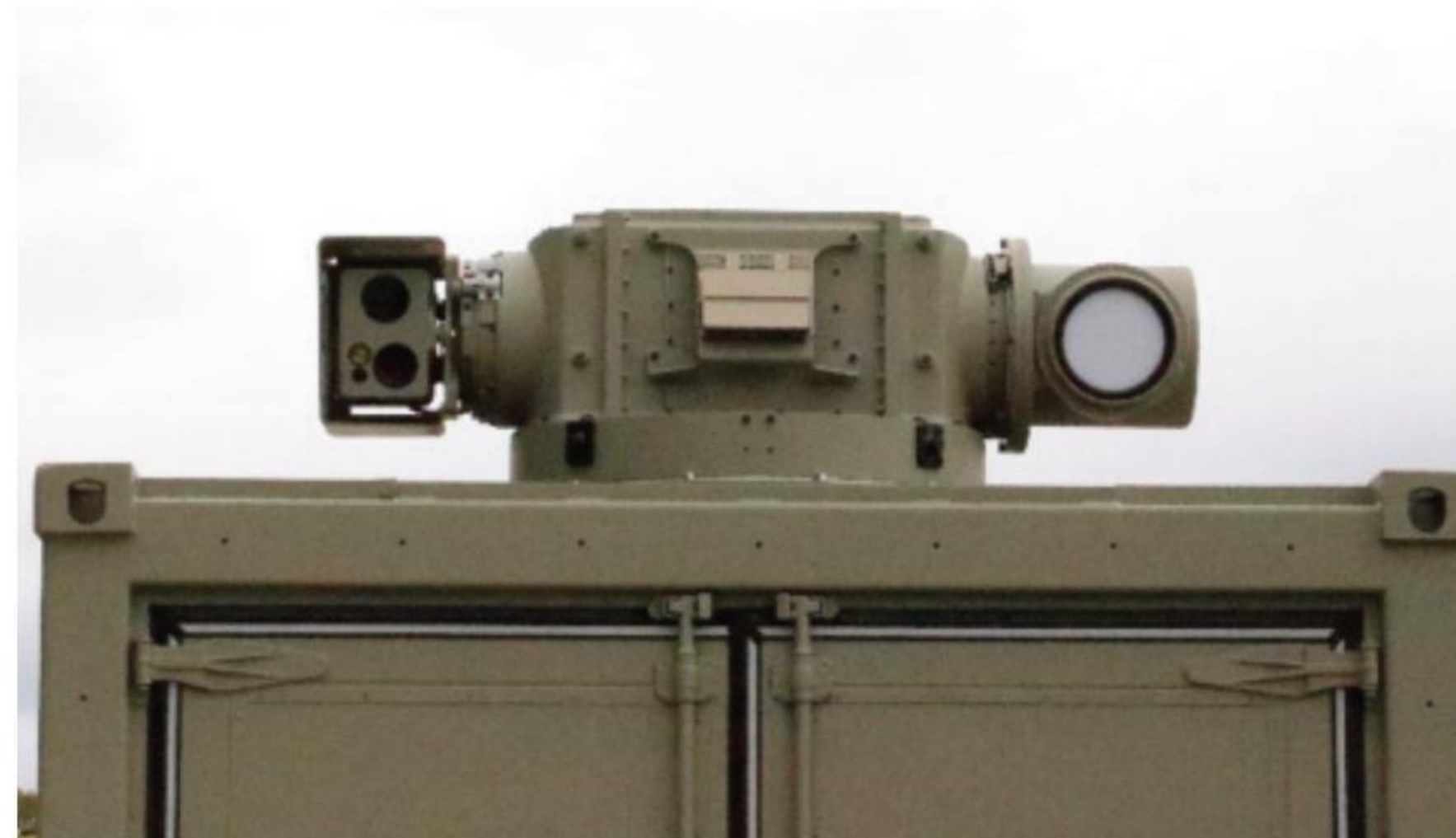
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Suicide drone swarms are present an asymmetric threat



Titanis 35kW Directed Energy Beam Director on containerised system

TITANIS DRONE DEFEAT

It is expected that unmanned aerial systems (UAS) will be used increasingly for malicious purposes as the cameras, weapons, toxic chemicals and explosives they are able to carry will be used for acts of terrorism, espionage and smuggling.

The Titanis Counter UAS (C-UAS) system has been developed by EOS to address the growing threat from malicious and threatening unmanned aircraft systems.

Based on the EOS R-Series remote weapon stations (RWS), Titanis is a fully integrated, scalable C-UAS suite combining specific detection, command and control (C2), and layered hard and soft kill defeat capabilities necessary to acquire, track, and defeat swarming UAS threats.

The Titanis system allows the operators to match kill solutions to large numbers and varying combinations of small and large drones to ensure that the threat can be mitigated regardless of their direction, numbers and capabilities while managing the environmental, geographic, airspace and personnel safety considerations.

A typical all-up Titanis configuration incorporates direct fire engagement systems, passive and active soft kill electronic warfare (EW) systems, an integrated sensor suite including Pulse-Doppler, software-defined radar, day/thermal camera, laser rangefinder and radio frequency (RF) detection systems - and an optional directed energy (DE) kill system. These systems sit together with, and are integrated through, a proprietary C2 and fire control system developed by EOS.

High volume fire, point defence solutions, range from the 7.62mm Dillon Aero M134-

series minigun to larger calibre 30mm guns (e.g. the Northrop Grumman M230LF 30mm cannon with EOS R400S Mk2 RWS, or Mk44 II Bushmaster chain gun with the heavier weight EOS R800 RWS) firing airburst munitions (including 30mm x 113mm proximity fused airbursts and 30mm x 173mm airburst rounds) to deliver C-UAS effects out to 3000m.

One of the key differences between C-UAS and other missions is the high angular speed that can be achieved by the UAS at relatively short range. EOS RWS have been modified with a fourth-axis independently slewing sensor unit that can move independently in azimuth to track fast-moving targets. A 1-Hz laser provides laser ranging and tracking throughout the engagement.

Passive and active soft kill EW systems, designed to operate across all-threat frequency bands are, as with the radar solutions, integrated according to customer preference. Typical solutions include offerings from Blighter in the UK, Echodyne in the US and RADA in Israel.

Titanis' DE system has been deployed with a 35kW high energy laser (HEL), although the HEL in its current format is capable of scaling to around 55kW. The HEL system has been demonstrated as a small containerised system; however, while the DE beam director is slightly different to a weapons station it has 60% commonality with the R400S RWS and will therefore be employable from deployable platforms.

Developed and manufactured in-house by EOS, the DE system – which includes the beam director, and co-mounted optical target identification and tracking system – is designed to address Groups I, II, and III UAS swarm threats, with high rates of target engagement, out to ranges of 4000m.



Kinetic C-UAS using airburst munition



RWS fitted with Dillon Aero M134-Series Minigun

The ability to maintain and manage the quality of the beam, the software that ensures precision engagement and drives the process, and all the mechanical designs and architectures, are all EOS designs and intellectual property.

Arguably, the largest growth rate in lightweight lethality systems is in the unmanned systems space, for both integration on unmanned platforms with remote operation, and also for the engagement and defeat of unmanned systems. In a C-UAS application, Titanis with direct engagement/point defence, passive and active EW and directed energy capabilities constitutes a significant force multiplier.



FIND OUT MORE: [EOS-AUS.COM/DEFENCE](https://eos-aus.com/defence)



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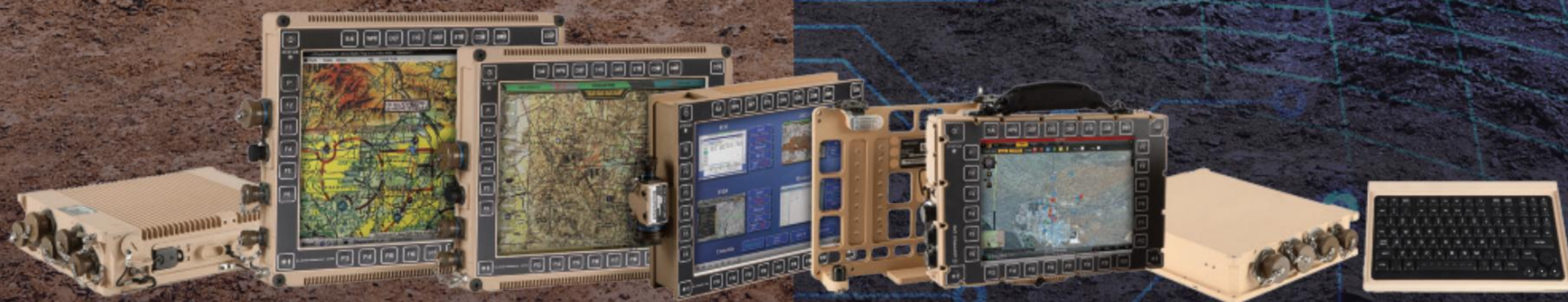


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