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CONTENTS

- 4 DSEI 2021** - What to Expect
- 12 Leonardo DRS** - Drawing Lessons from Years of Experience
- 16 Interface Concept** - High Performance Ethernet Redundancy Solution
- 18 Kewell Converters Ltd** - Military & Defence Foam Packaging
- 28 PEI-Genesis** - SWaP-Optimised Connector Solutions for Military Aerospace Applications
- 34 Raptor Photonics** - Next Generation Low Light Camera Technology
- 36 Display Technology** - Military Applications for Night Vision Imaging
- 40 Nedinsco** - Purveyor of High-End, Reliable Vision Systems
- 44 Lutra Associates** - Planning Ahead
- 52 Adacore** - Increase Military Software Innovation and Longevity through Reuse
- 58 Smiths Interconnect** - Flying High on F-35 Aircraft
- 64 Horstman** - Mobility Solution Provider in the Global Heavy Armoured & Tracked Vehicle Suspension Market

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Welcome to this DSEI 2021 edition of the **Military Systems & Technology Magazine.**

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

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

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

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What to Expect from DSEI 2021

After a lengthy global shutdown of the exhibition sector during the COVID-19 pandemic, DSEI is returning to ExCel London from 14-17 September 2021 led by feedback from across the defence and security industry that has shown a strong appetite to reconnect.



DSEI encompasses the entire defence and security audience, including Air, Land, Naval, Security and Joint, to reflect the complex nature of modern warfare and security operations. This includes an increased emphasis on Space and Cyber.

DSEI Connect

This year DSEI is introducing a range of new online opportunities to complement the live event. DSEI Connect' is a digital platform that will bring participants from around the world together with those attending the event in London to create a flexible and accessible 'hybrid' format. Through this secure and regulated platform registered participants are able to build relationships, share knowledge and develop business.

For seven weeks from 16th August to 30th September 2021, DSEI Connect will provide an exclusive series of live and on-demand content-led presentations from eminent international guests. It will also include a comprehensive schedule of seminars, roundtable and panel discussions focused on the DSEI 2021 central theme: An Integrated Response to Future Threats.

As global governments place increasing importance on organic integration of procurement and deployment of capabilities across their armed forces, DSEI Connect will offer an opportunity to engage with representatives from governments, national armed forces, industry thought leaders, and the global defence and security supply chain.

DSEI Connect will also provide a new seller-buyer matching programme – MeetMe. Specially designed for “LinkedIn” style buyer-led networking, MeetMe is a secure platform which enables registered participants to identify, message, and arrange secure online meetings with key potential business contacts and ultimately generate significant leads.

Sally de Swart, Managing Director of DSEI, said: *“The launch of DSEI Connect is the first part of an extensively researched programme that we are proud to bring to market. The last year has encouraged us to think more imaginatively about our offering to the defence and security sector, analyse what makes DSEI so important for the industry and examine how this can be expanded virtually for the audience on an ongoing basis. DSEI Connect reflects this, driving industrial collaboration, defence engagement,*

and the development of new technology, while also providing a platform for strategic thinking and messaging from global leaders, during 2021 and beyond”.

Why Visit?

“DSEI has been shown to accelerate the trajectory of businesses that attend. The last year has encouraged us to think more imaginatively about our long-term offering to the defence and security sector and analyse what makes DSEI so important for the industry. As such DSEI will now provide a wider range of opportunities for those who don’t normally - or this time cannot - attend in-person, and we are pleased to take this opportunity to introduce DSEI Connect to the market.” - Grant Burgham, DSEI Event Director

DSEI remains the best way to gain a comprehensive cross-section of the Defence industry, welcoming exhibitors from the entire defence and security supply chain, from Primes/OEMs to Tier 3 manufacturers. DSEI is the only event of its kind to integrate all the pillars of national security and defence: Air, Space, Land, Naval, Security, Cyber and Joint. DSEI has always been an ideal place to engage with innovative SMEs on the forefront of technological development. This process will be facilitated by DSEI Connect, a digital platform.

Backed by the UK Ministry of Defence, DSEI connects governments, armed forces, industry thought leaders and the global defence and security supply chain on an unrivalled scale. The event is curated to consistently support both the prime contractors as well as small and medium-sized enterprises while,

crucially, giving the UK exports a significant boost. On a rolling 10-year basis, the UK remains the second largest defence exporter in the world.

New features & exhibitors

This year DSEI will feature eight theatres, packed with content from exhibitors spanning the entire defence spectrum. DSEI will also feature 20 international pavilions, supported by the commitment made by all the major defence primes to provide exhibitors and attendees with an excellent opportunity to engage with the global defence community.

Organised and launched in collaboration with DSEI 2021 strategic partner, Fujitsu, the Future Tech Hub will provide a meeting place to explore and discuss the decisive role Information, AI and Digitisation play in the future battlespace. This debut area will play host to several first time exhibitors, including Vodafone, DELL & Improbable Defence. This trending topic of computers, robotics and hi-tech will also be evident across the Joint Zone, which will feature new companies such as Sony.

Other Zones and Hubs have also been expanded with strong new additions. One of the world’s largest shipbuilding groups, Fincantieri, will be part of the Naval Zone while the MakeUK Defence Pavilion at the Manufacturing Hub will host CBRN detection specialists, Kromek, exhibiting their standalone autonomous biological COVID Detection System.





To demonstrate the ongoing drive of the British Armed Forces toward sustainability and a net-zero carbon footprint, the British Army will conduct an outdoor live demonstration for the first time at DSEI. This will showcase hybrid models of the Foxhound, Jackal and MAN SV vehicles.

DSEI 2021 will feature visiting Royal Navy and international ships. The five ships, of all shapes and sizes, are set to be a unique feature of the DSEI Naval Zone and a showcase of maritime technology and capability for visitors to explore. Taking place in the Royal Victoria Dock, DSEI will also host waterborne demonstrations from sponsors, Volvo Penta and Survitec Group.

Keynote Speakers

DSEI 2021 is proud to present a keynote programme featuring the top Defence officials from the UK Government and Forces, alongside some of their key international partners. Speeches will be delivered live in an on-site keynote studio to a small audience. All speeches will be broadcast across the venue for attending visitors, as well as on the event's digital platform "DSEI Connect" for those who are unable to visit in person.

To reflect the central role of UK Strategic Command at DSEI 2021, the show's first speech will be delivered by General Sir Patrick Sanders, Commander of Strategic Command. Gen Sanders will give insight into the implementation of Multi-Domain Integration across Defence, and highlight the role that industry has to play

within that. His speech will be followed by an opening address from the Minister for Defence Procurement, Jeremy Quin MP. The opening ceremony will also include a flypast and marching bands of the British Army and the Royal Marines.

Figureheads of the British Armed Forces are set to speak consecutively on Wednesday 15 September, with Second Sea Lord, Vice Admiral Nick Hine opening DSEI Day 2. He will cover the Royal Navy's key theme for DSEI as well as how they aim to harness innovation, technology and data solutions to provide a truly integrated Royal Navy.

The next speech will be delivered by General Sir Mark Carleton-Smith, Chief of the General Staff, who will explore the theme of the British Army at DSEI, *"Future Soldier: An Integrated Army"*, and the new land operating concept.

Later that day, Air Chief Sir Mike Wigston will explore the opportunities 6th Generation Fighters represent for the defence industrial base and the Royal Air Force theme for DSEI: *"The Next Generation Air Force - integrated for advantage, by design, across all domains."* The RAF's plans to enhance pan-national industrial collaboration will be an essential topic for the Air Domain, as the FCAS (Future Combat Aerial Systems) and TEMPEST return to the show floor.

To complete this line-up UK Secretary of State for Defence, Ben Wallace will be opening the show's third day on Thursday 16 September, emphasising his commitment to international defence cooperation and collaboration, through industry.



British Armed Forces: an Integrated Force

Bringing together defence innovation leaders from across the land, air, sea and joint domains, participants from all levels of the defence industry will be able to engage directly with British Armed Forces stakeholders and gain insight into the capabilities and structures required for the future.

The 2021 Cyber Security Forum features discussions on Tuesday 14th to Thursday 16th September, developed in partnership with

the UK MoD StratCom Working Group. The Forum is designed to enable dialogue between all parts of the supply chain around the following core themes: Industry engagement and acquisition; Future operational requirements; obtaining and retaining skills; and information exploitation.

Leading the government participation at DSEI, the new Strategic Command is charged with transitioning the traditional warfare era's Joint Force into the Information Age's Integrated Force. The Command's priorities include achieving strategic integration across defence and establishing dominance in the grey zone of the battlefield through special operations, and harnessing disruptive technologies such as artificial intelligence and big data in the cyber domain.

General Sir Patrick Sanders, Commander UK Strategic Command, commented: *"UK Strategic Command looks forward to being a key participant in DSEI 2021, setting out our responsibilities and our thinking – as UK Defence's integrator and responsible for key strategic capabilities - against the rapidly changing character of warfare."*

With a focus on adapting to the evolving character of warfare, the British Army's presence at the DSEI Land Zone will be led by a "Future Soldier: An Integrated Army" theme that will look to build support for its new operating concept at the highest level. Key to this is the Army's ability to work collaboratively with industry. General Sir Mark Carleton-Smith, Chief of the General Staff, said: *"The Army's relationship with industry will be vital to ensuring it has innovation at the heart of future capability and we will be actively seeking opportunities to develop Defence's relationship through the Army's Land Industrial Strategy."*





DSEI 2021 will host the largest Aerospace Zone and Space Hub offering to date where the Royal Air Force will take centre stage. The service will seek out technological innovation that will deliver success in the “grey zone” – including space, cyber, special operations and information operations. With key strategic assets joining the UK air fleet in 2021, including the F-35 Joint Strike Fighter and P8 Poseidon maritime patrol aircraft, the Next – Generation Air Force will also address the integration theme driving UK defence transformation.

Air Chief Marshal Mike Wigston, Chief of the Air Staff for the Royal Air Force, said: *“To continue making a leading-edge contribution to the UK’s place in the world, the Royal Air Force must be at the leading edge of technological innovation in all that we do; DSEI 2021 offers an excellent international platform on which to explore those challenges alongside our industry partners.”*

Alongside international warships on static display and waterborne demonstrations on the River Thames, the DSEI Naval Zone will be backed by the Royal Navy. With HMS Queen Elizabeth and HMS Prince of Wales now fully supporting operations internationally, the service will focus on laying out its multi-domain integration requirements and harnessing maritime innovation and technology that will help build a fully networked digital force.

Admiral Tony Radakin, First Sea Lord and Chief of Naval Staff commented: *“The Royal Navy continuously seeks to remain at the forefront of maritime defence technology, and events such as DSEI help to keep us there. I am delighted that the Royal Navy is once again playing a leading role in DSEI in 2021. Our ongoing success on operations around the world is a direct result of the strength and skill of the UK defence industry, as well as our international*

partners. DSEI gives us the ideal opportunity to bring all the key players together to discuss the latest innovations, developments and technological achievements.”

DSEI in a Covid world

DSEI organisers have worked closely with all stakeholders, venue, the Government and local authorities to ensure that DSEI 2021 delivers as full an experience as possible, whilst taking the necessary precautions and upholding highest standard of health guidelines for Covid-secure events.

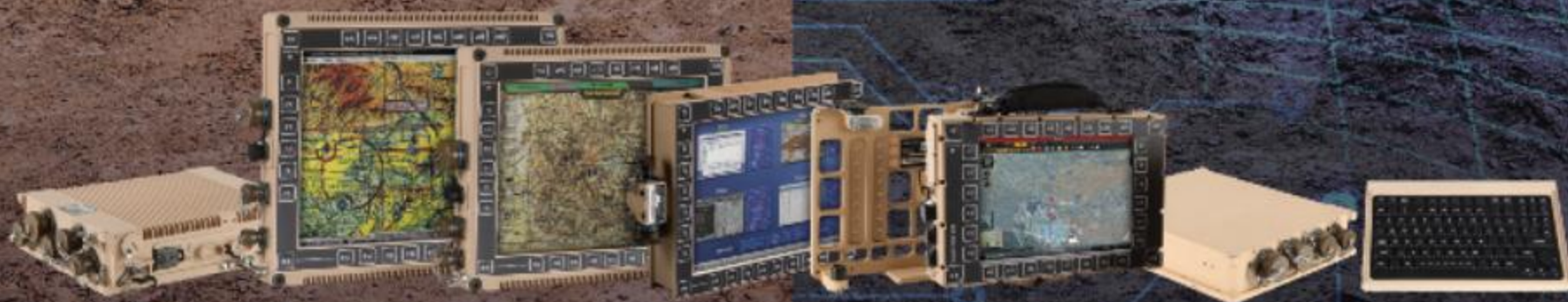
DSEI has created extra space with larger gangways and additional seating areas to ensure distancing measures are met. To help ease the flow of people in and out of the venue, visitors attending in person will be required to register prior to coming to the event and to bring their coloured printed badge from home. Exhibitors will also need to review their stands, taking into account social distancing and cleaning measures and submit layouts for checks in advance.

ExCeL has been operating in a Covid compliant manner throughout the pandemic and as a venue, is well versed in sanitisation of the venue space. The building has increased ventilation management systems in place to support good airflow and there will also be a testing process in place.

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PLATFORM COMPUTING

Proven on the battlefield. Trusted by the warfighter.



The battlefield is no place for compromise. Warfighters shouldn't have to choose between mission-critical performance and innovation. That's why Leonardo DRS' Proven Platform Computing systems are both. Modernized for the warfighter and rugged for the battlefield. Connecting warfighters to the mission information they need, all while protecting from cyber threats and reducing size, weight, power and cost (SWAP-C) — ultimately enabling situational understanding, so you own the edge.

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September 14-17, London Excel

BOOTH H4-622 LAND ZONE

DSEI



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Drawing Lessons From Years of Experience To Support The Evolution Of Land Tactical Systems

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

For nearly 20 years, Leonardo DRS (DRS) has been involved in delivering cutting edge Tactical Computing and Networking solutions to customers around the globe. This rich heritage can be traced back to the inception of the UK Bowman project where DRS competed for and won a substantial contract for the vehicle-based tactical workstations in 2002. Key to the success of the programme was the high degree of commonality between the three different workstation variants: VUDT (Vehicle User Data Terminal), BMDT (Bowman Management Data Terminal), and PBPU (PBISA Processing Unit), leading to economies of scale and making software and through-life support economic and effective. This initial modular and upgradeable approach proved to have long-term benefits to not only Leonardo DRS, but also to the U.K. Ministry of Defence (MoD).

Leonardo DRS provided more than 14,000 tactical user data terminals to General Dynamics UK (GD UK) for the initial Bowman implementation. The User Data Terminals (UDTs) are installed in all tactical vehicles, wheeled, and tracked, with the BMDT and VUDT (now referred to as CT1 and CT2) being dismountable for use within command posts or autonomously off the vehicle platform.

Leveraging Leonardo DRS' position as the major supplier of tactical computing to the U.S. Army has been a core strategy of ours over several years. When we had the opportunity to re-compete for the Bowman UDTs in 2008, we took the approach that upgrading the delivered systems was the most competitive and impactful way to



BOWMAN in the field, 2002

provide the enhanced capability that the British Army required.

Key to this strategy was the high degree of re-use that could be made of vehicle infrastructure, including cabling and installation kits, which represented a significant savings to the customer. In winning the re-compete BCIP5.4/5.5 Bowman contract in 2008, we were able to draw together the product development roadmaps for both the US and UK Armies. We did so by leveraging technology drawn from the US Army Force XXI Battle Command Brigade and Below (FBCB2) contract that Leonardo DRS had won and delivered to the U.S. Army at the time.

U.S. AND U.K. ALIGNMENT

In 2016, we were once again presented with an opportunity to compete for the next spiral of Bowman technology insertion in the form of Bowman 5.6. This was a key phase of development as 5.6 would provide the tactical computing infrastructure for a more open system as part of the evolution to the U.K. Morpheus program.

Maintaining our incumbent position on Bowman was, and is, of great importance to Leonardo DRS and the Bowman 5.6 project provided another opportunity to deliver a value-for-money solution (built on the principles discussed above). Leonardo DRS was pleased to be awarded the 5.6 contract continuing the highly successful partnership developed with both GD UK and the British Army.

On this occasion, we were able to exploit the U.S. Army Mounted Family of Computer Systems (MFoCS) contract that we had originally won in 2013, and again in 2018, in the form of MFoCS II. The U.S. Army MFoCS effectively replaced FBCB2 so this was a natural progression and once more allowed Leonardo DRS to align the primary U.S. and U.K. brigade and below C4I projects by providing a solution, which had a high degree of commonality across both programmes.

It also ensured that Leonardo DRS continued to deliver the benefits of ongoing technology insertion, underlying capability development and enhancement to both projects based on a significant degree of commonality in terms of the core computing, display, networking, and security architecture.

NO COMPROMISE

Leonardo DRS' ultra-rugged tactical computers are designed to allow for ongoing technology insertion and upgrade. Over the course of a project the size of Bowman and MFoCS, we were able to use the same basic infrastructure to deliver ever-increasing amounts of capability as computing technology advanced. The Intel™ Core 2 Duo systems delivered back in 2002 have now been upgraded through two spirals to new Intel multi-core technology, maintaining legacy I/O and introducing new interfaces for future expansion. The ability to use the current infrastructure and upgrade the current systems is more cost-effective than buying lower-grade, rugged COTS systems and ensures that there is no compromise regarding the environmental performance of the system. Modern Battle Management Systems (BMS) are mission-critical, and Leonardo DRS believes that there should be no compromise in their ability to perform in the harshest of conditions.

Today, Leonardo DRS's tactical computing & networking products is the choice of wide range of demanding end-users ranging around the world.

Our systems are installed and operational in over 300,000 ground vehicles and command posts to-date and are delivering unparalleled performance in terms of reliability, availability, and resilience. In addition to the U.S. and U.K. installed bases, end-users in the Middle East, Europe, South East Asia, Australia, and Taiwan have all adopted a wide range of DRS products to build their tactical C4/5i systems and solutions.

As the nature of Land Tactical C4/5i architectures change so our hardware and software continue to evolve to meet new and emerging requirements.

EMERGING CAPABILITIES

As a major Intel partner, Leonardo DRS is participating in Intel's Early Access Programme (EAP) for the 11th Generation Core Processing technology and is currently engaged in the development of computer mainboard's that provide a step function enhancement in both CPU and GPU performance. This leap in CPU (x4 improvement in core CPU Passmark benchmark) and graphics (x8) performance is essential to supporting fast emerging BMS, Enhanced Situational Awareness (ESA), and related graphics intensive tactical applications. New higher speed GbE interfaces are also being introduced which are better suited to handling high bandwidth video interfaces such as those found on OO-82 compatible cameras and video feeds. These significant CPU, GPU, and I/O enhancements are at the heart of Leonardo DRS's next generation tactical computing platforms.

These new enhanced computing platforms continue to be married with the Leonardo DRS suite of agnostic networking, communications, and platform management software such as the Voice Cross-banding, remote radio management and associated voice comms capabilities of our digital vehicle intercom system (VIS).

To continue, Leonardo DRS is also driving innovation and enhancing capabilities in the areas of Assured Position, Navigation and Timing (APNT) and Cybersecurity.

Leonardo DRS AC²ES Embedded APNT

The Leonardo DRS modular and scalable APNT Converged Computer – Embedded & Scalable (AC²ES) solution can be readily integrated within widely used DRS Tactical Systems such as the Data Distribution Unit (DDU) and offers users with the ability to continue operations in GPS degraded environments.

AC²ES provides APNT capability by augmenting standard military GPS PNT source with technologies such as anti-jam, anti-spoof, M-code receivers, vehicle IR sensor vision navigation, wheel rotation, and inertial measurement units. A fusion engine merges and prioritizes all PNT sensor data to provide a reliable, GPS-denied navigation solution during real world jamming and spoofing attacks. AC²ES can operate standalone, or while hosting the vehicle's BMS and can be easily controlled via its GUI.

Cybersecurity

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



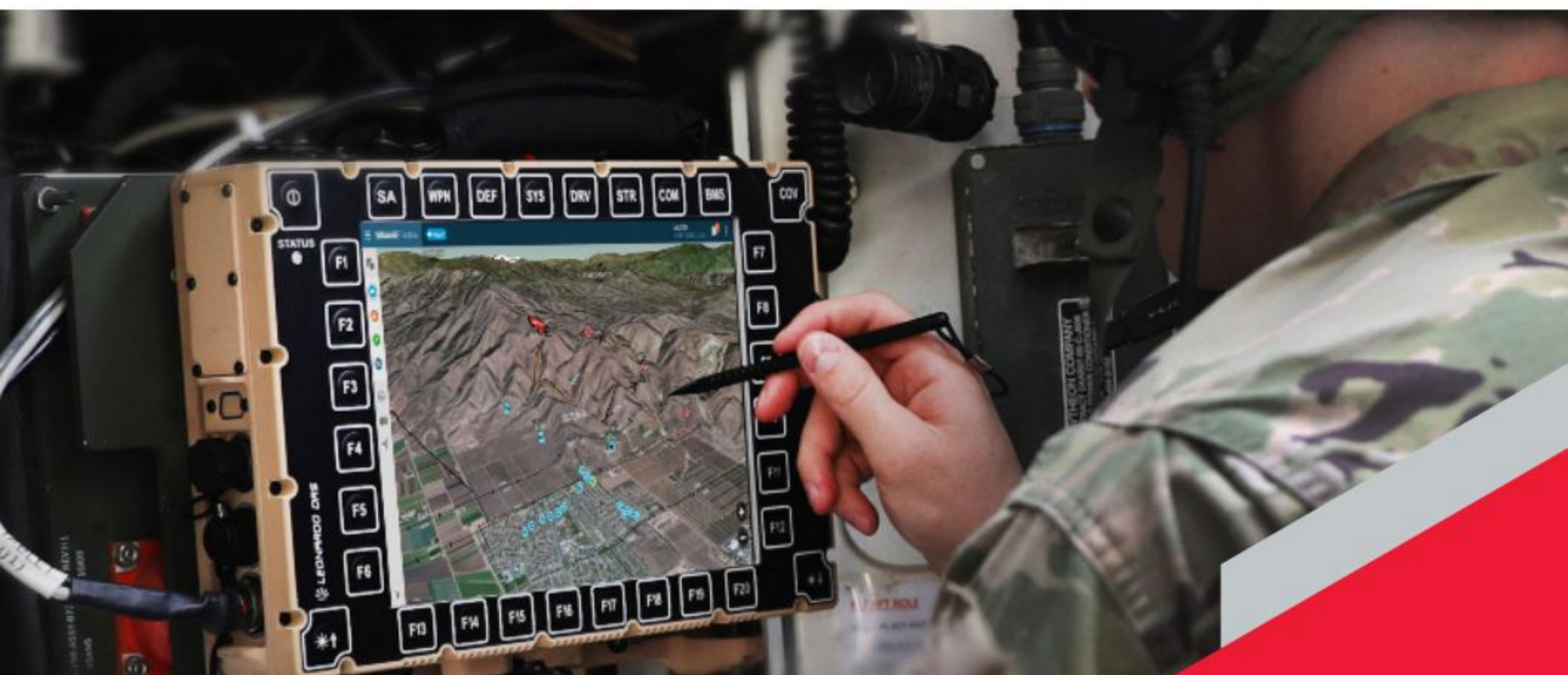
are key technologies for protecting against these threats. In 2007, Leonardo DRS began embedment and provisioning of Trusted Platform Modules (TPMs) in fleet-base tactical computers. Since then, Leonardo DRS has continued to develop and expand its use of this technology and is now considered an industry 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 is in a unique position. We have derived a great deal of experience in delivering tactical systems content into the

two largest BMS/C4I projects conceived in the form of FBCB2 evolving to MFoCS in the US and Bowman evolving to Morpheus in the UK. We have built on this position by working closely with many other international customers such as the Australian ADF and UAE GHQ.

This experience has provided us with a wealth of knowledge and capability that goes into everything we do. The development of new tactical computing platforms based on next generation 11 Intel technology, network agnostic software services coupled with innovative technologies such as AC²ES and robust cybersecure solutions continues to make Leonardo DRS the natural partner for today's tactical system implementations.

Visit Leonardo DRS at DSEi in Hall 7, booth number 410 or at LeonardoDRS.com/platform-computing.



High performance Ethernet redundancy solution

for the Industrial and Defense markets

Today's defense systems are highly sophisticated and based on high-performance mission computers, servers, workstations and signal processing nodes that need to exchange large amounts of information.

This critical and strategic information is transmitted via communication networks requiring high availability, reliability and robustness. In these systems, where Ethernet is ubiquitous, the network infrastructure and communication protocols must ensure that no data gets lost and that information is reliably delivered. To meet these requirements in the most critical conditions, a solution to consider is the implementation of a redundancy network.

THE CHALLENGES

In parallel with the rapid deployment and growing popularity of Gigabit Ethernet standard, that is not deterministic by essence, network redundancy protocols such as Parallel Redundancy Protocol (PRP) and High-availability Seamless Redundancy (HSR) have been developed to overcome network failures.

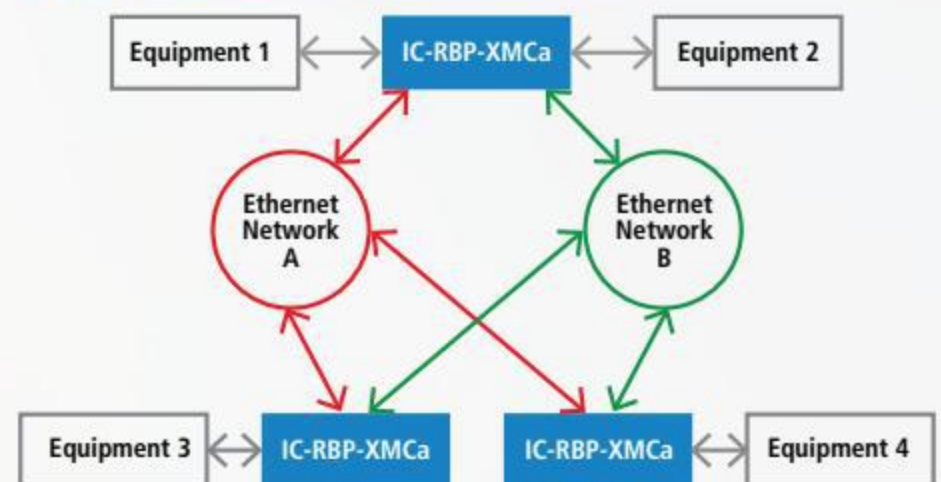
However, introducing communication robustness to embedded military systems means adding a constraint to this area already subject to quite a few, the main ones being to maintain even continuously improve performance, ensure interoperability and reduce costs.

THE SOLUTION

As a result, most integrators and users in the Defense, tend to upgrade their VME and VPX systems with a high-performance redundancy module. In this respect, Interface Concept has leveraged its knowledge in the defense systems and extensive experience in Ethernet technology, to provide the market with the IC-RBP-XMCa.

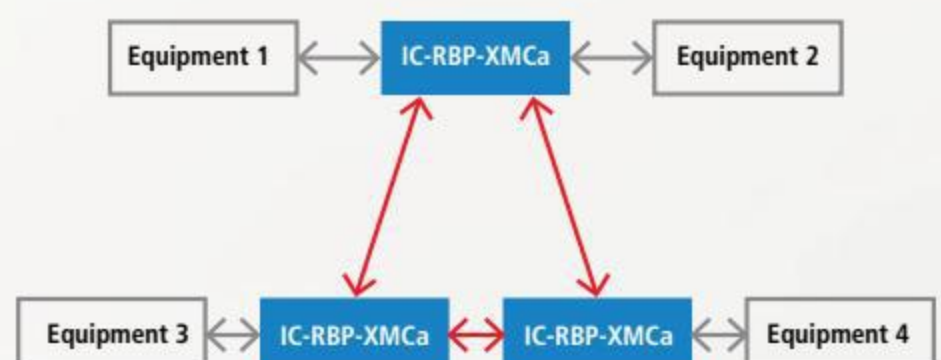
The IC-RBP-XMCa, an FPGA XMC (Switched Mezzanine Card) board offers an outstanding solution to the above requirements. The on-board FPGA makes the board versatile, supporting both PRP and HSR redundancy protocols, as a redbox :

PRP: Parallel Redundancy protocol network



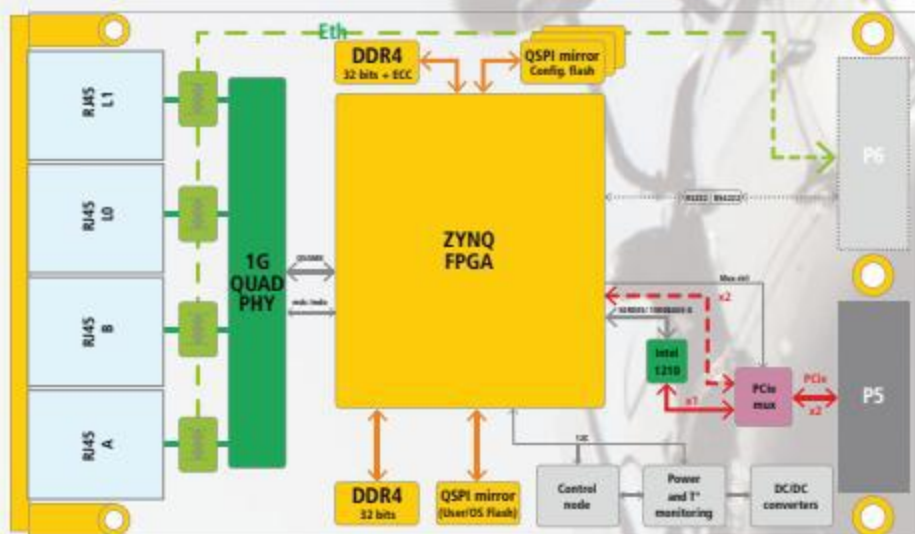
When operating in PRP mode, several IC-RBP-XMCa cards are attached to two separate networks via two distinct Ethernet interfaces. Each IC-RBP-XMCa card is also connected to a Single Attach Node (SAN) or equipment which receives/transmits normal (non-duplicated) traffic. When transmitting frames towards the network, the IC-RBP-XMCa card forwards the frames coming from the SAN on each network. When receiving frames from the redundant network, the IC-RBP-XMCa forwards the frames arriving first to the SAN and discards the duplicate frames. In case of a failure in one of the network links, the redundant network allows the remaining operating network to continue to seamlessly provide traffic to the attached equipment.

HSR: High-availability Seamless Redundancy



When operating in HSR mode, several IC-RBP-XMCA cards operate in a similar way but with a ring topology network. In this case, each IC-RBP-XMCA board stands at each node of the ring and is capable of duplicating traffic towards both directions of the ring when transmitting frames and discards duplicates when receiving frames.

WHY USING THE IC-RBP-XMCA ?



IC-RBP-XMCA block diagram - Active network redundancy XMC Switch Mezzanine Card

1/ The FPGA turns out to be very efficient in applications requiring low latency, which offers an outstanding solution to the redundant communication systems performance requirements.

2/ Besides, whether it be redundancy with PRP or HSR protocol, it is essential to be able to manage the redundant networks, and from a software standpoint, a monitoring application accessible via the IC-RBP-XMCA's Ethernet ports provides the user with network statistics and status and can be used to generate real-time events such as the loss of a network link.

In light of this, hybrid chips, like Xilinx Zynq® architectures, which integrate ARM processors as well as programmable logic in a single System-On-a-Chip (SoC), find all its meaning and allow to deal with both the required determinism by the function and to provide an answer to the microprocessor need with regard to the control.

The IC-RBP-XMCA supports an internal Ethernet switch for several SAN ports to allow easy systems connection to redundant networks.

The IC-RBP-XMCA has been developed to meet all redundant communication network requirements.

This mezzanine card, equipped with a Xilinx MPSoC, namely a Zynq® UltraScale+, may prove to be the ideal DAN for embedded communication systems:

- The FPGA allows it to be optimal in terms of performance and latency delay. It also allows the board to support independently PRP and HSR protocols on Giga Ethernet networks.
- The ARM processor integrated to the MPSoC, enables the user to access monitoring and control functions, while the board is being turned on.
- Its XMC mezzanine form-factor (VITA 42) makes the board a versatile DAN that can be integrated in any system type and on any carrier or Single Board Computer type.
- This board has been qualified to meet environment requirements in the embedded market, and is available for air-cooled systems and conduction-cooled systems.

In the light of the above characteristics, the IC-RBP-XMCA is definitively a high-performance, reliable, versatile and cost-effective solution.

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MILITARY & DEFENCE FOAM PACKAGING

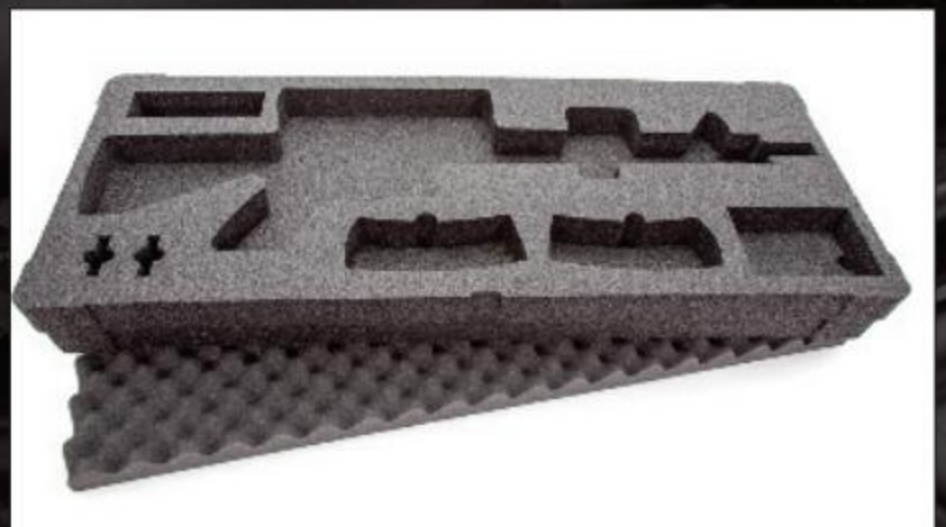
Thinking outside the box to meet defence requirements

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

- Tested and approved
- Light weight
- Energy absorbent
- 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

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CP Cases' anniversary year – new capabilities, new products, same high-performance protection.

We are over half way through the year and as 2021 marks the [big 50th milestone for CP Cases](#) – we also have a lot more we want to shout about regarding products, capabilities... the list goes on. We can't wait to showcase it all at **DSEI** in September - visit us at **stand number: H2-800**.

If you aren't already familiar with CP Cases and what we do. In short, we design and manufacture [protective equipment cases](#), [19" racks](#) and [rugged textiles](#) products for transport, operation and storage in a variety of different markets spaces. Customisation is our speciality and our innovation and technology are continually growing along with our customer base and the markets we operate in.

With 5 decades worth of expertise in the manufacturing industry, we are confident we have the perfect formula. The innovation, durability and high-performance materials guarantee that CP Cases is the case provider of choice for transport, operation and storage situations.

This year has given us the time to hone in our focus on continuing to build on our in-house manufacturing capabilities, recent investments in our [new plastic moulding plant](#) and very latest technology sheet-metal processing kit; we're delighted to continue to deliver on our best value for money and fast-track lead-time objectives.

The advantages of bringing our rotomoulding capabilities in-house stands by our increased focus on social values and sustainability. This is a growing emphasis in today's market for businesses to prioritise; especially within the Defence sector and we as a business have many plans in place for this important and greener shift in processes.

It has been a tough past 18 months and like every company, there has been a number of hurdles that we have had to overcome; but our passion, innovation and talented team of people has helped address these challenging times and transform them into positives. We are confident that we can continue this into our future thinking and keep on delivering inventive technology to fit to our customers' requirements.

Whatever item it is that you're looking to keep safe or transport securely, it's important to have a high-quality protective packaging solution you can rely on. CP Cases uses ruggedised and high-performance materials to manufacture custom cases, racks and bags that [meet exacting project specifications](#).
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Rugged Video Processing and Distribution from Vision4ce



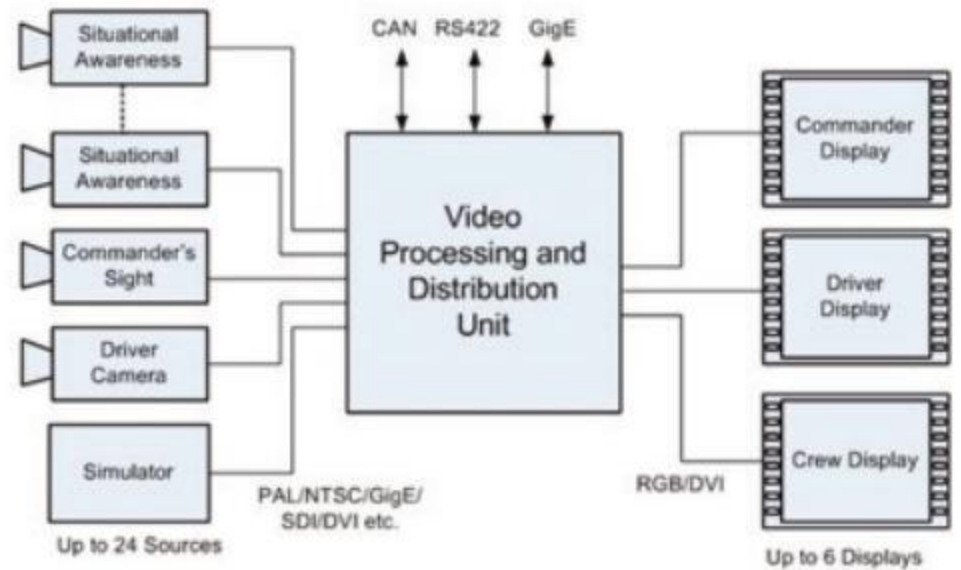
A range of computers, designed for harsh environments, optimised for image and video processing, including tracking and classification of objects using Artificial Intelligence algorithms.



The GRIP Video Processing and Distribution units (VPDU) from Vision4ce are rugged high performance computer platforms based on industrial PC hardware which is packaged in sealed enclosures for use in harsh environment applications.

The range includes high performance Intel Core i7 CPUs and can also include NVIDIA or AMD GPUs to support complex graphics requirements or high-performance computing applications using GPGPU processing.

The GRIP VPDU's incorporate unique video processing



hardware that facilitates processing and distribution of video in systems comprising multiple video sources which need to be processed and routed to multiple video displays.

For example, the VPDU can support Intel latest generation multi core i7 mobile processors, with an AMD GPU to drive up to 6 output displays. The VPDU 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.

Video Processing and Distribution Options

Image	Product	Size	Data Interfaces	Video Inputs	Video outputs	Processing	Features
	VPDU	287mm x 340mm x 101mm	4 x RS232/485 2 x GigE 1 x CAN 2 x USB2.0	24 diverse video Analog & digital RGB, PAL/NTSC, SDI (SMPTE 292) DVI-D, CamerLink, GigEV	6 diverse video RGB, DVI -D, DP	Intel CPU AMD GPU	Low latency output and distribution
	VPDU 10	293mm x 242mm x 89mm	1 x RS422 1 x RS232 4 x GigE 1 x CAN 4 x USB2.0	24 x HD -SDI (SMPTE 292)	4 x HD -SDI 1 x DVI-D 1 x PAL	Intel CPU NVIDIA GPU FPGA	Very low latency output and distribution
	VPDU 20	293mm x 230mm x 88mm	4 x RS422 5 x GigE 1 x USB2.0 1 x CAN	Any two from: 2 x PAL/NTSC 2 x YPbPr 4 x HD -SDI	4 x PAL/NTSC/ YPbPr 4 x HD -SDI 1 x DVI-D	Intel CPU NVIDIA TX2	Very low latency output and distribution
	VPDU 30	191mm x 172mm x 58mm	2 x Ethernet	2 x USB3.0	2 x DVI	DUAL NVIDIA TX2	Includes 4 port Ethernet switch
	VPDU 90 (Embedded Video Processor)	125mm x 98mm x 71mm	2 x RS232/422/485 4 x GigE 4 x USB3.0 4 x USB2.0	2 x HD -SDI (SMPTE 292)	1 x HD-SDI 1 x VGA 1 x DVI-D	Intel CPU	Very low latency output and distribution
	VPDU 100 (Embedded Video Processor)	100mm x 100mm x 20mm	3 x RS422 1 x GigE 1 x CAN 1 x USB2.0	Any two from: 2 x PAL/NTSC 2 x YPbPr 4 x SD/HD/3G -SDI	4 x PAL/NTSC/ YPbPr 4 x HD -SDI 1 x HDMI	NVIDIA TX2	Very low latency output and distribution

Software Options

GRIP VPDU's can be supplied with a range of Vision4ce software solutions.

FrameWorkx

Customers can purchase FrameWorkx which allows them to easily build their own image processing system, with a collection of video sources and sinks which can be combined with any number of image processing blocks to create a custom pipeline to meet the specific needs of their application.

The proposed framework provides video capture and display functionality and also includes an API definition for the implementation of alternative image enhancement algorithms. The API allows the customer to develop their own C++ processing libraries and then use the framework to input video frames and output video and symbology to the selected video output.

DART Software

The VPDU has the option of the DART software, an image processing software library for Intel or ARM processor platforms under a Windows or Linux operating system. A video tracker analyses video image sequences from a sensor system (one or more cameras), mounted on a servo-controlled pedestal (platform) to keep the camera pointing at the nominated person or object. In this context, a Tracker has two primary processing functions:

- Detecting and locating objects of interest in the video image (object location)
- Controlling the platform (Pan and Tilt) position and rate such that the camera follows the designated object (Pan and Tilt Control).

AI Classification

Vision4ce's Deep Neural Network based classification application runs on GPUs powered by NVIDIA's Tensor core architecture. It can benefit all manned and unmanned systems that require real-time multi-target object detection and classification technology.

With our dedicated in-house deep learning team, Vision4ce can assist with the entire deep learning process: Data collection, analysis, architecture selection, customisation, training and debugging, optimisation and runtime accelerators.

Video Management Software

The Video Management software (VMS) is a comprehensive tool enabling the complete system control of electro-optical (EO) systems. The application is comprised of a number of standard software modules that can be custom configured to meet the end user requirements. This modular approach enables the rapid and cost-effective deployment of sophisticated video management solutions with customers only needing to purchase those modules required for their custom application. The VMS includes bespoke operator interfaces.

A range of libraries based on the Vision4ce GRIP VMS software are available including:

- BIT
- Low latency video capture and display
- Video detection and tracking
- Video compression, streaming and recording
- Image fusion
- Ballistic computation
- Panoramic image formation

Customisation

The Vision4ce VPDU range is designed to simplify customisation of the hardware and software to satisfy user specific performance, electrical and mechanical requirements.

For more information about the Video Processing Display Unit please feel free to call us on:

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SWaP-Optimised Connector Solutions for Military Aerospace Applications

In military aerospace applications, engineers are constantly challenged to do more in a smaller package, including circuits for critical systems and external payloads.

The main driving force for new interconnects lies in SWaP connectors that support compact, rugged, and lightweight circuit designs while supporting a mixed variety of signal and power levels. But what is SWaP, and why is it important?

What is SWaP?

The acronym SWaP stands for Size, Weight, and Power and was originally an initiative employed by the US military and NASA. SWaP has helped connector manufacturers maintain a focus on developing connectors that are both smaller and lighter. Some may incorrectly assume that any Mil-Spec connector would be suitable. Still, traditional Mil-Spec connectors (i.e., MIL-DTL-38999 connectors) contribute to the weight burden of designs because they are relatively large, heavy, and not suited for applications such as embedded high-speed systems.

Benefits of SWaP-Optimised Connectors

Electronics engineers, in general, are pushing for smaller, lighter interconnects for a variety of reasons, including the need to meet tight space constraints. SWaP connectors allow engineers to shrink the existing footprint without decreasing functionality and to simplify board layouts. SWaP connectors also contribute to increased quality assurance and reduced costs. These connectors make it possible to create shorter, more direct interconnections that allow for faster signals and response times. And because they are small connectors, vibration is reduced, leading to greater stability.

SWaP Connectors and Military Aerospace Applications

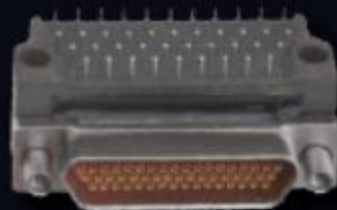
Soldier-worn equipment and UAVs (Unmanned Aerial Vehicles) have both significantly advanced over the last few decades, including reduced processor and memory sizes. Soldiers are now carrying computer processing power on their bodies that once would have filled a room. These advancements require less voltage and current, resulting in smaller wires, and therefore smaller connectors. Utilising connectors with both power and signal/data contacts reduces the number of cables and connectors that go into the electronic module. Size, weight, and power density remain critical, as well as the ability to transmit power, data, and signals. Lighter SWaP connectors can decrease the weight burden for soldiers carrying equipment on their bodies, allowing for greater mobility and endurance. Keep in mind that devices such as batteries, GPS, tablets, weapon optics, and night vision add up to around 20 pounds for a soldier to carry. Weight can





also be particularly essential when designing UAVs because they must support additional payloads that can include cameras (e.g., visual and thermal) and LiDAR (Light Detection and Ranging) in addition to integral power, guidance, and control systems. Both soldier-worn equipment and UAVs are also subject to vibration, impact, and shock loadings that can dislodge a poorly specified connector.

Cinch Dura-Con Micro-D M83513 Connectors



The Cinch Dura-Con Micro-D M83513 connector series is an excellent SWaP connector solution for UAVs. These Mil-Spec Micro-D connectors are rugged, robust, and reliable. Their reliability is achieved using a wire form pin with twist pin technology that provides seven points of contact when mated. They also offer high-performance levels and can inter-operate/inter-mate with other connectors installed in a UAV.

Additionally, all rectangular microminiature D-Sub connectors with solder or non-removable crimp contacts used in military applications UAVs (drones) must comply with the MIL-DTL-83513 specification. This specification is provided by the USA's Defense Logistics Agency (DLA), which covers connectors that are suitable due to their weight and size.

These lightweight Cinch microminiature D-Sub interconnects are designed to MIL-DTL-83513 standards for reliability and meet MIL-

STD-1344 requirements. They have a current rating of 3A and a wide operating temperature range of -55°C and 125°C. Cinch Dura-Con Micro-D M83513 connectors can also withstand shock loadings of 50 Gs (per MIL-STD-1344, Method 2004, Condition E) and 20 Gs of vibration (20 G's per MIL-STD-1344, Method 2005, Condition IV), making them ideal for the rugged conditions faced by UAVs.

PEI-Genesis: SWaP-Optimised Solutions for Your Designs

Whether they are being used for soldier-worn GPS systems, the guidance system on a UAV, or external LiDAR, SWaP-optimised connectors provide many features beneficial for various military applications. For aerospace designs in need of rugged, reliable, SWaP optimised connectors, let the experts at PEI-Genesis help. Our team of connector experts and engineers can aid you in specifying the suitable space and weight-sensitive Mil-Spec interconnect solution for your application.

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MILITARY DIVING: OPERATIONAL CHALLENGES AND THEIR INFLUENCE ON TECHNOLOGY

INTRODUCTION

We are living in the Information Age where we are driven by the latest technological developments and diving, like all pursuits, has seen significant advancements in the available equipment and utilisation of information. Technology has enabled technical divers to push the barriers of rebreather diving, and the military sphere is now on the brink of a similar capability leap as they begin to adopt these new developments. The focus of militaries has been on terrestrial warfare, the current geo-political landscape has dictated this effort, but we are entering a moment where the maritime sphere is receiving progressive attention. We have seen extraordinary progress in diver propulsion devices (DPD) developments, and alongside the introduction of innovative electronics in rebreathers, divers have the capability to run extended duration and deeper dives without compromising on personal safety. The outcome of bringing maritime capability in line with terrestrial is that we are now in a position where the human body is being outperformed by the available equipment. The question is how technology can advance to enable the human body to perform as well as the machine. Our experience has identified the **five** immediate challenges holding back the evolution of diving.

THERMAL STRESS

Thermal problems in diving are often associated with cooling, and the risk of hypothermia due to water typically being colder than the human body. Secondly, water requires more energy to heat than air and with the effects of movement and conduction, the body will cool quicker in water than in air (Ornhagen, 2004). This process is the same even in warmer water, where the diver will eventually cool as the core temperature reduces, just over a longer duration. This is not to say that over-heating (hyperthermia) is also not an issue. In a dry suit the cooling effect of evaporation is void and when diving in warm waters it is possible for divers to over-heat, with this issue only counteracted by some form of cooling.

Compounding the natural effects of water on the human body, military divers constantly have to compromise between wearing the appropriate passive protection for the water temperature and what is operationally suitable, for example combat swimmers operating in cold water environments may choose to wear less passive protection in order to allow a very high intensity work rate (which will keep them warm for a period), whilst allowing flexibility both on the dive and on target. However, any delays or issues sub surface will leave them highly vulnerable to rapid heat loss and thermal stress, which will undoubtedly affect their operational performance.

There are many solutions available on the market to heat and/or cool the body and lessons have been learnt to develop these into safety critical pieces of equipment. Early active heating suits operated by simple on/off switches led to major fluctuations in operator body temperatures and the onset of decompression illness to varying degrees. Industry developments have since accounted for this issue and evolved the concept of heating a body underwater (and maintaining a diver's core temperature) using temperature controlling elements. By doing so the diver always operates within an optimal thermal envelop.

OXYGEN TOXICITY MANAGEMENT

To date combat diving has been conducted on pure oxygen rebreathers, and in recent years with DPD's to support shallow water transit. Divers on pure oxygen can carry much smaller amounts of gas when operating on closed-circuit systems (Wilmshurst, 1998). However, pure oxygen dives are limited by depth and time because at higher partial pressures oxygen causes acute toxicity leading to convulsions and other symptoms (Ran, Tzipora & Yochai, 2006), which underwater are typically fatal due to drowning (Wilmshurst, 1998). The MCM100 overcomes this by operating on mixed gases, customisable depending on the dive plan, and maintaining a fixed partial pressure of oxygen (PPO2 Setpoint)

throughout the dive profile. The setpoint can be controlled to minimise the risk of oxygen toxicity over a wide depth range.

OXYGEN DURATION

Dives are also limited by the volume of breathable gas carried. With the implementation of propulsion equipment e.g. Jetboots/DPDs etc., which have enabled divers to transit further with minimal exertion and remain subsurface for longer durations, the efficiency of the breathing equipment becomes essential to further extend the duration of a dive.

Traditional front mounted mechanical O2 rebreathers may not be the most appropriate apparatus in this new extended discipline given the diver is typically limited to only a couple of short deep excursions to depth as they risk the onset of central nervous system oxygen toxicity (convulsions due to high PPO2) and over long exposure to lower PPO2's, pulmonary toxicity. Semi-Closed Circuit Rebreathers (SCRs), with additional extended range gas supplies, have historically been an alternative however, the constant flow addition of oxygen is wasteful, and a less covert way of maintaining PPO2 due to the regular expulsion of gas from the loop. The technology in today's Electronic Closed-Circuit Rebreathers (ECCRs) makes them the ideal solution for long endurance, multi-level diving. By removing the issues associated with pure oxygen and SCR

systems, through a combination of smart sensing that ensures a constant maximum PPO2 throughout the dive (at all depths) and by diluting the oxygen concentration therefore extending the available exposure time, the total mission time can be extended.

CO2 ABSORBENT DURATION

Real time oxygen setpoint and toxicity tracking is well established in modern rebreathers; however, carbon dioxide is largely ignored and is a hidden danger which can not only incapacitate the diver but also exacerbate central nervous system oxygen toxicity. CO2 can rise quickly in the breathing loop for several reasons including:

- Empty cartridge
- Poorly packed cartridge leading to CO2 channelling,
- Damaged sealing system
- Exhausted Absorbent,
- Out of date absorbent,
- Flooded absorbent,
- High intensity work and the associated high ventilation rates resulting in too much CO2 produced to be effectively removed by the absorbent.

When tested and certified in accordance with the CE EN14143 standard, commercially available rebreathers all achieve differing CO2 absorbent cartridge (scrubber) durations due to factors such as cartridge design, absorbent capacity and type of absorbent. In recent years some manufacturers have incorporated CO2 tracking solutions to estimate remaining



absorbent life and to improve diver safety however, this typically is based on a rudimentary method of tracking the thermal reaction front (a by-product between CO2 and the absorbent material) through a cartridge. In addition, some units deploy simple gaseous CO2 sensors based on non-dispersive infra-red sensing technology which are prone to inaccuracy as a result of humidity.

Without an accurate way to monitor CO2 and the subsequent scrubber endurance military divers, often alone or in pairs, working at moderate intensity for long periods, can only rely in their own preparation of the CO2 scrubber cartridge and 'worst case' data available from the manufacturer. Any issues with preparation can lead to serious problems sub surface. Problematically, the physical signs and symptoms of elevated CO2 in the loop can drastically affect a diver's ability to identify and rectify the issue. With the advent of accurate CO2 sensors and high pressure (HP) gas sensor and monitoring algorithms, new methods of tracking CO2 and scrubber endurance are

available. One example is that real time scrubber endurance can be monitored by calculating theoretical CO2 production based on oxygen usage, the CO2 value can be deducted from the tested scrubber canister absorbent capacity to give the diver an indication of mission time remaining. Digital CO2 sensors also warn the diver if any of the previously listed issues occur, removing the serious risk that elevated CO2 presents to the diver and therefore operations.

NUTRITION

Current operational methods for diver nutrition on long endurance missions is through the consumption of liquidised food via a port within the full-face mask. There have been limited developments in improving this method. However, for most dive operations nutrition is not an issue. Short to medium length dives will not require the diver to eat, and in the case of long endurance dives, food may also not be a consideration. However, it is only until dive plans attempt to push the equipment to its maximum whilst also requiring the diver to maintain full operational effectiveness, that the issue of nutrition becomes prominent. With advancements in underwater vehicles divers could realistically be underwater for in excess of 8 hours, at which point their physiological and mental effectiveness is inhibited by a lack of nutrition.

Avon Protection keeps these challenges at the forefront of our developments ensuring we always consider how can we improve the safety and comfort of the diver and therefore how can we extend their operational capability.

References:

Ornhagen, H. (2004). *Thermal Problems in Diving*. Lecture in Tokyo.

Ran, A., Tzipora, S., Yochai, A. (2006). *CNS Toxicity in Closed-Circuit Oxygen Diving: Symptoms Reported from 2527 Dives*. *Aviation, Space, and Environmental Medicine*. 77 (5), pg.526-532.

Wilmshurst, P. (1998). *ABC of oxygen: Diving and oxygen*. *British Medical Journal*. 317 (1), pg.996-999.



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*Mark Donaghy, VP Sales & Marketing
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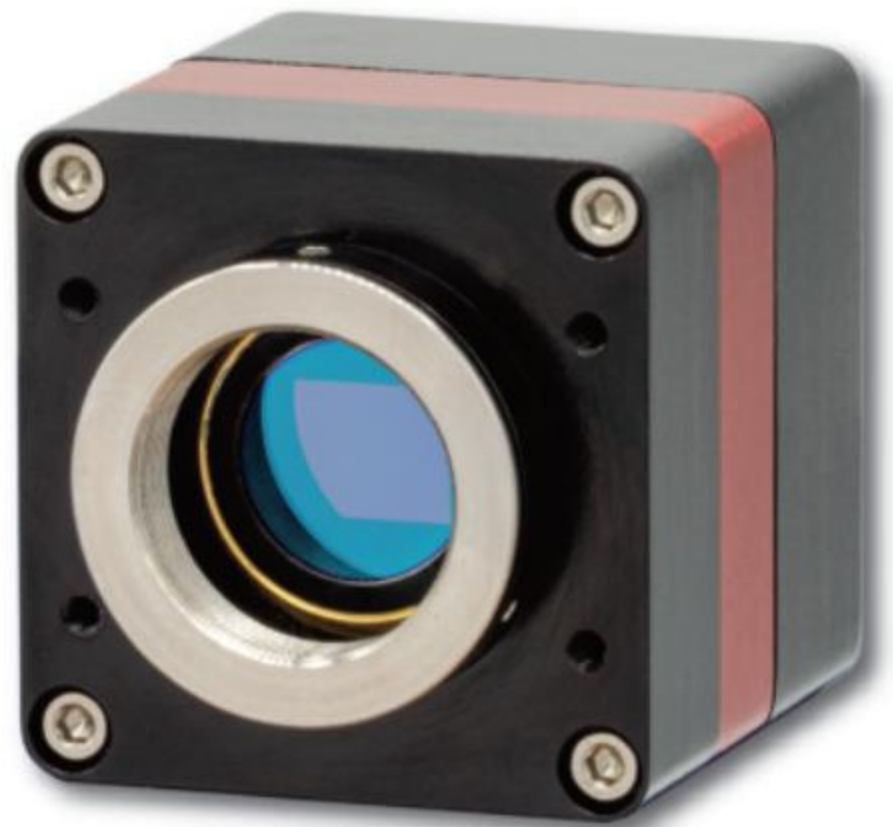
Raptor Photonics is a UK-based specialist camera company, developing ruggedized, SWaP enabled camera cores and systems for the surveillance and defence markets.

Our customers are primes, government organisations (Government Labs other NATO customers) and systems integrators.

Seeing in low light is desirable over a broad spectrum of environmental conditions. Raptor cameras are compact and rugged, operating in harsh climates. This is essential for customers who quite often put the cameras into “mission critical” applications, which run 24/7. Raptor now has cameras and systems being used underwater, on land, in the air and even in space—where Raptor cameras are used in low-orbit cube satellites for earth observation and 5G telecommunication networks.

SWIR Camera technology

Raptor's camera technology enables users to see subject matter in very low levels of light. Since its inception, Raptor has been a leading player in the design and development of SWIR cameras using InGaAs sensors. Many applications that are difficult to perform using visible light are made possible with SWIR imaging, enabling the user to “see beyond the visible.” Unlike mid-wave infrared (MWIR) and longwave infrared (LWIR) light, which is emitted from the object itself, SWIR is similar to visible light in that photons are reflected or absorbed by an object. The reflective nature of SWIR light provides the strong contrast needed for higher-resolution imaging. Ambient starlight and background radiance (nightglow) are natural emitters of



Owl 1280 Vis-SWIR camera

SWIR and provide excellent illumination for low-light or night-time imaging, including imaging through fog, haze and water vapors.

The cameras are capable of imaging from 600 nm to 1700 nm. Raptor's family of InGaAs focal plane arrays offer different resolutions and pixel pitches along with cooling, readout and interface alternatives, providing a range of options for customers requiring visible and SWIR imaging. Low-noise electronics and readout integrated circuit (ROIC) design ensuring high quality images. Furthermore, Raptor is certified to the ISO 9001:2015 standard.



SWIR Monocular / Pocketscope

SWIR Monocular / Pocketscope

Raptor has developed a handheld ultra-compact multi-functional tactical SWIR monocular which operates in zero light conditions, greatly enhancing vision at night or in dust, fog, smoke conditions as well as full day time operation. It offers countermeasure capability in that it detects all FoF (Friend or Foe) LTD (Laser Target Designator) wavelengths. It is ideal for special operations personnel, offering a compact, lightweight, rugged, and reliable solution.

It can be handheld or weapon mounted, allowing for both passive day and night vision and See Spot Detection (Laser Target designation) for any battlefield laser, from 600nm to 1700nm. The full system is rugged, small and ideal for field application. The system comes with an integrated 1550nm laser illuminator (not detectable by GEN II or III monocular or NVG) for discrete covert night vision application. It is light weight, pocket-sized developed to provide precise and accurate target acquisition during day and night operations.

It is available with different SWIR optimised lenses, 14mm and 50mm

Next generation CMOS technology

Raptor has recently launched a family of next generation CMOS based digital cameras offering superb night vision capability. There are two options offering SVGA and HD resolution, both are mono, global shutter compact camera core in low light

Hawk 800 CMOS Camera



performance. The camera is SWaP optimised and designed to Mil Spec (-40°C to +75°C) standards. It is perfect for integrating into gimbals and turrets and there are many custom options for OEMs including electronics, mechanics, extended operational temperature as well as digital video outputs.

OEM Capabilities

Raptor is working with many major OEMs and instrumentation companies globally across a wide range of applications, who need custom designs to meet their exact imaging and detection requirements. We work collaboratively to understand their camera needs and develop robust solutions through a detailed project management system. We design and develop core camera platforms which can then be customised / tailored to address specific requirements. Our quality, reliability, flexibility, and fast delivery make us a very attractive solution for OEMs.

For further information on any of these products or our camera capabilities please visit our website

www.raptorphotonics.com or contact us on sales@raptorphotonics.com



How Display Technology is being used in military applications for Night Vision Imaging



In combat and use in other sectors like policing and civilian security, we've seen an explosion in demand for high performance Night Vision Imaging System (NVIS).



These handy display systems allow for enhanced visibility at night by emitting a small section of dim light that is easier to see at night.

Night Vision Imaging System displays make up part of Display Technology's vast catalogue of military standard displays and embedded systems.

The effectiveness of NVIS imagery is dependent on the quality of display used in the system, as poor displays can make it difficult to make out figures and images. That's where Display Technology's Taiwanese partner Litemax comes in, offering displays specifically designed for use in Night Vision Imaging.

Litemax's displays come equipped with a specialist NVIS cap filter on the LED backlight. This allows for easily configurable use between day mode (with 50% brightness off) and enhanced night mode. Litemax calls this feature 'dual-mode backlighting' – allowing for easy day and night mode use.

These displays for Night Vision Systems allow for covert and effective operation of display equipment at night. Military system designers use these displays for mobile radar stations or military vehicle operation. Standard displays can be too bright for use at night, negatively impacting covert operations. However, having displays that are designed exclusively for night use can make equipment unusable during the day.

The Litemax display's ability to switch from normal brightness in day mode to night mode using NVIS adds a lucrative level of versatility perfect for covert military deployment.

Other features of Litemax's stellar NVIS display is a wide operating temperature of 30°C - 70°C and its low power consumption. This makes the display perfect for prolonged outdoor use and can be powered by portable batteries for in-the-field use.

Who is Litemax?

Our partner providing these excellent displays for our military portfolio is Litemax. Founded in 2000, Litemax Electronics are a

display manufacturer from Taiwan, renowned for their high-quality industry leading display technology.

First positioning themselves as a reputable supplier of sunlight readable industrial displays, Litemax has now established themselves as a trusted name for all of your display needs.

Alongside military-use displays like the NVIS systems, Litemax offers fantastic options for digital signage as well as excellent products for use in transportation and rail. These displays are specially designed to be ultra-efficient, be incredibly reliable and also adhere to all relevant standards for your market sector.

Why Display Technology?

Here at Display Technology, we have an in-depth knowledge of the displays we offer and can guide system integrators through the process of selecting the right products for their desired application.

For military applications, true compatibility and faultless reliability is essential. That's why military system integrations benefit from detailed advice on which displays fit the bill and hold the necessary safety regulations for combat use. We can help you pair displays with embedded systems and ensure the right power supply is selected for safety and EMC.

Get in touch with us today and explore how modern display technology can revolutionise your application.

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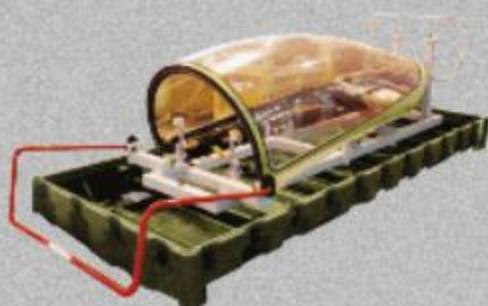
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MORE AND MORE APPLICATIONS IN VIEW

Nedinsco has been a purveyor of high-end, reliable vision systems to defense organizations for over a century.

Nedinsco specializes in the development and manufacture of opto-mechatronic systems. Based in Venlo, the Netherlands, the company has been supplying high-end products such as camera systems, day and night vision solutions, 360-degree cameras, sensor platforms and periscopes for over 100 years. This is achieved through its robust R&D department and world-class manufacturing, assembly and cleanroom facilities. Nedinsco's various divisions - optics, mechanics, electronics, software - operate in-house, in accordance with any relevant certifications, such as AS 9100.

DEFENSE MARKET

Nedinsco develops and manufactures a wide range of premium products for the defense market. The product range is ideally suited to land, air and naval systems. Governments, defense ministries and OEMs in the top segment of the defense market regard Nedinsco as a reliable knowledge partner and optical systems developer. The most rigorous quality standards are applied to the company's high-end cameras, day and



night vision solutions, sensor platforms, periscopes for submarines, boresights and training systems. These systems are designed to meet customers' most stringent demands both today and into the future. Nedinsco's unparalleled strengths lie in the fact that its products range from unique concepts and prototypes through to serial production and Integrated Logistics Support (ILS). Nedinsco supplies an impressive range of solutions, including both serial manufacture and specifically tailored products.

"RUGGEDIZED"

Nedinsco's reliable solutions provide top visibility under harsh conditions, from rain, salty fog and sandstorm to extreme temperatures and vibrations. This is the result of a special process called "ruggedizing", or designing and building robust, "ruggedized" systems. Thanks to the combination of the right optics, mechanics, electronics and software in the design of Nedinsco products, the systems function without fail for years on end even under the most extreme conditions. Nedinsco's customers depend



heavily on the vision systems and must be able to trust them to work unfailingly.

UNIQUE COMBINATION

For example, Nedinsco is developing all kinds of systems that combine ever-higher zoom and vision factors into the perfect vision solution — in a robust housing and with the electronics and software to ensure the system never fails. 'This combination is unique in the world and we want to develop it to its fullest extent. We build complete systems, including periscopes for submarines, as well as 360-degree systems such as those used for street view. Other applications include camera detection for pipelines, bird detection at airports, meteorology and applications for the offshore industry. We are also working on new systems for looking into the ground or detecting roadside bombs, as well as vision solutions for looking into aircraft engines for preventive maintenance. With our camera solutions, the aircraft engines can be checked for dust, oil residues, rust or other issues.

ORIGINAL MODULE MANUFACTURER

In order to properly serve these diverse application areas, Nedinsco is striving for a position as Original Module Manufacturer. Electronics and software are becoming increasingly important for the further development of these kinds of systems. In addition, intelligence is required to translate images into information, to recognize vehicles and other objects, and to fuse images (from day and night vision, for example). "That's where our future lies," says Jos Klippert, Commercial Director at Nedinsco. "This is why we invest in knowledge development in these areas. In combination with our state-of-the-art mechanical hardware, we can then design and build turnkey, fully tested systems. We deliver our complex products with input from our own technology, having built up IP for this over the years."

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Defence

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ACTIVATED CARBON INNOVATION

ACTIVATED CARBON CLOTH FOR THE DEFENCE SECTOR

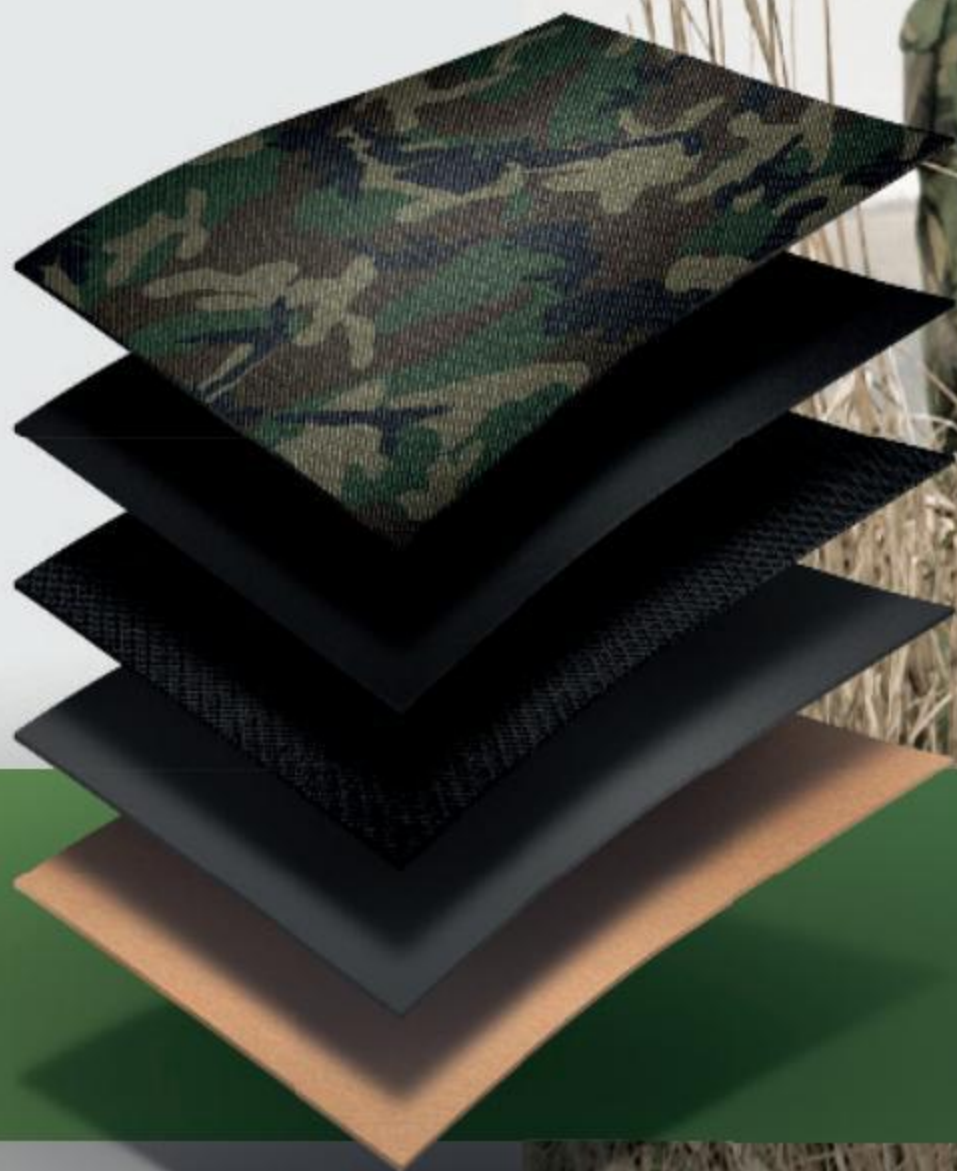
Flexzorb™ - The flexible, lightweight protective textile that is widely used by many of the world's leading defence vendors, making us the leading provider of activated carbon cloth for defence applications.

Lightweight and breathable, Flexzorb is used in a range of defence applications, including:

- CBRN Respirator filtration media
- CBRN Personal protective equipment (PPE)
- CBRN decontamination wipes
- Missile decoy media
- Phosphine gas adsorption media

WHEN FAILURE ISN'T AN OPTION

Chemviron, the European Operation of Calgon Carbon Corporation, has a long history of protecting and defending troops with our activated carbon products, and we remain committed to providing adsorbents to combat chemical warfare agents. In an environment where there is no room for failure, why wouldn't you rely on products that have been used and trusted for over half a century?





PLANNING AHEAD



**LUTRA
ASSOCIATES**

Lutra Associates Limited is an SME consulting company. From the start it set out to use the associates knowledge and experience to solve the problems whether routine, quirky or unusual which are faced by companies in the defence and security domains.

The associates pride themselves on reducing their overheads whilst delivering simple, easily explained and pragmatic solutions to their clients quickly and with the minimum of fuss.

The associates form a loose conglomerate which takes advantage of the experience and knowledge of the members most of whom are known to each other. Many served in the UK armed forces together or worked together in industry. All have a reputation for

originality and providing effective solutions to problems. The majority of the associates are UK based but frequently with overseas experience and there are some based overseas with whom the UK members have worked during their careers.

Work areas cover but which Lutra is not limited to include: Business Improvement, Market Access in UK and overseas, Market Investigation, Assistance with Tenders, Problem Resolution, overseas Partner Location, Development of Operational Doctrine and Procedures, Due Diligence and Competitor and Market Intelligence and Analysis. These activities are carried out generally and in a number of specialist areas such as CBRN and all its Taxonomies, C-EO(EOD), Vehicle Design and Training to name a few of many. Lutra boasts it covers the A-Z of Defence and Security and if it does not it knows someone who does. (The Z is Zoonotic Diseases which is quite topical!)

As the Exhibition season hits full swing many SME defence companies are anxiously glancing at the order book and wondering what the coming year will bring. If they are lucky they will have an



order backlog, those that are slightly less lucky will be looking towards “banker” projects or customers who buy their products on a routine basis. Others less lucky will be worrying about where work will come from. This is especially so for the small scale manufacturers or those manufacturing niche products.

The traditional consulting company will be looking to refresh existing contacts and contracts and scanning the horizon for other prospects. Sometimes those contracts come to the company unbidden and these frequently turn out to be the most fruitful for both parties. However they come and whatever they are for and whether they come fortuitously or by design a consulting company must be helping a client to secure it future all the times. Everything a consulting company does for a client must seek to maximise the client’s performance whether the relationship involves business improvement, studies, market access or product and service delivery.

To do this effectively there are rafts of information to seek out, gathered, ordered, analysed to allow options to be considered and a plan formulated that means something to all levels in the company and that people in the company can buy into it. This latter point is crucial for if there is neither acceptance nor ownership the plan and the relationship is doomed to failure and the companies investment at best nugatory.

Lutra seeks to concentrate on getting relationships right. As a company we aim to do this with both the client and the people they interact with. It is only in this way that you understand where people are coming from in the difficult worlds of security and defence. What might be as plain as a pikestaff to a commercial design or manufacturing specialist does not deal with the foibles of government procurement such as: DEF STANS, export licencing, Cyber Essentials etc., although the new UK procurement regulations may help provide more simplicity and clarity.

This “getting the people right” leads to a very important nuance about how we operate. Yes Lutra is on social media and yes e mails fly in formation through the ether. But the fact it that even though social media can measure hits and communications it can’t measure whether the message has been absorbed. Short of a face to face discussion the telephone is the best for this and preferably a video call. Many people forget that people run things and even control artificial intelligence. Spread sheets tend not to be able to run things. The best CEOs and boards know what is working, what is or is not profitable and why the company is taking certain actions or not. Time spent on spreadsheets is time not talking to people.

Equally most people are taught to read using a book and thus an article on paper is better than one in the ether. If this was not the case why do people print web pages, articles and blogs? Of course there is no rigid formula about the methodology, just as there is no rigid formula about how many days are required in the office, it’s a blend using one methodology to prompt another etc. but there is a real and enduring role for meetings with clients, which don’t have to be in offices, exhibitions and other face to face events and for paper articles and advertising in magazines and newspapers.



This might seem old fashioned but it works and is effective. This is a crucial point. Lutra like to claim that it offers pragmatic advice. The ultimate tests of pragmatism are simplicity and effectiveness. The solution must work and it must be understandable. To achieve this it is important to bound what you are doing or set out to do. That is not to say ignore what is going on around the problem.

Nothing works in isolation, but concentrate on fixing what is within reach. If there is something else that you can not see or is outside your bounds which is impacting what you are doing bring in another team. Work with them so the two solutions are not isolated but solving the second issue is their problem. If there is a need to co-ordinate the two that is a job for the company’s leaders.

The role of the companies, both clients’ and consultant’s leaders is crucial. They have the experience and must be free in the loan of and application of it. They have to be open with each other and wise with their teams. Wisdom is what consultants are supposed to dispense but more frequently it’s the application of common sense and often seeing things that the people who are doing the daily work just don’t have the time to see. The crucial point is the Chief Executive owns the result and must take it to his people.

Returning to the role of the consultant making certain that the client’s interests are central at all times and securing their future is the key element and is probably the thing that will win a consultant the most business since word of mouth is the best advertising. The moral of the tale, do your job and the jobs will find you.

www.lutra-associates.com





RunFlat International invests in increasing production capacity.

RunFlat International has reaffirmed its long-term industrial strategy with a £1m investment in new casting facilities.

This follows the commissioning of multiple CNC machines, the upgrade of our chemical plant and the opening of our new tyre fitting centre over the past few years.

This is the largest single investment the company has made for 20 years, demonstrating our determination to provide our customers with the latest polymer technology within short leadtimes. All our RunFlats are manufactured in the UK from raw chemicals. Our proprietary material is developed and processed specifically for RunFlat system applications, resulting in optimal ballistic resistance and run-flat performance.

Eric Cartelet, Managing Director, stated the following *"Over the past year we have been at full capacity so this investment will significantly boost our output and enable us to expand the quantity and size of the RunFlats we can offer."*

RunFlat International Company Overview

RunFlat International is the leading independent RunFlat systems supplier in the defence and security sector, having built a reputation on quality, performance and customer care.

We offer a complete range of wheel and RunFlat systems to suit all vehicle applications. When fitted, up to 100km can be achieved with deflated tyres following ballistic or terrain related damage.

We are exhibiting at DSEI (stand H4-700).

RunFlat International Ltd | Gawne Lane | Cradley Heath | West Midlands | B64 5QY | United Kingdom

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See us at DSEI 2021
Stand H4-700

4 Segment RunFlat - 24.00R21 Tyre / 18" x 21" Wheel

Here is the RunFlat for one of the largest complete wheels we have ever produced at RunFlat International. This wheel is complete with bespoke CTIS, piping and inflated ready to install onto the vehicle.

RunFlat International can provide bespoke complete wheel solutions, including supplying the wheel and tyre to suit customer needs.



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

Peli-Hardigg

presents its 65 years of experience
in Customised Engineered Cases at
DSEI 2021

PELI Products, the World's largest manufacturer of Military and Aerospace approved reusable tough plastic containers, presents PELI-Hardigg, its high-end division of Engineered Case Solutions at **DSEI 2021 (Stand H2-674)**. PELI's Advance Case Solutions division brings more than 65 years of experience working with the Top Aerospace and Military organisations on a non-disclosure basis throughout the World, having successfully customised Cases for the most diverse type of equipment.

The complete success of any mission critical operation with Peli-hardigg Advanced Case Solutions –

Peli-Hardigg roto moulded cases can be customised according to each customer's needs while offering the best protection possible to any type of equipment, even the most fragile one.

Peli-Hardigg offers every customer the optimised global resources of a renowned injection and roto-moulded case leader's customised service and manufacturing capabilities. The resulting ability to respond with speed and agility benefits every Advanced

Case Solutions customer, whether requiring one unique case solution or a thousand delivered worldwide.

Peli-Hardigg has been able to build a robust line of more than 500 sizes of cases that proudly live up to the harsh demands of the military, aerospace and other industries. They have been tested in the field as well as in combat situations. They are used to



protect and transport aircraft pieces and engines, military diving scooters, all types of drones/UAV, weapons and missiles, satellites, robots, electronic equipment, among others. No matter the size and characteristics, Peli-Hardigg offers a solution to any company's need of safe transportation under any type of mission critical operation where extreme protection is a must.

Watch Peli-Hardigg expertise video:

<https://www.youtube.com/watch?v=V86kIPyKNTQ>

Peli-Hardigg™ Light Lift™ Series Rotationally Moulded Cases – Same Protection with 30% less Weight

The advanced material used to build Peli-Hardigg Light Lift series cases makes them up to 30% lighter than traditional rotationally moulded cases, which means considerable logistics savings with less manpower and resources required. This brings a substantial benefit for the Health and Safety of professionals working in the field.

The new Light Lift case family is geared toward two or four man

carry applications with a maximum 136 kg. gross payload (total of case and content weight).

Peli-Hardigg Light Lift Series cases still offer the same protection and pass the same rigorous MIL-SPEC testing as traditional Peli-Hardigg rotationally moulded cases.

The cases feature popular catch & strike hardware to tightly secure the lid and recessed handles to prevent shearing or snagging from outside forces. Additional available configurable hardware options include plastic or metal handles, airtight construction using PRV valves, edge casters, locking hardware and humidity indicators.

For more information visit

<https://www.peli.com/eu/en/professional/single-lid-cases/light-lift-cases/>



Increase Military Software Innovation and Longevity through Reuse

Software is a critical element in almost any military application and can be a differentiator that provides strategic and tactical advantages on the battlefield.

However, it also has to meet set challenges – it has to be long-lived, reliable, and easily maintainable to match the longevity of the military platform on which it is deployed. That means it has to account for both innovation and longevity from the start, and be able to work consistently and effectively over decades without the risk of failure.

Yet, in long-lived military projects, software is often being rewritten from scratch, pushing up costs and delaying overall completion. For example, the U.S. Government Accountability Office (GAO) highlighted software delays as a key factor in the F-35 fighter jet modernisation programme failing to meet deadlines to move to full-rate production. This is no outlier – 10 of the Department of Defense's (DoD's) 15 major IT projects are behind schedule.

It's therefore time for a new approach – one that applies lessons learned from previous military software development and focuses on military grade, open source, standards-based solutions that reuse and rejuvenate existing assets. This method will deliver the innovative software capabilities that military projects require – on time and on budget.

Time to go back to the future

Software makes up a growing proportion of the overall budget for many military projects. However, while it is essential to innovate, it is just part of the military platform. It has to be able to do a job, be verifiable, long-lived and testable – just like the carbon fibre in an aircraft wing or the steel in the armour of a tank.

Yet, while carbon fibre isn't reformulated from scratch for every new project, software often is, ignoring the existing code base that has been developed and run over decades for similar projects or applications.

Many reasons can influence the decision to rewrite existing software applications, including an overall cost analysis based on system requirements (although this often only looks at upfront expense and not project lifetime costs), performance of the existing system, hardware obsolescence, and the strength of the specific software ecosystem (including the available tools and programming skills).

The problem is that during the planning phase of military projects, programming languages can be selected that don't necessarily have the rigour or staying power to meet long-term military-grade needs. Instead, rewriting and reusing existing, proven code can deliver the balance of innovation, cost-effectiveness and reliability that military platforms require.

We've been here before – back in the 1970s, the US DoD used over 450 languages within its software, leading to concerns about support, maintenance and reliability. The result? It commissioned the creation of Ada, a new, standards-based, open-source language designed specifically for long-lived, mission-critical software engineering. Ada is designed to be easy for developers to write code and also for this code to be read and understood by development teams for decades to come.

Ada is now the backbone of projects across the world. World-leading missile systems company MBDA has a long-term commitment to the Ada programming language. “Successfully developing reliable, high integrity software is critical to MBDA’s world-leading portfolio of products,” said Colin McDonald, Software Performance Evaluation Manager, MBDA. “The Ada language is the perfect fit for our global needs as it delivers unsurpassed safety and reliability.” See the full press release [here](#).

Understanding the key criteria for military software

Aside from its fundamental role in the military platform, software has to meet very specific criteria. It has to be testable and verifiable to ensure it will perform consistently in use, whatever the circumstances. It must be hardware-independent, capable of meeting modern cybersecurity threats, be certifiable against military and civil avionics standards, and have an open data model to help with testing.

Demonstrating this, Airbus Helicopters selected Ada and AdaCore’s GNAT Pro tool suite to develop new software components for its VSR700 prototype project. VSR700 is Airbus Helicopters’ tactical unmanned aerial system (UAS) designed to meet the demanding requirements of global navies and armies in the 21st century. Commenting on the choice, Matthieu Vatinet, Head of Embedded Software Products, Airbus Helicopters said, “We selected AdaCore and the Ada language because we believe that this technology and related tools will increase the maintainability and quality of our software and make it easier to provide some evidence for certain software certification objectives.” See the full press release [here](#).

Taking an open approach

The best way to cost-effectively meet these criteria is through approaches and languages based on a combination of open standards (such as The Open Group’s Future Airborne Capability Environment (FACE™) Consortium or the Modular Open Systems Approach (MOSA)) and open source. This enables access to a wide range of existing software that can be re-used or rejuvenated while ensuring supply chain security through transparency and traceability, using tools such as Software Composition Analysis (SCA). In addition, ecosystems such as GCC and LLVM provide the combination of tools and technology to power open source, removing the risks of proprietary software that can add to project costs.

Adopting open source software enables military projects to securely leverage the efforts of the wider community and re-use code rather than writing it again from scratch. Given that it was created specifically for the longevity, reliability and mission-critical nature of military projects, Ada is the perfect open source programming language to support software rejuvenation. It’s time to go back to the future.

Overcoming the challenges

However, many military industry HR departments are concerned about a perceived skills gap – that they can’t find enough programmers willing to learn Ada for their projects.

What’s needed to attract the right talent is a different approach that emphasises the elements that will appeal to today’s programmers. Ada is an open source language that provides the opportunity to be part of a growing community that uses open source tools and enables modern, innovative, state-of-the-art software development practices such as formal methods. While Ada itself has its roots in the late 70s, it has been continually advanced through the ISO-standardisation of the language, the latest version being Ada 2022. This means programmers can use innovative software tools and processes while still relying on the language for its efficiency and rigour.

Additionally, defence contractors can widen the talent pipeline themselves by working with colleges, offering apprenticeships and investing in continual training and mentoring of developers. Given the longevity of military projects, learning Ada provides programmers with a secure job for life and the chance to constantly add to their skills.

Adopting Ada for software reuse, therefore, benefits the projects, the programmers themselves and their wider communities by creating long-term, high-level employment opportunities.

Ensuring software innovation and longevity

We live in a software-driven world and it is vital to understand the critical role of software in the modern military platform. However, it doesn’t need to be created afresh every time – rejuvenate existing code and focus on the right language for the job. Military projects are long-lived, complex and mission-critical. That means you need a language and an approach that fits your needs. The obvious choice is an open source language that has been deployed in numerous safety-critical platforms and is tested and proven through operational use. Adopting Ada is key to ensuring that your military software really is both innovative and immortal.

AdaCore has built a business helping customers reuse and rejuvenate their existing software investments and assets. Contact an AdaCore expert to see how they can help on info@adacore.com.

www.adacore.com

AdaCore



CBRNe

British designers and manufacturers of CBRN and antiviral PPE

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What's the difference between air permeability and breathability?

OPEC CBRNe focuses on developing CBRN garments with greater air permeability and comfort. By doing this our objective is to reduce thermal burden on the end user.

The most important variables we have to consider in achieving that are air permeability and breathability.

...but many people don't understand the difference between the two.

Air permeability in textiles is the measure of the volume of air that is able to pass through the fabric structure under controlled conditions.

Breathability is a fabric's ability to transmit moisture vapour and conduct body heat outward through the material.

The challenge for CBRN garment designers is to configure appropriate ratios between air permeability and breathability, while also achieving high CBRN protection within the garment.

At OPEC CBRNe, we have developed a family of CBRN garments. Our garments vary in levels of air permeability and breathability as a response to differing risk environments. However, our overall goal remains to provide maximum CBRN protection by blocking CBRN challenges from the outside while simultaneously allowing air flow and enhancing comfort by allowing heat and perspiration to move out of the garment.

Following extensive research performed at Loughborough University, George Havenith and his team concluded:

“

a substantial and significant difference in heat stress between ensembles was observed, which therefore must be attributed to the effect of air permeability on heat and vapour transfer through the clothing in actual use.”

High Performance Reference Sources for Mission Critical Apps.

For over 60 years, Greenray high performance oscillators have been designed as reference sources for communications, radar and other military applications that require low g-Sensitivity and excellent phase noise in order to optimize system performance under the most demanding environmental conditions.

State-of-the-art vibration compensation enables our oscillators to deliver excellent phase noise performance and the short and long term stability necessary in high shock and vibration environments.



Our T1254, T1276 and T1282 Series TCXOs have been designed for low orbit satellite applications and deep space exploration. They offer guaranteed, long-term performance under radiation exposure from 30krad to 300krad.



The T1215 Series TCXOs feature hermetic packages and tight temp stability. They excel in high shock and vibration conditions and are ideal for communications, instrumentation, multi-band terminal, GNSS, upconverter and SATCOM applications.



Y1630 Series clock oscillators, available from 60 to 130 MHz, offer low phase noise and ultra-low g-Sensitivity performance (to $5 \times 10^{-11}/g$). The Y1630 features a 0.68" sq. SMT package, +5 Vdc supply and +11 dBm sinewave output. It has been designed for a variety of aerospace-specific applications.

For information about our full line of high performance oscillators, call Greenray at +1 717-766-0223. You can also visit us at www.greenrayindustries.com.

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Phase Noise vs. Vibration Testing



✦ **Missile Guidance** ✦ **Smart Munitions** ✦ **SATCOM** ✦ **Telemetry** ✦ **Airborne Communications** ✦
✦ **Radar** ✦ **Portable Communications** ✦ **GPS** ✦ **Detection & Identification** ✦

When The Going Gets Tough...

Radar, SATCOM, airborne communications, GPS, telemetry – these and other military systems rely heavily on high performance crystal oscillators to optimize system performance under the most demanding operating conditions.

Oscillators function as the heartbeat of these systems, generating the frequency – the timing reference signal – they require to function effectively. They are designed to perform precisely and reliably under any and all conditions that the system may encounter. Noise in the system – *phase noise* – and sensitivity to shock and vibration, or *g-Sensitivity*, are the critical performance parameters that must be addressed.

Data communications systems used in military applications often require that the signal be multiplied to a higher frequency. And because noise degrades exponentially, it is necessary to start with as little phase noise as possible.

The presence of high phase noise in the oscillator of a receiver, for example, will limit the sensitivity required to detect very low power signals, such as weak signal returns from a distant target.

While an ideal oscillator would generate a pure, noise-free sine wave, all oscillators produce noise due to active devices in the circuit. Fortunately, design, manufacturing and test advancements in recent decades have enabled crystal oscillator phase noise performance previously thought to be impossible.

While crystal oscillators provide today's system designers with frequency reference sources that can offer exceptional phase noise and frequency stability performance, one aspect that may not be considered initially is the signal degradation that can occur when the oscillator is exposed to vibration in the application environment. Even moderate levels of vibration can adversely affect a low noise signal – and increase phase noise.

Although it is not possible to completely eliminate the effects of acceleration on the frequency of a quartz crystal oscillator, by understanding the vector nature of the crystal's g-sensitivity characteristic, the impact in most applications can be minimized and managed acceptably.

For a more thorough technical discussion of the g-Sensitivity characteristics of oscillators and the implications for defense and airborne system platforms, please visit the Tech Articles page at www.greenrayindustries.com and download "Sensitivity Characteristics of Crystal Oscillators."



✦ **Missile Guidance** ✦ **Smart Munitions** ✦ **SATCOM** ✦ **Telemetry** ✦ **Airborne Communications** ✦
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Smiths Interconnect flies high on F-35 aircraft



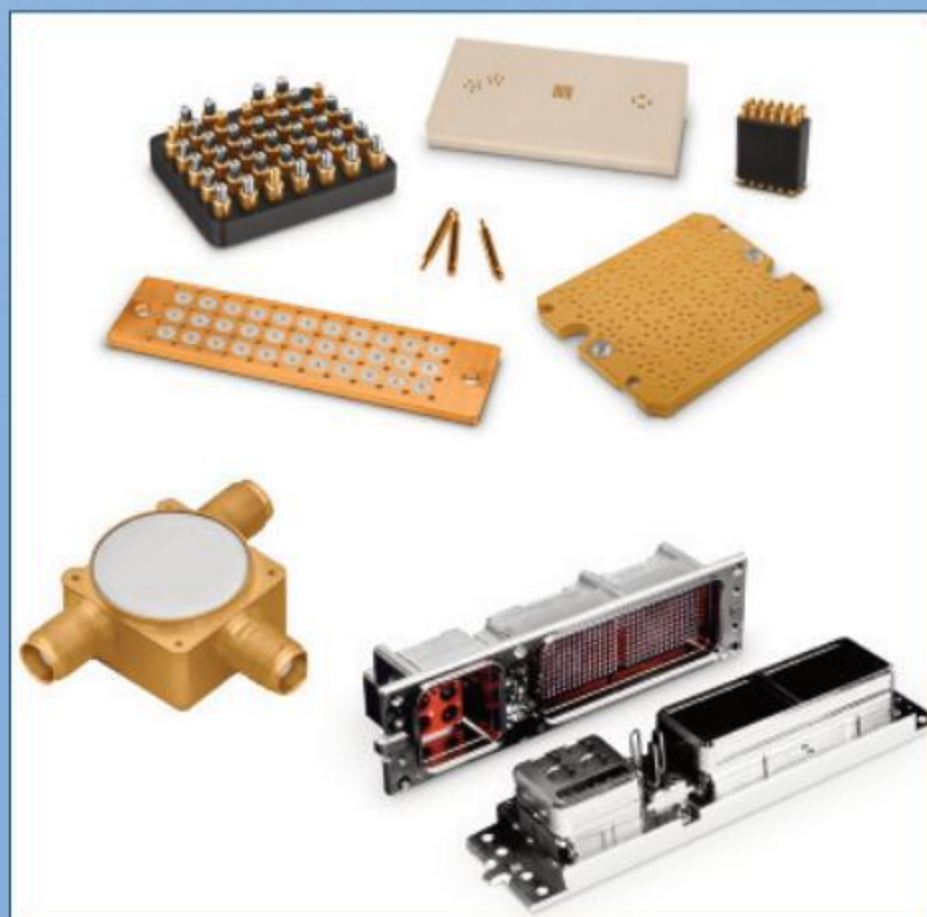
Working with principal partners to deliver safety, reliability, and performance

TAll military programmes are valuable contracts to secure as they are typically long-term commitments that will generate stable future revenue for the businesses. The Lockheed Martin F-35 Lightning II (previously known as Joint Strike Fighter/JSF) programme falls into this category, dating back to the late 1990s when the need for a 5th Generation aircraft began to evolve.

The F-35 Lightning II is a family of single-seat, single-engine, all-weather stealth multirole combat aircraft that represent a quantum leap in air dominance capabilities. It is the first 5th generation multi role aircraft to reach service, offering significant updates over previous generation jets. Intended to perform superior air dominance, F-35 are also able to provide electronic warfare and intelligence, surveillance, and reconnaissance capabilities. Integration and interoperability between allies have also been a key driver in the technology development.

Smiths Interconnect has been involved in the programme for more than 20 years, supplying hundreds of different interconnect devices including high reliability technologies, from RF components and high-speed/power/density/filtered connectors to integrated microwave assemblies.

"We proudly supply different connectivity solutions to different customers that are destined for use in the F-35 aircraft," said Paul Harris, President at Smiths Interconnect. "Our products and





technologies are renowned to ensure the performance, reliability, safety and productivity that are paramount in this most advanced multi-role fighter in the world”.

Smiths Interconnect's connectivity solutions for the F-35 aircraft include:

- **High power circulators embedding used on the Communications, Navigation, and Identification (CNI) system and integrated microwave assemblies used on the Electronic Warfare (EW) system, both embedding TRAK technology**
- **Power connectors with Hypertac hyperboloid contacts used on aircraft power systems**
- **Custom interposers with IDI spring probes used on the radar system**
- **High reliability attenuators with EMC technology also used on the radar system**

- **Discrete filters embedding Lorch technology and used on the CNI system**
- **EMI/EMP filtered connectors with Sabritec technology used in power distribution, power panels and battery chargers**

In addition to the above, Reflex Photonics, which was recently acquired by Smiths Interconnect and complements its product offering with the addition of core fibre optic capabilities, is developing optical transceivers for use in the programme.

www.smithsinterconnect.com

**smiths
interconnect**



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For over 45 years, major global defence primes have relied on Peli's high-performance packaging and lighting solutions. With hundreds of sizes and bespoke solutions, Peli cases provide the highest quality protection for any type of equipment, from electronic devices to helicopter parts.

Peli's innovative cutting-edge lighting solutions include tactical torches as well as portable floodlights, which provide powerful, energy-efficient, rechargeable lighting for remote areas, confined spaces and large workspaces without the use of a generator.

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Horstman

Horstman is attending DSEi September 13 – 17, 2021

located on the Renk Group stand at #H6 – 464

Horstman, a Company of the RENK group is an agile and growing business comprising businesses units in the UK, US and Canada. Providing world leading design and manufacturing capabilities, our customers benefit from our time-tested pedigree in innovation, product development manufacture and defence project

management in heavy armoured and tracked vehicle suspension systems.

With over a hundred highly skilled employees in the UK, US and Canada, we are a high value added, innovative engineering business with a global footprint in both customer base and supply chain. We provide a quality,



Hydrogas® Rotary Damper and InArm® Suspension Systems



See us at DSEI 2021
Stand H6-464



technically excellent offering to solve customers' problems, throughout the product life cycle.

The defence heavy armour business has arduous development and testing cycles to ensure that the serving soldier has the best combination of armour, firepower and mobility that they deserve. Horstman provides this

balance to our customers – having built our talent base over decades from a combination of industry experts, service veterans and continuous investment in apprenticeships, graduates and training.

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World's Widest Range of Hydrostruts®

An army marches on its stomach....

electrothermal[®]



Electrothermal[®] is a part of Antylia Scientific[™], a global brand that manufactures and designs water and ration heaters for military vehicles. Our heaters are designed for operation on the move and can fit into the cramped quarters of a tank, or other military vehicles to provide necessary sustenance to the soldiers on-board..

Key features:

- Heats 2 pints water and 5MREs in the vehicle while on the move
- Contents remains hot for up to 6 hours after the unit has been switched off
- "Cool to touch" outer casing
- Designed-in "Boil Dry" condition and fail safe mechanisms
- Connects to vehicles auxiliary power supply, 24 volts DC
- Heating range 66 to 71°C (on LO setting)
- Heating range 82 to 88°C (on HI setting)
- Ramp rate of 56°C in one hour (max) from ambient temperature of 21°C

Caution

Contents may be hot



This system is designed to
ONLY HEAT:
- Meals, Ready to Eat (MREs)
- Sealed containers of food
- Drinkable water.
This system will **NOT** cook, boil, or
fry foods, and it will **NOT** disinfect
or decontaminate water.
The **REMOVABLE CONTAINER** and
HANDLE will be extremely **HOT**.
Use Gloves or other hand protection.
Do **NOT** use removable container for
personal hygiene (showering, washing, etc.).
Use only **APPROVED** cleaning material
as defined in the technical manual.

Our current range of RAK water and ration heaters includes:

- RAK 15: operates off 15A and is designed for installation in tanks and trucks
- RAK 30: draws 30A to heat faster and is designed for the marines and special forces

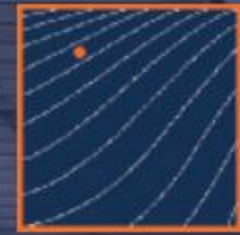
Food and water heaters for modern military operations

RAK15/30 units are designed to withstand the rigours of modern conflict and have been comprehensively tested to meet military standard specification MIL-PRF-44466D, MIL-STD-461 and MIL-STD-810. They are also certified for food heating after meeting NSF ANSI 4-2013.

Constructed from a robust stainless-steel outer casing, the unit is sealed to be water-tight, so that any steam is retained within its interior. It has both low and high temperature settings and its own built-in control, so that a separate control unit is no longer necessary. The choice of heating ranges is either 66°C - 71°C (on LO setting), or 82°C - 88°C (on HI setting).

www.antylia.com

DELIVERING IN A PANDEMIC



**Survival
Systems
Limited**

Delivery is more than offloading new equipment, it's also: supporting existing items, commissioning new, replacing the worn and tired elements and enabling the users to continue to function; in short a whole life activity.

The difference between a good and an exceptional company is the good does what it says on the tin, the exceptional provides the tin opener, plate, cutlery and salt and pepper too. To make this happen its delivery ethos has to be ingrained throughout the company and during a pandemic especially so.

Survival Systems Limited (SSL) of Halifax Nova Scotia, is an SME with a worldwide reputation for delivery excellence. With diverse multiple simulation products in safety critical environments based on customers' helicopters, boats and vehicles, military and commercial installations and service in varying environments and customer cultures, no two situations or solutions are the same. To achieve its reputation and market position SSL's delivery ethos flows through its veins. Delivery is difficult for most companies at the best of times. When a pandemic comes often the default position is to give in and, consciously or unconsciously, use the pandemic as an excuse to lower standards. We have all heard the "The COVID - 19 situation means we will not be offering our normal standard of service" message. The trick is to turn this on its head and say "the pandemic makes it difficult but we are here for you regardless".

Exceptional companies embrace the challenge, discover new methodologies, and continue to excel. It's like the Olympics. Champions find a way to be the best. Reorganizing production for socially distanced working is like using an empty training location to reflect empty stadia. Providing mobile phones, ensuring desk phones are diverted or have clear messages to put people to the right number is the coach getting their message to distant athletes. Ensuring the person who answers the phone gets the enquiry to the right person helpfully and willingly is getting the message around the team.

What happened recently in the UK and Australia shows how SSL, a Canadian SME in a very niche business rose to the



Australia METS® Rigid Hull Inflatable Boat at HMAS Cerberus

Covid-19 challenge. Thirty months ago SSL supplied a Twin Gantry Hoist (TGH™) personnel-rated lift system for the brand new RN Centre for Maritime Survival and Underwater Escape. This in itself illustrates SSL's delivery ethos because the unit specified from another company could not meet the contract challenge. The programme was falling behind time. SSL stepped in to solve the problem with rapid delivery and installation.

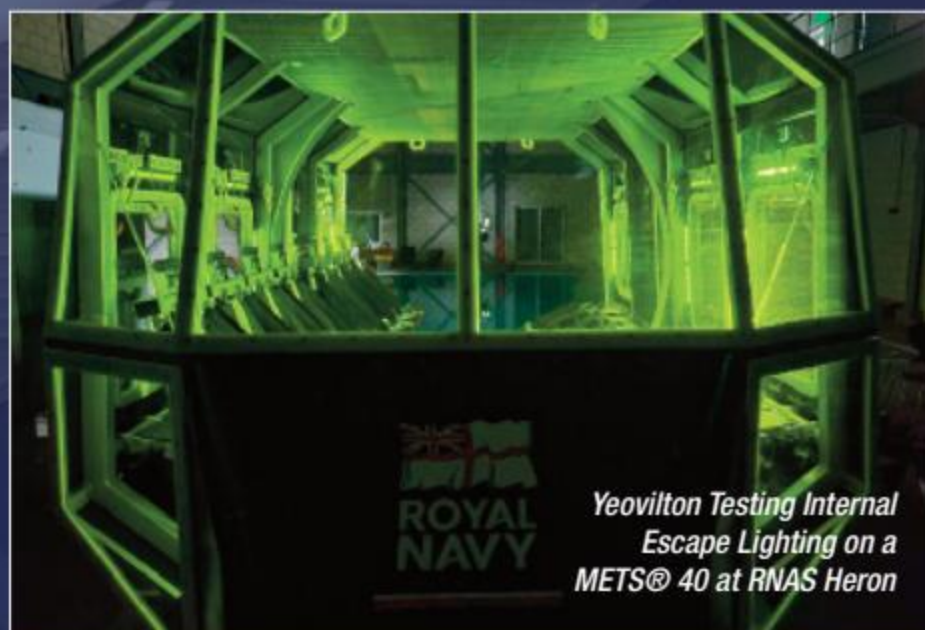
The TGH™ positions and retrieves Helicopter Underwater Escape Training (HUET) systems. The RN's existing HUETs were old, becoming dangerously unserviceable and outdated. Pending supply of 2 new HUETs SSL provided two leased HUETs from its range of Modular Egress Training Simulator (METS®) variants which replicated UK in service helicopters.

Following a competition the scheduled contractual delivery of the Navy's new HUETs (2 x Customised SSL's METS® devices) was right in the middle of a long pandemic lockdown. Commissioning was scheduled for the start of the next. SSL prides itself on being fully engaged with the customer. It makes certain all the nooks and crannies in the delivery of unique product designs, which UK helicopters are, which cannot be solved by looking at drawings are resolved by active customer engagement. Travel bans prevented this in-person commitment.

The first issue was to deliver what was clearly agreed on. This accounted for probably 90% of the contracted articles. The second issue was to work out nuances in UK customization which were different from SSL's standard, by exchanging drawings, sketches, photographs, and holding detailed video conferences. All agreed that these activities were constructive but did not yield exactly what was required. To complete as much of the remaining 10% to enable training to commence the solution was to move the manufacture and final finishing of the manufactured bodies and accessories to the RN's operational site, RNAS Yeovilton. One of SSL's Manufacturing Specialists and its training Subject Matter Expert accomplished these tasks in Yeovilton. They carried out the necessary fitting and adjustment enabling training to re-start with minimum downtime. The Royal Navy was superb in assisting and being understanding and flexible during the unusual delivery.

To minimise downtime whilst swapping from the old HUETs to the new METS® it was agreed that a planned TGH™ interval servicing would coincide with METS® configuration completion. A SSL lift specialist diverted from another UK client sites for the TGH™ was also able to help with METS® final assembly.

This very major logistic effort involving PCR Tests, certified accommodation, feeding and moving, including flying, the team to Yeovilton coupled with isolated working on site and returning the leased METS® back to Canada took care of another 7½% of the work: so 2½% left. SSL's production staff member returned to Canada. SSL's Subject Matter Expert deployed onto Australia to deliver Instructor Development training for a METS® Rigid



Yeovilton Testing Internal Escape Lighting on a METS® 40 at RNAS Heron

Hull Inflatable Boat (RHIB) being installed at HMAS Cerberus in Crib Point, Victoria. The route there could best be described as pretty but it's part of having the delivery ethos in the veins

Thanks to the information from the production specialist and the on-site service delivery the 2½% remaining could be rapidly completed back in Canada. When another pause in training occurred the final METS® components were shipped and installed. The challenge was availability of SSL specialist staff because the installation team had been deployed to deliver and commission the Royal Australian Navy METS® Training Equipment. There are a number of ways home to Canada from Australia: via the UK is one! SSL's Technical Specialists, having finished the Australian delivery, went to Yeovilton to help complete the task. More difficult flights, more PCR testing, more time away from families, more isolation, more quarantine back in Canada, all to ensure that customers, end users, and SSL were confident and delighted in a job properly and safely done despite the COVID beast!

Delivery continues through life and has associated costs. How do customers / users get best value? There are many options but in SSL's experience related to their products, it's making sure that equipment is designed for maintenance. A customer fully trained on SSL equipment is the most economical option. Users have a sense of ownership, the equipment is better looked after and lasts longer and sensible discussions can be held at distance with additional SSL help at hand. It's all part of delivery and having delivery as an ethos in the veins.

www.survivalsystemsgroup.com



Craftsman preparing outer skins for METS®



AJ+S

Global Navigation Satellite Systems (GNSS) become more and more ubiquitous and so does the threat of interference. While jamming deliberately blocks signal reception of GNSS receivers, spoofing aims to manipulate the position and time information of the attacked receiver. Interference techniques constantly evolve and become more accessible. And robust GNSS equipment and applications are no step behind.

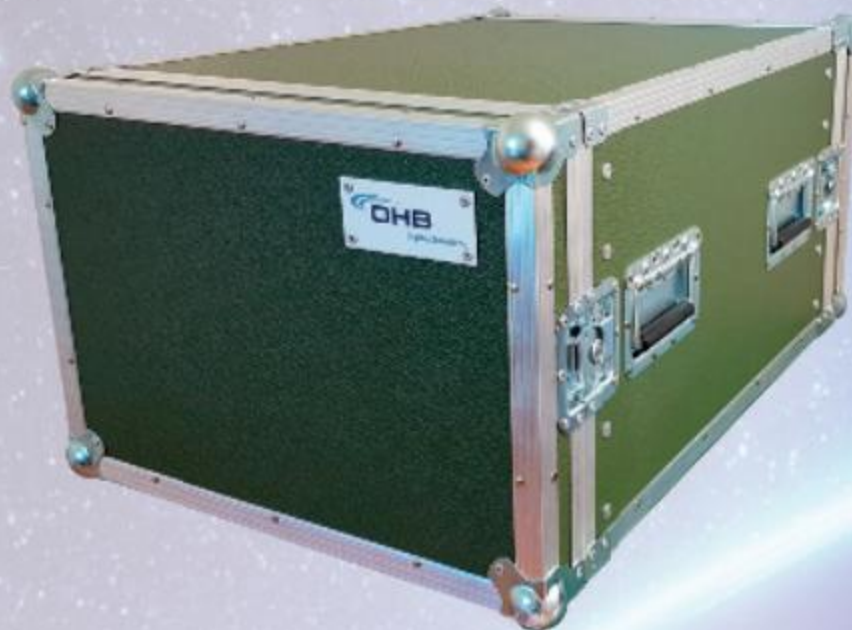
OHb's Advanced Jamming + Spoofing (AJ+S) system is a compact solution to generate and broadcast jamming and spoofing signals. All required hard- and software components come in one mobile and sturdy 19" rack box.

The system includes the user control unit, a performant industrial-grade PC, a signal generator with dual-channel high-fidelity RF output, an integrated GNSS receiver for time synchronization and ephemeris data, and a broadcast antenna. AJ+S is operated via the integrated monitor and keyboard. An intuitive graphical user interface guides the operator step-by-step.

AJ+S can be used as a standalone system in a navigation warfare scenario or to test equipment and applications safely and realistically in a GNSS-denied environment.

It is designed to easily generate and transmit jamming and spoofing signals and to assess various types of attacks on receivers with broadcasted RF signals.

OHb's system allows GNSS equipment manufacturers and users to test their equipment in a protected and realistic environment.



AJ+S is used to assess vulnerabilities and improve equipment to better tackle GNSS interference. It is successfully used by governmental authorities, armed forces, and system integrators, 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.



ADVENTURE
TACTICAL

25th
ANNIVERSARY

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 boasts 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 EUR1 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.

Lincad's 'one-stop-shop' Caravel Mk2 simplifies battery management in the field



The military landscape is growing increasingly technological and power hungry, with more and more equipment requiring batteries to operate.

Soldiers working on the front line must be able to rely on their kit at a moment's notice and this generally means keeping any batteries continually charged, ready for use.

Most man portable battery solutions on the modern battlefield use energy dense Lithium-Ion technology. Lithium-Ion Batteries require discharge to less than 30% of their maximum capacity to render them safe for transport on aircraft in accordance with current IATA (The International Air Transport Association) regulations. Equally, if they require long term storage, the optimum state of charge is 50% of their maximum. Achieving these varied charge states for a potentially large fleet of batteries, Lithium-Ion or otherwise, can present a severe logistical problem for users. Having separate pieces of equipment to fulfil all these battery fleet management functions adds to the already heavy logistical burden and workloads that soldiers must bear on the front line.

UK battery and power management systems manufacturer, Lincad, has developed the ideal 'one-stop-shop' solution that simplifies battery management in the field. Initially launched in 2019, the Caravel Mk2 Charger is a sophisticated charging system that represents the latest innovation in battery management technology and design. The Caravel Mk2 provides a single point solution to every stage in the chain from battery charging to discharge for transport and storage as well as diagnostic capabilities for some smart batteries. Available in single and four channel variants, the Caravel Mk2 charges batteries of any electrochemistry and from any origin. This includes Lincad's own suite of LIPS (Lithium-Ion Power System) batteries but extends to third party batteries like the widely used BB2590. The Caravel Mk 2 is used by customers worldwide, including the UK Ministry of Defence, which has already placed significant orders.

The Caravel Mk2 charges batteries from 2V through to 58V using battery interface adaptors to facilitate connection of any physical form factor battery to the Charger. The four-channel variant can charge up to four batteries at once with each

channel fully independent, allowing a range of batteries to be charged for an operation using a single charging device. Additional USB ports enable smart phones, tablets, and other personal mobile devices to be charged. The Caravel Mk2 Charger may also be supplied configured for wireless or ethernet communications for central monitoring, adding greatly to its versatility.

The unit itself is hard-wearing and rugged, with steel chassis able to stand up to demanding surroundings commonly found in front line military operations. For reliability, the Caravel Mk2 Charger uses active thermal management to maintain safe operating heatsink temperatures, even in hot desert conditions. It can work in ambient temperatures as low as minus 5 degrees C, going up to an upper limit of 55 degrees. Intelligent control capabilities based internally help manage charge and discharge rates to keep both the operator and equipment safe. The charger is powered from a standard 13Amp plug socket via a standard IEC power lead, meaning there are no specialist power requirements for operation.

The Caravel Mk2 Chargers operational flexibility are enhanced by the ability to carry out software updates via a smart phone or tablet Android app whilst still in the field. Software upgrades no longer need be by return to the manufacturer, meaning a vast improvement in turn around time and cost if any functionality changes or refinements are desired.

Showing the flexibility of the Caravel Mk2 Charger, Lincad is continuing to innovate and improve the product by addressing a key aspect of air transport regulations. There is an obvious requirement for clear and accurate labelling of a battery's state of charge before it can be safely loaded onto an aircraft. For a battery to be safe to fly, it must demonstrably be at less than 30% state of charge and reliable labelling to this effect removes a further concern from the logistical process. Work is currently underway to interface the Caravel Mk 2 directly to a standard label printer to enable status labels to be automatically generated with the batteries' state of charge and other vital data once a charging or discharging cycle has been completed. These labels can then be attached to the batteries being transported and act as a status label for easy checking of IATA state of charge and functional compliance.

The label printing system is user-scalable and configurable, and the printing process is stand-alone, which means that no external inputs are required for general operation. Multiple battery conditioning and charging devices from within Lincad's charger range can be connected to a single printer at any one time via an RS485 communications bus to allow larger numbers of batteries to be processed and labelled at once. Up to 128 Caravel Mk2 Charger channels may be connected to a single printer at any one time. Flexible configuration helps meet the user's precise requirements for each individual operation.

The Caravel Mk2 Charger is part of a whole suite of charging products designed by Lincad specifically for military front line



operations. All Lincad's products are designed and manufactured in Surrey in the UK in line with exacting ISO 9001 as well as UK and US defence standards. This helps the company offer total reassurance and reliability when they are most needed.

Peter Slade, Joint Managing Director at Lincad says of the Caravel Mk2 Charger, "Our four-channel charger offers modern soldiers a flexible, all-purpose solution for battery charging, conditioning and overall management in barracks environments when reliability and quality performance is crucial."

While Lincad works mainly in the defence sector, supplying batteries, chargers and power management systems to armed forces, defence primes and other military customers around the world, their products are expanding into the medical, commercial and petrochemical sectors. The company's team of engineers are constantly working to develop new ways to support a wider range of performance critical industries by creating more versatile and reliable equipment.

www.lincad.co.uk



LINCAD
POWER MANAGEMENT SYSTEMS

Visit JFD at DSEI!

JFD, the world leading underwater capability provider serving the commercial and defence diving markets and part of James Fisher and Sons plc, will be showcasing their full defence portfolio at this year's DSEI!

They'll be situated on **stand H5-350**, where you can come and learn about their defence capabilities.

Submarine Escape & Rescue

As an established provider to 42 navies, JFD delivers innovative and technically advanced submarine escape and rescue solutions that improve safety and preserve life in the event of a submarine incident.

JFD's capabilities span the entire submarine escape, rescue, abandonment and survival (SMERAS) environment. JFD is

unique in being able to deliver solutions across all these areas as a one-stop shop.

Latest news: JFD | JFD world-first simultaneous build of submarine rescue vehicles (jfdglobal.com)

Submarine Solutions

40 years of extensive experience and expertise within submarine rescue has enabled JFD to offer a range of related services and solutions to the submarine platform sector.

Our existing submarine capabilities include testing, equipment design and manufacture, system integration, and asset management services. This includes a through life support capability focused on assured submarine operational availability. Combined with many years of experience in life support and safety this enables us to offer innovative and practical solutions to our customers across the world. JFD is currently engaged in four international submarine programmes to provide design assurance and equipment as well as the provision of through life support to specialist systems. This includes both large and small conventional and nuclear submarines with international as well as UK customers. Latest news: JFD was recently awarded a contract, in excess of £20million, by the UK Ministry of Defence (MOD) to be the provider of a novel capability support contract for the Astute class submarines.



Special operations

Evolving land, sea and airborne surveillance and weapons systems are reaching ever further into the littoral zone. As a consequence, inserting Tactical Divers to within realistically achievable swimming distances of an objective is becoming increasingly challenging. In response, it is an operational necessity that tactical diving methodology also evolves. One solution is the employment of Tactical Diving Vehicles (TDVs) that can rapidly insert at high speed on the surface over long distances and when the threat level requires, operate discreetly in semi-submerged mode and covertly in submerged mode. JFD offers a range of TDVs, Tactical Diving Life Support Systems and ancillary equipment which uses both advanced and proven technology to support a range of operational profiles enabling a maritime SOF team to effectively and efficiently carry out their mission.

Latest news: JFD has announced the establishment of its office in the United States, JFD North America, provide its world leading sub-surface engineering, technology, and special operations capability to the United States and to the Americas through a dedicated entity.

Defence diving & security

JFD provides a range of solutions to enable safe and efficient underwater operations within some of the most dangerous and complex scenarios. Our MCM and EOD diving equipment is trusted by a large percentage of the world's Navies and our experience in this area is unrivalled.



We offer flexible solutions to companies looking for support across MCM/EOD, underwater engineering, autonomous systems, infrastructure protection and security industries who are looking for a layered defence capability.

We recognise a drive towards autonomous systems and as a proven systems integrator JFD can help you transition into this teaming space.

Latest news: JFD was awarded a contract for the management and availability of the Royal Navy's in-service life-support diving equipment, to help safeguard the lives of divers worldwide.

To book a meeting on the stand contact:

JFDevents@jfdglobal.com

NANUK PROTECTS MISSION CRITICAL GEAR

Known as the world's best protective cases, **NANUK** guards your critical equipment so military personnel can successfully carry out their mission.

BATTLE-TESTED & READY TO SERVE

NANUK indestructible cases keep weapons and gear secure, and safeguard sensitive instruments from the repeated blows, drops and shocks that happen in the field.



Crushproof

Made from crushproof NK-7 resin certified to withstand extreme impact and continuous vibration, each case is built to bear the brunt of combat vehicle rides and rescue stretcher falls, ensuring its precious contents work without fail when failure is not an option.

Stays Shut

Our patented PowerclawTM latches use compressive force to clamp each case tight, so they stay shut no matter what.

A PLATOON OF SOLUTION

We have cases for every aspect of military service, protecting the needs of those who protect us.



Designed for Military Specs

NANUK offers a full spectrum of protective cases purpose built for weapons, sensitive equipment, lifesaving medical devices, military supplies and soldier storage. All designed to meet the most demanding military specifications.

- Rifle & pistol cases
- Ammunition transport
- Medical devices
- Deployment kits
- Communications systems
- Supply containers
- Footlockers

WE DO CASE PROTECTION, NOT ECONOMY PROTECTION

Our quality is infallible, just like the men and women who serve their country. When the stakes are high, low end cases aren't worth the risk of failure.



No Deformation

Whether transported on a pallet in a C130 or in the cargo bed of a Humvee®, our cases are built to withstand the extremely high binding tension from tie-down straps without deforming.

Light But Mighty

We don't remove material to make our cases lighter. Engineered with resilient, lightweight resin, they're as strong as can be without weighing you down. The NANUK line has 31 sizes and is growing.

MILITARY GRADE. GUARANTEED

The NANUK name stands for strength and fearlessness. We design and build our cases to survive in the harshest of conditions. And we stand by every single one.



MIL-SPEC

NANUK cases are suitable and certified for a minimum of 100 airline trips, stands up to heavy impacts, withstand repetitive shocks that can occur during loose-loaded transportation, extreme vibration resistance, rainfall, water submersion and heat. Our new NANUK 975 obtain 2 certifications:

- Military grade: MIL-C-4150J MIL-STD-810G

Lifetime Warranty

NANUK cases are manufactured in Canada and are tested in some of the harshest conditions. Every NANUK case comes with a lifetime guaranty so that if there is a problem with your case then it will either be repaired and returned, or a new one shipped out to you.

DSEI 2021 Show - Sept 14-17 - London

Will you be attending the DSEI 2021 show? The NANUK EU sales team will be there to meet you and is excited to learn more about your next project. We'll be at booth **H8-205**. Visit us and stop by to see our newest cases and custom capabilities.

WE GOT THERE!

The team at PlastPack Defence (PPD) have been involved in packaging since their CEO started working after university. PPD was founded in 2012 and ever since has been involved in bringing plastic packaging to ammunition carriage.

The main thrust of this work has been replacing the steel M2AI and its clone the H83 with the plastic Lightweight Ammunition Case (LWAC). LWAC is for small arms ammunition. Work is also going on the PA-120 for the 40mm ammunition for the 40mm grenade launcher in a joint development with Rheinmetall Waffe and Munitions.

PPD is a Danish owned and domiciled SME and brings the very best of Danish design, engineering and management to the project but has a business model that allows local manufacture when it is economically sensible for the end user/customer. This allows PPD and their partners to take advantage of issues such as the “social advantage” part of the new UK procurement assessment criteria. This, when coupled to the myriad other benefits of plastic ammunition boxes especially those giving the massive cost, green and operational benefits achieved by LWAC makes the LWAC an exciting and really modern military, logistic and economic development.

From the outset the senior management of PPD realised that LWACs would have to pass all the environmental and operational tests that old fashioned steel cases have been subjected to. This has proved to be an interesting challenge for 3 reasons: as was the way back when steel cases were introduced it turns out that many of the tests were written around the boxes rather than the boxes working to a set of requirements often based on the notion that it seems like a good idea, secondly there is a huge degree of personal interpretation as to what constitutes pass or fail and thirdly many countries state their packaging passes the tests when a pinch of common sense tells you there is no way a pass could be achieved. It also does not help in that the way the tests and cases have evolved has led to a situation where the existing designs and construction results in an even more dangerous situation in the event of a hazard, particularly fire, than modern approaches to product design and testing would allow.

Against this background PPD decided to work with neutral independent test houses. Some were government owned some commercial but in essence an eclectic mix giving a broad spread of independent test results. So over the last few years LWAC have been exposed to all the risks and dangers of military use and they have been burnt, frozen, exposed to simulated high levels of solar radiation, smashed, crashed and vibrated, shaken and probably spoken to sharply. They have been burnt, forced underwater, overpressured, underpressured, had the ambient pressure changed rapidly, shot at, hit by fragments and subject to electrical discharge and a whole lot more physical insult and abuse.

At long last the tests are over and the results can be collated. A key part of the tests programme has involved studying the tests themselves in detail to see that they were a fair reflection of the aim of the test. In two cases the test was not testing what the requirement actually sets out to protect against.

It has been quite surprising how wedded to the tests people were without understanding what the test was actually testing. Frequently there was quite a large element of “we have always done this test so we will do it again”. When questioned there was no coherent answer as to why the test was being carried out. Once the purpose of the test was accurately reflected in the test the LWAC passed with flying colours.

The final tests have involved putting single and multiple LWAC full of different ammunition natures into extremely hot fires and recording what happens. The Covid pandemic has for a variety of safety and practical reasons delayed these. They have been the final series of tests. Once conducted there are a number of questions to answer. It's the same process after every test. Much simplified some of the



questions following the burn tests are: do the boxes explode? No they melt. What happens to the ammunition inside the box? It falls to the floor or lowest available level. What happens then? Some of it heats up and explodes in exactly the same way as that which escapes from steel cases. This process is called cooking off. How many cook off and how far do the fragments travel? As far as is possible every one is recorded and measured (17,500 in the biggest test). No further than those from steel boxes and on balance a lot less. Does the LWAC shower fragments and components like the M2A1 and the H83 does? (there is a difference as a lid from a case will cause different damage and injuries to those from the shards of the case wall)? No it has melted and/or burnt. etc etc.

All the tests regardless of who has carried them out have been observed by a number of neutral observers, frequently members of ministries of defence, to ensure impartiality and ensure adherence to the spirit and letter of the test procedures. Some countries who do not ship ammunition outside their borders or who ship it in different ways or who use different calibres are already using LWAC and are gaining the significant cost, operational and green benefits of doing so.

Alternative uses of LWAC are already surfacing. In the same way as steel cases are unofficially used as tool boxes or for fishing tackle boxes there are a number of additional formal uses being made of LWAC. For special forces who need their rations packed in waterproof lightweight containers rations are being packed in LWACs with the benefit that they float when things go wrong. Fully NATO stock numbered coffee and refreshment kits are available in LWAC. Perhaps the most unexpected use has been using LWAC with customised internal packaging to transport and store sensitive electronic components. The manufacturers taking advantage of the weight reduction LWAC offers to save on transport costs whilst ensuring that

the contents are protected against the physical issues involved in military service.

The final certification is complete as the Health and Safety Executive in UK has issued draft certificates. Breaking the the back of the certification process has required a major effort as one would expect when replacing a genuine military antique and old fashioned system. There remain some issues with equivalence of testing and certification, such as why some countries allow paper packaging and are allowed to claim identical results to steel. These inconsistencies are being discussed with the testing authorities but LWAC is certified.

Regretably PPD will not be at DSEI. Ever a keen member of the Danish Defence Trade Association FAD and a central part of the Danish Pavilion the decision to proceed with DSEI in person came too late for FAD to gather a group together to attend and thus provide a platform for PPD. However if you are there and wish to discuss LWAC contact PPD by phone or e mail and they will arrange a meeting with Lutra Associates, their UK Representative, who are attending and who will meet you at DSEI or somewhere convenient afterwards.

www.ppddk.dk



PlastPackDefence

The Benefits of Applying Open Architectures

Private investment in the telecommunications industry has put defence communications equipment programmes under increasing pressure.

Unable to spend enough to keep up with external technology development, the only realistic approach is to leverage commercial off-the shelf (COTS) items through the application of open interface standards.

Pre-defining the hardware and software communication systems architectures for diverse applications is an almost Sisyphean task. To make this more manageable it is helpful to consider iterative refinements (applied over a period of time) as an approach to refining technical standards.

Meeting the Challenge

In 2017, PPM Systems was challenged by UK MOD to bring together hardware and software technology developed under previous government programmes, into a ruggedised form-factor with the goal of delivering a supportable in-service signal analysis capability.

The technical scope and tight timescale meant 're-inventing the wheel' was out of the question. So, PPM selected and worked with

a team of industry partners to collaborate on the project management and systems engineering, with the solution's sub-assemblies contracted out to a small ecosystem of suppliers.

Delivering in the required timeframes called for an open and collaborative approach between the industrial and government partners. The engagement of technical and user communities ensured requirements capture could be conducted quickly. This allowed early creation of accurate sub-contractor work packages and facilitated the acceptance of finalised work. The flexible stance the commercial authority took allowed integrated logistics activities to work at pace alongside development, and potential issues to be handled before they became problematic.

The real challenge was the mandated use of components which had been developed for other purposes. These components formed the basis of the project and included signal processing elements (PE), RF front end devices (FED) and baseline signal decode applications (APPs), which provided the underlying analysis suite. As not all the elements were fully mature and some needed tailoring, component uplifts were made.

In addition to this, the final delivered capability also needed to co-exist with the other applications already using the components, be powered by an in-service fleet of LIPS10/12 batteries and work with the in-service PPM Systems' Rodent 4 remoted antenna platform.

The Solution

PPM Systems' implemented solution was an embryonic capability-delivery through the application of open standards.

Integrating all of the components was only possible due to the openly published standardised interfaces that governed them. These interfaces included Rodent 4's remote antenna RF over fibre connection to the FED signal capture cards, the VITA49 radio transport (VRT) protocol used to connect to the PE compute nodes, and the SW API that allowed application re-use. These employed standards allowed previous developments to be carried forward for this new use.

Bringing the COTS modules altogether, through the use of standard communications protocols, a containerised software orchestration layer and a generic vehicle architecture (GVA) inspired frame-based graphical user interface (GUI), resulted in the creation of PPM's 'Crossbow' signal analysis system.

The working method undertaken by PPM not only sped up the development time – meaning the tight delivery timeframe was met, but also created a legacy of supportable and upgradeable equipment for the future; using open architectures. On project completion, the maturation activities were published back into their original defence programmes to ensure other programmes could benefit.

Defence EOD & Search Branch, Army HQ, commented: "PPM exhibited the sort of behaviours we'd expect other equipment suppliers to demonstrate."

PPM added: "All of the staff at PPM gain great satisfaction from delighting the user community by exceeding their expectations of what a systems integrator can deliver."

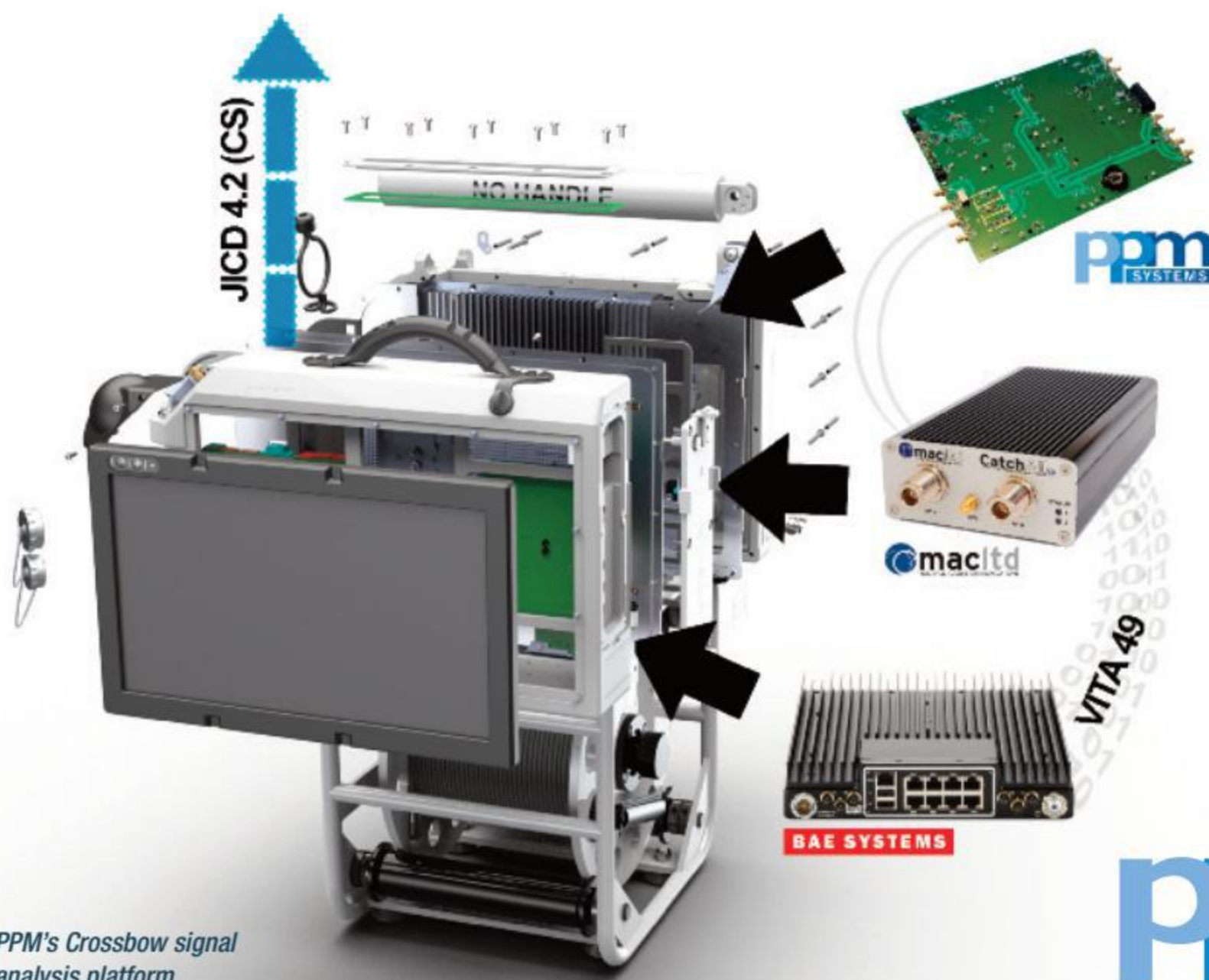
PPM is now working to expand Crossbow's capacity and bandwidth, with upgraded hardware modules and an uplift to the operating software, to enable it to function as part of a network connected enterprise.

Future Benefits

PPM System's work on this project has opened the door for other such in-service capabilities to be incrementally evolved in order to keep up with changing technology. The delivered capability is an example of how the benefits of open architectures can be realised; leaving the path open to extend and upgrade elements for the future's as yet undefined features.

PPM Systems specialises in products for government and military sectors, supplying fully customised RF systems.

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PPM's Crossbow signal analysis platform

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Management System standard, you
can be assured of AMA's continued
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TOGETHER WE ARE STRONGER

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METALS

FASU
FOUR STAR
UNION

INTEGRATED QMS:

THE MARK OF A SUPPLY CHAIN YOU CAN TRUST

Stronger together: five of the world's leading certified suppliers of defence and aerospace metals join forces to achieve single certification.

The defence and aerospace industries are global and, as such, need a global capability from its supply chain. But, a capability that not only demonstrates streamlined procedures and continual improvement, but one that also recognises the value of local service and support.

The universally accepted mark of a trusted supply chain is one that meets the stringent ISO (International Organization for Standardization) Quality Management System (QMS) standards. Aero Metals Alliance (AMA), a global partnership of leading metals suppliers to the global defence and aerospace manufacturing industries, is one such supplier that has recently been awarded global consolidated certifications for EN/AS9100 and 9120, achieving single certification to the AS9100 industry-recognised QMS standard.

What does it mean to be EN/AS 9100 and 9120 certified?

The ISO 9000 family is the world's best-known quality management standard for companies and organisations of any size. The objective of ISO 9001 is to provide a set of requirements that, if effectively implemented, will give original equipment manufacturers (OEMs) confidence that a supplier can consistently provide products and services that:

- Meet its needs and expectations
- Comply with applicable regulations

Specific to aerospace, aviation and defence industries, the ISO AS9100 QMS standard fully incorporates the entirety of the current version of ISO 9001, while adding requirements relating to quality and safety. It is universally adhered to by aerospace OEMs and the wider supply chain.

The recent single certification underscore AMA's commitment to meeting and exceeding the increasingly stringent industry requirements for aerospace related products.

AMA's Commitment to Quality

AMA comprises five of the world's leading suppliers of metals - two UK-based distribution businesses: Gould Alloys and Wilsons Metals, together with three overseas businesses; Service Centres Aero (SCA), Progressive Alloy Steels Unlimited (PASU) and Sunshine Metals. Its network of strategically located service centres, each with its own processing capabilities, collectively offer: cutting, shape cutting, milling, surfacing, sawing, drilling, guillotining, waterjet cutting, USI testing, heat treating or re-tempering, forgings and machining to near net shape to national and international customers.

All five businesses have established their own reputations for industry experience, knowledge and expertise to service

the needs of its 'local' customers. Collectively, the Aero Metals Alliance structure enables a pooling of resources and technical knowledge to bring a trusted global supply chain to the defence and aerospace manufacturing industries.

Each of the AMA businesses hold long-standing individual certification, but the business units recognised the importance of holding global consolidated approvals. The group sought to achieve single certification to showcase its interconnected expertise and highlight its collective commitment to quality. BSI was selected as the project accreditation body and cross-site audits were conducted. Throughout the project, the businesses worked ever closer together to drive improvements across its sites for the benefit of its wide-ranging customer base. Core business processes, covering all locations, were agreed to create an AMA standard global monitoring and measuring system. Consolidation certifications were issued in May 2021.

Martin Pennington, AMA Group Quality Manager, said; *"It has been an exciting challenge to achieve this unified quality approach and recognition. The journey to achieve our goal would not have been possible without the teamwork within our Alliance. I would like to thank everyone that has supported this enhancement to our business model."*

Simon Bell, BSI Global Client Coordinator commented; *"Having worked with AMA over the past 18 months it has been great to see the level of commitment and dedication to this goal. The AMA team based in the UK have supported the global teams through the consolidation process and demonstrated a joined-up approach to quality management that is vital to multiple site QMS and certification."*

He continued, *"Now the team has reached this achievement, the real challenge will begin, with the global team aiming to work closer together to drive improvements across all sites for the benefit of their wide range of customers. We look forward to working with the team to help ensure that the management system continues to meet the requirements and creates added value for the business and its interested parties."*

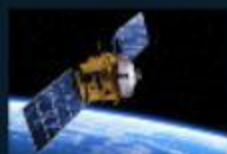
The consolidation of AMA's quality systems not only serves to strengthen the AMA union, but also gives defence and aerospace customers the assurance of a continued commitment to quality.

To learn more, visit www.aerometalsalliance.com



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AIR

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Radar EA
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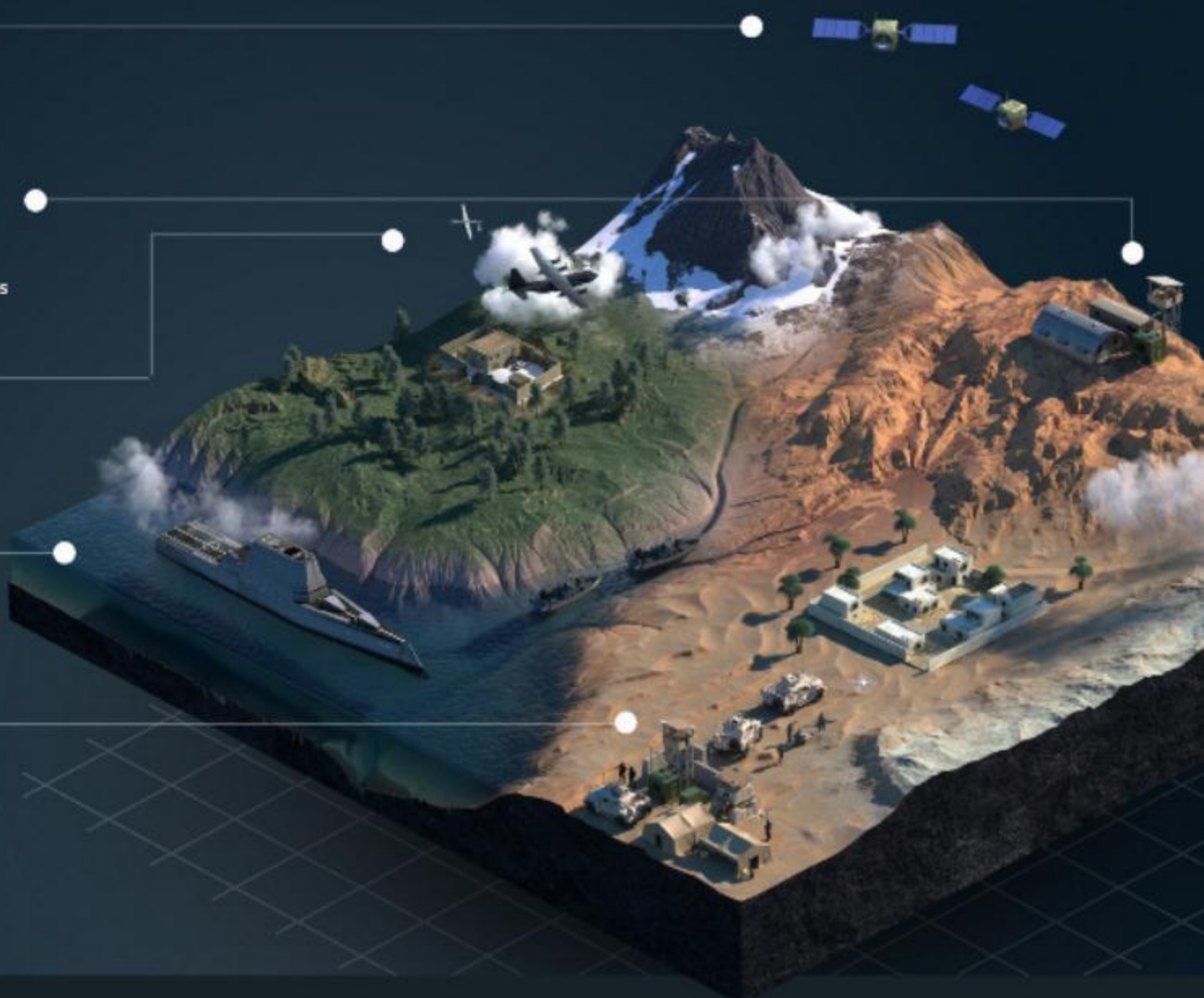
WATER

Radar Guided Missiles
RF Sensors
Laser Comms



LAND

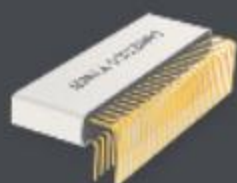
Tracking Radars
Laser Dazzler
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MICRO - D



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HIGH SPEED

Ruggedize micro-miniature interconnect solutions for high reliability applications.

Omnetics' connectors are proven to deliver exceptional performance in extreme environments for mission-critical applications.

Multi-signal Interconnections

FOR DEFENSE BASED GROUND DEVICES

Bob Stanton, Director of Technology, Omnetics Connector Corp.

Defense electronic devices have evolved to highly integrated digital systems that utilize multiple sensor systems and remote sensor and communication technologies to greatly expand capability and control needed in complex battleground arenas.

New ground-based devices require high-speed digital transmission and responsive signal connections that come in a variety of electrical values and impedance levels for each device within the system. Radio systems must simultaneously connect to the complete advancement



squads out in the field. Hand carried range-laser targeting devices, must be compact, lightweight and have higher density electronics inside each unit. The electrical connection systems must also be impervious to cyber intrusion and EMI, (electromagnetic interference) from outside and adjoining signals within their equipment. These electronic requirements occur simultaneously with the drive for high mobility in the extremely rugged environments of a battlefield. Advanced sensors and electronic devices must also be small, lightweight and offer continue performance during high shock and vibration. One solution to these combined requirements is to design an "application specific" interconnection system that uses Micro-sized and or Nano-sized military qualified connector and cable elements.

*What happened to older and more established military electronics? In recent years, microelectronic devices operate at much higher speeds. Chips are being built with materials that switch digital levels at multiple levels using very low voltages. These fast rise-time devices moved from silicon to using GaN, (Gallium Nitride) and GaAs, (Gallium Arsenide) charge-coupling devices for multiple digital signaling processes. The new chips offer higher speeds because electrons travel about five times faster in Gallium Nitride and Gallium Arsenide than they do in silicon. Gallium materials have a natural resistance to electrical current before other elements are diffused into the base material and are therefore "semi-insulating" instead of semi-conducting. They can also work in a wider range of temperatures than the older silicon based chips. Fortunately, gallium arsenide operates well within higher radiation environment giving a significant advantage for military types of applications.

Sensor and detector designers have employed "field-effect", (FET) transistors to offer a broad family of new sensing systems. These

devices range from moisture and material detection instruments to include detection of radiation changes and even the smell of emissions from a chemical or a person. The new FETs are built using a sensitive layer of oxide called the "gate". They can detect changes in conduction due to environmental changes on or near the gate surface. Various gate and oxide types are built on the surface of the FETS that help route the detected information to and from the source and or drain of the transistor. Metallic layers are added to create insulated gate, MOSFETS (metal oxide surface field effect transistors) used in signal and power level management within the operating system. Variations in sensors include motion and pressure detection as well as image sensing camera technologies that can feed high pixel volume into processor and storage modules.

Designers have begun combining signal and power within one cable. Analog and digital signal management are often coordinated within one cable module. Multiple data acquisition, storage and retrieval information is processed simultaneously and included in compact, monolithic units. New image analyzers can receive and compare photos to established reference data for the soldier. Active sensors and processing chips are now moving away from big-box data storage and data centers to selectively placed modules near where the sensors are placed. Many robotic devices carry their own set of electronic processing systems onboard.

Evolving interconnections routing power and signals to and from sensors has shifted toward lower voltages from about 3 volts to 12 volts. The new cables can support differential digital signaling that only requires milliamp current levels. Shorter cable lengths and smaller connectors have become necessary in many compact units. Wiring cable has shrunk in diameter but ruggedness, and flexibility remains critical. Noise, EMI and Cyber shielding has become more important as new military circuitry has rapidly evolved toward use in remote robotic equipment for operation of autonomous defense systems.

In time, many of the older standard connector designs and cable standards have not fit the needs of the equipment needed for rapid portability and remote control electronics. To solve the need, cable designs have moved to including multiple signal types, of analog and digital with power by isolating and shielding each section or type of signal. Finally, an over-all cable jacket is applied to meet the environmental needs. Connectors also have adapted designs to handle mixed or hybrid signals. Military reliability standards were retained and most often the key elements in the new interconnections are used within selectively modified designs.

"All-in-one", the "next generation" cable and connectors are adding



more capability and features for multi-signal instrument support. Ground systems during battlefield conditions are in direct contact with overhead constellations of orbiting satellites for a complete range of communication, precision positioning, remote weapon control as well as soldier health and tactical management. High speed microwave signaling can be received and controlled within the coaxial connector to cable simultaneously while micro-wiring delivers power supply needs to active elements within the system. High-speed digital and analog data from sensors on-board the same robotic device is collected stored and processed within the same cable. The Micro pins, inside the connector, can offer higher current and power where needed. Each digital signal set would be wrapped and shielded separately to insulate them from adjoining data. When transmission to a remote area is needed, the data is routed through the coax connector and cable to a portable antenna for conveyance to the satellite above. Coax of this size and design can provide up to 20 Ghz. transmission. Depending on the equipment; cable and connector systems are shielded to insure total cyber security of the cable and connector. Designing multi-signal cable and connectors has become a standard procedure with today's design and manufacturing technologies.

"Standard vs custom connectors" often becomes a discussion about application, time and cost. It is notable today, that tailored variations of high reliability customized standards are done quickly and at much lower cost. Most standard connector models are in residence in solid modeling software at the connector supplier's factory. A system designer can first review the standard designs and then call and work remotely with the connector supplier to adapt and even re-size connectors for new multi-signal defense equipment with little effort. The solid-works design systems can then send data to 3-D modeling or CNC machines to build up the 1st article product. The connector and cable can then be placed into the new unit to assure form and fit within a very short time. The key is using the same pin to socket mating elements within currently high reliability connectors in the industry. Multi-signal custom design begins with itemizing a specific list of what power and signal types are required for the instrument, as well as how many of each type, will be required. Items like size, weight and shape can follow in a discussion with the solid-model design engineer. In many cases, today, multiple signal type connectors have already been designed and are available that may meet your requirement. For more information call Omnetics Sales and or visit our site at:

www.omnetics.com

OMNETICS
CONNECTOR CORPORATION

Will-Burt to debut the Mobile Sentry at FDIC 2021

The Will-Burt Company will introduce the Mobile Sentry tethered aerial system at FDIC International 2021. Designed to deliver autonomous scene illumination, persistent video surveillance, and communications for mission-critical operations.

The Mobile Sentry tethered aerial system (TAS) is an automated, quick-deploy, tethered drone system capable of delivering scene lighting, enhanced visual surveillance, and telecommunications.

The Will-Burt Company will be conducting live demonstrations of the Mobile Sentry TAS at the FDIC International exhibition held in Indianapolis, IN from August 2-7.

With autonomous launch, flight, and landing features, personnel can be designated to critical tasks requiring more diligence rather than piloting and flight monitoring. Reaching an elevation up to 150 feet / 45 meters, the TAS provides wide area coverage of the emergency scene. Interchangeable and multi-payload capabilities including

thermal sensors, video tracking and license plate reading, communication devices, LED lights, and EO cameras allow the Mobile Sentry to be tailored for multiple scenarios. Mobile Sentry is a lightweight, man-portable tethered drone system with portable or vehicle base stations available.

Richard Lewin, CEO and President of Will-Burt comments, ***"The progression of elevation solutions from Will-Burt is revolutionizing the industry with the latest technology available. Will-Burt is proud to be the first to provide high-powered scene lighting from a drone system designed specifically for first responders. This technology changes the way an operation is not only illuminated but also recorded for evidence and safety."***

After FDIC our Will-Burt Sales Team will be available for live demonstrations of the Mobile Sentry system. Visit **www.willburt.com** for more information.





MOBILE SENTRY™

Tethered Aerial System



4GD at DSEI

Close combat immersive technology specialists, 4GD, are returning to DSEI in September 2021 following two productive years that saw the veteran-run U.K based company achieve significant business objectives including:

building new partnerships, releasing new products to the market, participating in demonstrations, and delivering to new customers. 4GD's offerings became even more relevant as a result of a global pandemic that significantly limited the ability of troops to train together, raising the issue of decentralised CQB training and the need for realistic simulation technology.

In January this year 4GD released their ECFFECTUS tactical performance data collection and analysis system, as well as ACIES IntegratedRealities synthetic environment. They are two revolutionary solutions in the close-combat training market as they allow 4GD to introduce other

combined arms simulators into the SmartFacility®. Highlights of the year also include the opening of the 4GD METALab research facility, partnerships with D3A and Parrot, attendance at the inaugural British Army BattleLab event, participation at the Army Warfighting Experiment and the delivery of cutting-edge training facility to the 16 Air Assault Brigade.

At DSEI visitors will find a sample of ACIES IntegratedRealities which seamlessly brings together the physical and synthetic worlds. In IntegratedRealities entities exist simultaneously in both of these worlds and an action taken in one world can have an effect on another. For instance, 4GD smart targetry "SimStriker" amongst other things, can record hits from non-ballistic ammunition. When accurately engaged by a soldier in the physical, the target will drop. When linked to the SmartFacility's IntegratedRealities system, ACIES, the SimStriker also appears as the avatar of an enemy combatant to anyone with a portal to the virtual world. Therefore, when the target is engaged in the real-world

and drops, the avatar will also be neutralised and anyone viewing its virtual representation will see this. If, conversely, the target's virtual avatar was shot in the simulation the avatar would drop and so would the SimStriker. 4GD will be demonstrating the first half of this IntegratedRealities loop and invite visitors to enter and clear a CQB lane armed with a UTM weapon. Outside of the range, viewers will be able to see their progress, in synthetic on a tactical UAS feed. This will also be available on replay afterwards.

Whilst full functionality can only be provided in a fully enabled SmartFacility®, the team will be available to field questions and hint at the exciting opportunities ACIES unlocks. Visitors with an interest in Mortars, Snipers, UAS or any combined arms, are welcome to explore how 4GD, and their partners D3A, can build these into a joint physical/synthetic battlefield.

As is customary at DSEI, 4GD will also host refreshments at the end of each day.

Join 4GD at the Brigantes stand, H1-480.

www.4gd.co.uk



FIGHT FOR FREEDOM. NOT INTERIOR SPACE.



The Cummins Advanced Combat Engine (ACE) is ideal for new or repowered armored vehicles where available power is key but so is maximizing interior room. It features a compact and modular opposed-piston configuration with an advanced two-stroke technology. This eliminates the valvetrain and is a major leap ahead in power density and heat rejection. A Cummins design developed with the U.S. Army, ACE is uniquely suited for all operating environments. Whatever your mission, the Cummins ACE gives you more with less.

cummins.com/defense

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U.S. Army awards Cummins Inc. \$87M contract to deliver the Advanced Combat Engine (ACE)

Columbus, Ind. — Cummins Inc. (NYSE: CMI), a global power leader, has been awarded an \$87M contract by the U.S. Army to complete the development of the Advanced Combat Engine (ACE), a modular and scalable diesel engine solution, capable of hybridization, that uses innovative opposed-piston (OP) technology to provide leap-ahead capabilities in power density and heat rejection not available in the current marketplace.

The recently awarded Other Transaction Authority (OTA) contract builds upon a competitive multi-year effort from the U.S. Army's Ground Vehicle Systems Center (GVSC) to develop transformational powertrain technology that is power dense, thermally efficient, modular, scalable, and affordable enough to enable the toughest mobility, survivability, and lethality vehicle requirements. Furthermore, the OTA allows for transitioning the new technology into the next generation of vehicle programs ahead of the programs' launch dates.

ACE's innovative OP technology provides a 50% increase in power density, a 20% reduction in heat rejection, and 13% improved fuel efficiency when compared to today's best in class combat engine. ACE's flexible layout options allow the engine to be configured in 3 cylinder, 4 cylinder, and 6 cylinder arrangements to deliver power ranging from 750 to 1,500hp. ACE can be integrated into hybrid architectures enabling commonality, thereby eliminating the expensive logistical burden of having multiple combat powertrains and facilitating the incorporation of new electrified technologies.

"We are excited to continue our valuable partnership with Cummins on the development of the Advanced Combat Engine (ACE); what's under the hood of the Army Ground Vehicles is also what drives our team's efforts at enhancing capability development," said Alfred Grein, Executive Director for Research & Technology Integration, U.S. Army DEVCOM Ground Vehicle Systems Center. ***"This project is a key part of our research and development work, and we see ACE as a potential enabler for both traditional and hybrid electric powertrains applicable to current and future combat vehicles."***

"ACE offers the U.S. Army rock solid Cummins engine

performance coupled with a configurable, flexible architecture to support their complete portfolio of combat vehicles," said Norbert Nusterer, Vice President and President of Cummins Power Systems. ***"ACE also offers the option to integrate into hybrid architectures and leverages Cummins' expertise from investments already made in the commercial space. We are excited to expand and deepen our longstanding relationship with the U.S. Army and contribute more cutting-edge technologies that support the current and the next generation of combat vehicles."***

Cummins engines are in more tracked combat vehicles today than any other brand. As a major supplier of diesel engines and gensets for defence purposes throughout the world, Cummins understands the needs of the U.S. military. In every mission, Cummins-powered equipment has served with distinction, earning the highest commendation for durability, dependability, and performance. Achates Power is the opposed piston technology partner of Cummins for ACE and a recognized expert in opposed-piston engine technology.

"Coupling our opposed-piston technology with Cummins's robust engine design, manufacturing, and new product introduction capabilities allows us to create a high performing and reliable engine for military operations," said Dave Crompton, President and CEO of Achates Power. ***"Achates Power is pleased to continue to support Cummins as a key technology partner in creating the next generation of engines for combat vehicles."***

For more information on the Cummins Advanced Combat Engine, please visit

www.cummins.com/defense

Excelitas Technologies Introduces New OrclR Long Range, High Definition MWIR Thermal Camera

Excelitas Technologies Corp, a global technology leader delivering innovative, customised photonic solutions, outlines its latest camera development – OrclR – a long range, High Definition (HD) MWIR Camera.

The OrclR combines the latest small pitch sensor technology with a custom designed, continuous zoom optic to deliver exceptional long-range imaging performance in a compact space envelope.

OrclR is the latest embodiment of the Excelitas modular camera architecture for high-performance, high definition, MWIR thermal imaging. This architecture combines exceptional image clarity with affordability by leveraging a high level of commonality across the camera range. OrclR is optimized for longer range applications including border and naval surveillance, fire control and C-UAS applications. For maritime installations, OrclR features an optional Diamond Like Carbon (DLC) tilted window, providing protection against wiper abrasion and environmental conditions.



An evolution of the proven CheetIR-L thermal camera, OrclR offers increased range performance with a longer focal length of 500 mm in the narrow field of view. The philosophy of the Excelitas camera range is to provide market-leading imaging performance in a ruggedized, low SWAP-C package. This is achieved using a custom designed, F/3 zoom lens combined with the latest generation of high operating temperature (HOT), 1280x720, 10µm imaging engine. OrclR delivers an unrivalled level of performance to enable fast and effective decision making in a compact package.

OrclR has been designed to accommodate future technology enhancements by offering the option to adopt future sensor developments as they mature. This innovative approach provides integrators and end users with the latest in MWIR imaging technology, increasing camera performance with minimal obsolescence and greatly reduced through life costs.

Additional information about the OrclR is available at <https://www.excelitas.com/product/orcir-long-range-high-definition-thermal-imager>.

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BRINGING FLEXIBLE SOLUTIONS TO UNPREDICTABLE ENVIRONMENTS: MOBILE SECURITY HAS BECOME MORE IMPORTANT THAN EVER.

The ability to position security, surveillance, jamming and command capabilities exactly where and when they are needed is increasingly essential, and demand for mobile security solutions is on the rise. Security innovator unival group provides specialised solutions built for flexibility to clients operating in unpredictable and changing environments.

THE RISE OF MOBILE SECURITY

Mobile security is one of the strongest growing domains. Its great appeal is to shift a checkpoint but at the same time have full screening or surveillance capabilities at hand.

Applications are wide-ranging, and growing in significance. Clients are looking for mobile units for people and baggage screening. This is going to be more and more a global phenomenon, because migration is going to be one of the key security issues that most governments will face in the coming years.

Mobile solutions are particularly crucial when border and migration control demands screening capabilities in areas where there is no fixed infrastructure. Other mobile capabilities, like surveillance and security (including drone defence) solutions, have a broad variety of applications, from public security and law enforcement to event security and VIP services, where being able to bring in mobile solutions allows organisations to deploy security capabilities flexibly and at short notice.

CHAMPION PRODUCTS

The MXV (MODULAR X-RAY VAN) has been specifically designed to provide on-demand high-quality screening of luggage and cargo, with all necessary systems integrated into a mobile platform such as the Mercedes-Benz Sprinter Van.

The MSS (MOBILE SCREENING SOLUTION) vehicle stands out as a very flexible mobile checkpoint that can be used for a large variety of applications. It is a fully-fledged checkpoint that includes people and baggage screening, along with all the other sensors that you would typically find at an airport checkpoint, including trace detectors, liquid detectors, passport control, face recognition and any other kind of biometric checks.

The screening applications for the MSS are not limited to airport security only. They can also be used for border control, stadiums, events and VIP security. Vehicles are equipped with all different kinds of cameras and sensors and integrate all these sensors in a management platform, which allows to synchronize the information and to send it to a remote control centre.

By integrating more functions and sensors, such as video and alarm management platforms, unival's new solutions increasingly pursue automation. Working both in fixed and mobile infrastructure scenarios and being able to operate remotely by not having to deploy experts in the field is a key requirement these days.

THE UNIVAL APPROACH

The company's full portfolio of solutions means that unival is ideally positioned to provide clients with the option that's right for them, whether that's a stationary, mobile, semi-mobile or combined solution. Mobile security options can operate as a standalone solution or as an extension to stationary security.



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53113 Bonn - Germany

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info@unival-group.com
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The MSS | MOBILE SCREENING SOLUTION the worldwide first completely autonomous mobile security checkpoint, featuring a fully integrated Walk-Through-Metal-Detector, X-Ray baggage screening system, 360° Video Surveillance and more.



MSS | MOBILE SCREENING SOLUTION

MSV | MODULAR SURVEILLANCE VAN

The MSV | MODULAR SURVEILLANCE VAN is the latest generation of the very successful unival surveillance van.



The MXV | MODULAR X-RAY VAN is the newest version of the uniSCAN MXV and has been significantly upgraded in many aspects.

MXV | MODULAR X-RAY VAN

The MXV DV | DUAL-VIEW X-RAY VAN is the first mobile and dual-view X-ray scanner with a tunnel opening of 100×100 cm.

MXV DV | DUAL-VIEW X-RAY VAN



Maintaining wheeled vehicle mobility with Tyron Runflat

In the constantly evolving theatre of operations, protecting lives in high mobility vehicles is critical.

TYRON Runflat

Recent changes have seen the focus shift increasingly to urban operations where wheeled vehicles have a major advantage over tracked, heavily-armoured vehicles. The line between wheeled or tracked vehicles has further broadened with the significant growth of ultra-maneuvrable 6x6 and 8x8 wheeled platforms.

However, wheeled vehicles come with their own challenges. Most notably, their vulnerability 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.

A recent market win for Tyron Runflat's technology highlights the continued demand for increased mobility and safety for military vehicle fleets, with the company's All-Terrain Rubber Multi-Piece (ATR-MP) runflats forming part of an industry

package selected to upgrade the British Army's Ridgback and Mastiff vehicles for deployment to Mali.

The equipment upgrade was carried out by NP Aerospace to re-engineer the vehicles under the UK Ministry of Defence's (MoD's) Protected Mobility Engineering & Technical Support (PMETS) contract. This Urgent Capability Requirement contract, awarded to NP Aerospace in May 2020, includes an off-road mobility upgrade of Ridgback and Mastiff vehicles and associated spares. The upgrade was 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. Key to Tyron's work 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 expediated timescale was central to the selection of our ATR-MP for this programme," Peter Simson, Director, Tyron Runflat, 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."***

As part of the package of the new vehicle system implemented – including new independent suspension systems, upgraded driveline, steering and braking systems, central tyre inflation systems (CTIS) and increased diameter tyres - 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,” Simson 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.”

All-Terrain Runflat technology goes back some 40 years, with the intent to give a wheeled vehicle with one or more tyres deflated the potential to continue to manoeuvre to a place of safety, over any terrain. Tyron's ATR runflats are designed to maintain mobility and safety during and after tyre deflation, whether due to ballistic attack, blowout, or puncture, 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.

“There is no such thing as a ‘one size fits all’ solution when it comes to military runflats, but we think the ATR-MP comes fairly close,” Simson said. “We also continue to innovate in order to give our customers the widest range of options to suit their operational requirements, with recent developments focusing on helping military forces reduce the weight of their vehicles.”

Military vehicle operators are seeking to offset the increased vehicle mass of their fleets brought about by increased armour and the addition of Active Protection Systems to already heavy vehicles. Tyron has approached this challenge with the inclusion of carbon cored rubber multi-piece runflats in its portfolio, which maintain the durability and serviceability of rubber and help reduce overall vehicle weight significantly.

“We recognise that every kg counts, and our ATR carbon runflats are up to 40% lighter than standard systems,” Simson said. ***“That can result in a 250kg unsprung weight reduction on an 8x8 AFV.”***

Additionally, with forged aluminium also reducing mass compared to traditional steel wheels, Tyron believes that future non-metallic developments that give improved blast protection whilst reducing weight will further enhance vehicle dynamics. ***“The wheeled vehicle is not going anywhere in the medium term, if anything their deployment will continue to grow as conflicts shift to more urban operations where wheeled vehicles offer the tactical advantage over tracked,”*** he said. ***“So, we continue to innovate and look ahead at the coming challenges our customers will face and explore how we can help overcome them to keep their vehicles moving and their personnel protected in the field.”***

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

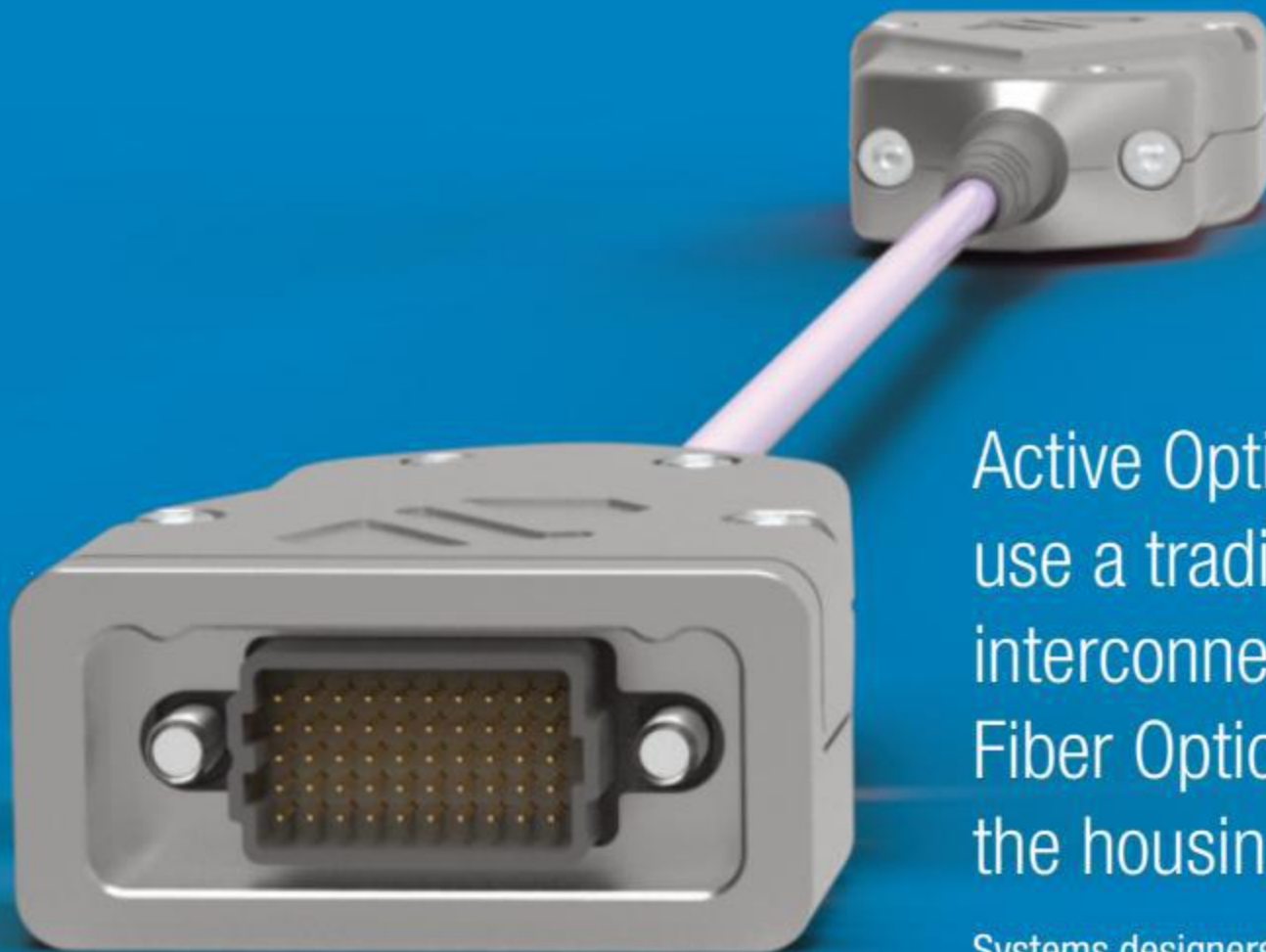


www.tyron.com

Simplifying System Design with Active Optical Cables



New Space-grade and Rugged AOCs offer unparalleled design flexibility



Active Optical Cables, or AOCs, use a traditional copper interconnect coupled with a Fiber Optic transceiver within the housing of the cable.

Systems designers can utilize AOC in effort to add high speed and EMI protection to the application without having to design in a bulky transceiver on PC Boards.

Since the transceiver is located within the cable, a traditional copper interconnect can be board mounted allowing the engineer to use the same board design in



applications where a short copper cable is sufficient or when several meters of fiber optic cabling is necessary. In short, one system can be designed to utilize copper cabling or fiber optic cabling.

Consider, for example, an engineer working on a specialized imaging system for aircraft with the requirement that the system work both on small training aircraft as well as large, military cargo aircraft.

The application requirements for the training aircraft note EMI protection is not necessary and physically, the data processing unit is less than a meter from the optical sensors. In this case, the data processing unit will be connected to the sensors using traditional copper cables.

In the cargo aircraft, the data processing unit is located 40 meters from the optical sensor and the customer specifies EMI Protection is a critical requirement. In this application, the same data processing unit and sensors will be used however the engineer specifies an Active Optical Cable to connect the two.

The ability to use copper or fiber as necessary simplifies the system design and implementation process by negating the need to create a system designed for copper and a separate system for fiber.

Rugged Active Optical Cables

The ease and benefits of hassle free fiber afforded by

Active Optical Cables were a natural fit for defense and aerospace applications, however the AOCs commonly found in datacenters would not withstand the demanding mil-spec requirements. Determined to bring bolt-on high speeds and EMI protection to rugged applications, AirBorn engineers set out to develop a ruggedized AOC.

After five years of development, testing and qualification, AirBorn's Space-rated AOC and Rugged AOC came to market, giving engineers the opportunity to use fiber where it was previously unavailable.

The company's AOC product is factory terminated, reducing customer assembly time and costs. Terminating fiber on the battlefield just isn't an option. AOCs

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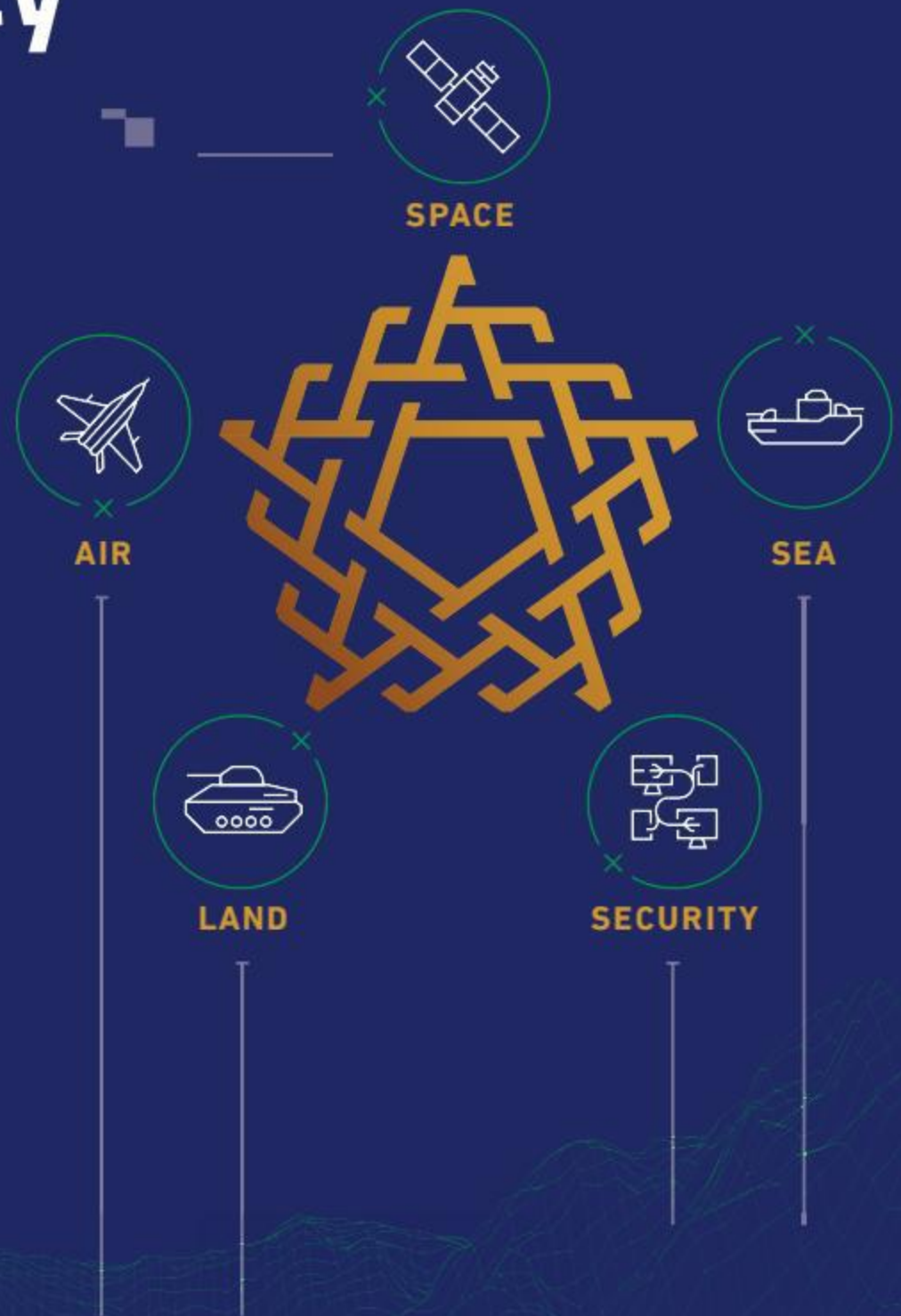
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Discover the trillion-dollar Middle East market at DSEI with World Defense Show

Meet the senior team behind Saudi Arabia's first-ever defense exhibition and learn more about opportunities in the Kingdom and beyond

Saudi Arabia's inaugural World Defense Show in Riyadh will unlock the trillion-dollar Middle East market for firms of all sizes during four action-packed days of live displays, exhibits, conferences and seminars. But while the event itself does not officially kick off until 6-9 March 2022, the senior team behind the show are coming to London – offering DSEI attendees an exclusive insight into myriad opportunities for major manufacturers and startups alike in Saudi Arabia and beyond.

As part of the Kingdom's pavilion at DSEI – which runs from 14-17 September – senior World Defense Show representatives will present the show's unique features, including the Official Military Delegations Program, high-level networking opportunities and showcase feature areas. They will be joined by organisations including show founder GAMI (General Authority for Military Industries), SAMI (Saudi Arabian Military Industries) and major firms from the Kingdom making an impact across the defense industry.

Thousands of senior defense leaders in one purpose-built venue

Hosted at an 800,000 sqm purpose-built venue, World Defense Show is expected to welcome a global audience of more than 30,000 visitors. With more than 70% of space already allocated, WDS is set to become a major international event in the global defense circuit.

Every two years, the show will provide insight and access to technological innovations that are shaping the defense industry: from start-ups and innovators to established multinationals. As one of the world's top spenders in the defense sector, Saudi Arabia's geographic location and international presence allows the kingdom to serve as the ideal location for such a show.

Unlock the Middle East defense opportunity

In line with the Kingdom's Vision 2030 ambition to localize 50% of domestic military expenditure, World Defense Show will highlight local capabilities transforming the future of global defense.

The event will exemplify how the localization efforts of key regional players, like Saudi Arabia, are placing a greater focus on enhancing homegrown production and innovation while upskilling citizens across the industry. Systems integration, tech innovation, research and development are among key areas, creating major opportunities for global industry players to play a part in local growth.

Join major exhibitors and startups to discover the latest innovations

Major exhibitors attending the show include Lockheed-Martin, Embraer and Rolls-Royce, as well as Saudi entities including Advanced Electronics Company and Military Industries Corporation.

The variety of expected exhibitors, from SMEs to Primes, will be complemented by an area focused on startups. Ventures will be connected with investors, financial houses and funds ready to invest in up-and-coming talent. These features are complemented by an interactive Command and Control Center, showcasing the latest interoperable systems that can coordinate activities across all defense domains

Meet high-level delegations, buyers and future talent

All exhibitors will have access to a dedicated Delegations Program, providing opportunities to meet dignitaries from around the world. Another benefit is the KSA Government Program, offering access to influential government figures and information about Saudi Arabia's opportunities.

Complementary show features, like the tailored Meet-the-Buyer and Official Military Delegation programs, will promote collaboration and investment between defense players and governments across the entire industry value chain in an optimal meeting environment.

World Defense Show's ambition is to highlight opportunities at every level of the Kingdom's expanding value chain by connecting stakeholders to the national defense ecosystem. In March 2022, leaders from every engine of the global defense industry will come together in the heart of Riyadh, propelling opportunities to the next level – and DSEI attendees will be among the first to get an exclusive glimpse into the opportunity.

World Defense Show will be held in the presence of Saudi Arabia's key leadership, international delegations and prominent industry decision makers from around the world. To learn more about the show, visit www.worlddefenseshow.com.

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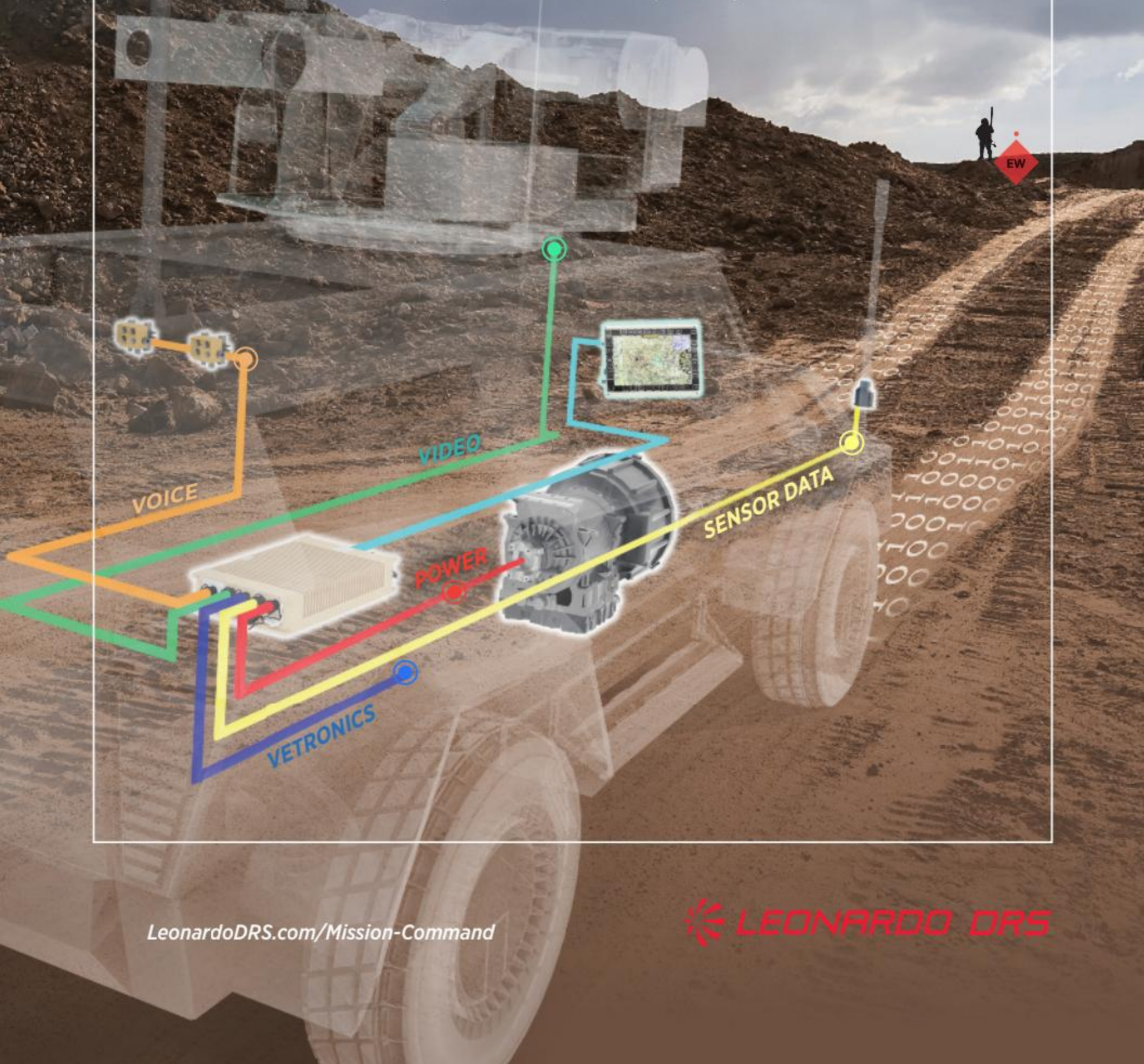
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