

A soldier in camouflage gear is seated inside a vehicle, operating a control panel. The panel features a laptop with a blue keyboard, various electronic equipment, and a mounted camera. The soldier's name tag reads "JONES". The background shows a desert landscape.

M

MILITARY SYSTEMS & Technology

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The Defence Suppliers Directory Magazine

FEATURING...

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OMNETICS

AERO METALS ALLIANCE

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DMS TECHNOLOGIES

KEWELL CONVERTERS

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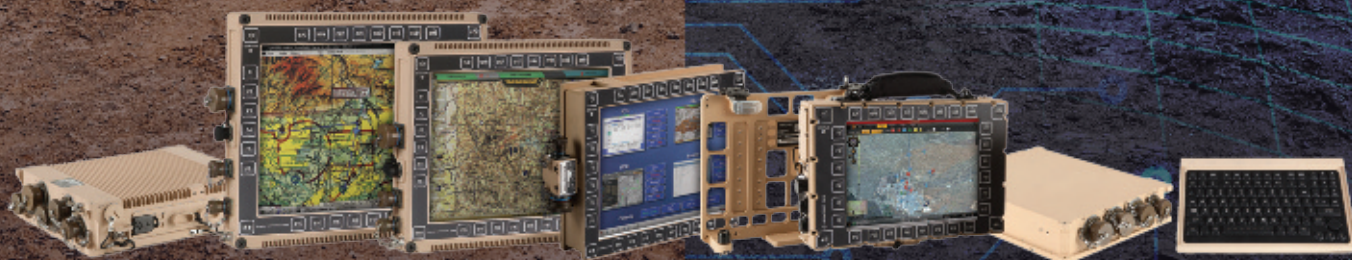
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Welcome to this Autumn 2020 edition of the Military Systems & Technology Magazine.

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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DRAWING LESSONS FROM YEARS OF EXPERTISE TO SUPPORT THE EVOLUTION OF MILITARY COMPUTING

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

Leonardo DRS has been involved in the UK Bowman project since its inception, having 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 upgradable approach has proved to have long-term benefits to not only Leonardo DRS, but also to the UK 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 US Army



BOWMAN Management Data Terminal

has been a core strategy of ours over a number of 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 provide the enhanced capability that the British Army now 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 saving to the customer. In winning the re-compete BCIP5.4/5.5 Bowman contract in 2008, we were



Mounted Family of Computer Systems Tablet

able to draw together the product development roadmaps for both the US Army and the UK Army. We did so by leveraging technology drawn from the US Army Force Battle Command Brigade and Below (FBCB2) contract that DRS had won and was being delivered at the time.

US AND UK 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 on which the evolution of the UK's Morpheus' to a more open system will be built.

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 US 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. US Army MFoCS effectively replaced FBCB2 so this was a natural progression and once more allowed Leonardo DRS to align the primary US and UK brigade and below C4 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 are mission-critical and Leonardo DRS believes that there should be no compromise in their ability to perform in the harshest of conditions.

The nature of the capability that Leonardo DRS provides has changed considerably over the past 15-16 years since we first won the Bowman contract, and then soon after, the US Army FCB2 contract. The original focus of our efforts was to ensure that we provided the very best tactical computing solutions that would stand up to the rigors of a battlefield environment.

Leonardo DRS' track record in this regard is unmatched. We have installed over 300,000 systems to date and are delivering unparalleled performance in terms of reliability, availability and resilience. These product attributes remain constant today.

However, the nature of modern fighting vehicle architectures has moved on and so our hardware and software has evolved as well.

GVA

MFoCS is much more about delivering an integrated networked capability, which can support a wide range of user needs and applications, as opposed to the previous stove-piped system which supported a single application. Although Bowman 5.6 may not mirror the multiple applications and network interfaces supported by MFoCS, the solution that Leonardo DRS is now delivering has the capability and capacity to migrate to the basis of a common vehicle architecture capable of supporting multiple applications.

The MFoCS/Bowman LSU computing baseline will support multiple virtual machines and Local Area Networks, interface with a range of video sources, and support more complex security architectures, and therefore provides the basis for capability growth. This positions Leonardo



Leonardo DRS Data Distribution Unit Block IV

DRS to continue to develop our solutions as the MoD looks to the future and to Morpheus.

A key part of the Leonardo DRS product roadmap is the development of Generic Vehicle Architecture (GVA)-compliant versions of the MFoCS core-computing products, which again leverage the common computing and display technologies and economies of scale with such a large US project of record, while adhering to the requirements of standards such as Def-Stan 00-82 and 23-09.

Leonardo DRS is in a unique position. We have derived a great deal of experience in delivering tactical computing content into the two largest BMS/C4i projects conceived in the form of FBCB2, evolving to MFoCS in the US and UK Bowman over a 15-year period. This experience has provided us with a wealth of knowledge and capability that goes into everything we do.

Today, Leonardo DRS is able to provide complete vehicle architectures that are both

network and application-agnostic and cybersecure while delivering world-class networking, voice, video and tactical computing infrastructure. The development of Leonardo DRS' latest variant of Data Distribution Unit Gen 4 (DDU-4) is a prime example. The DDU-4 shares much of its DNA with the primary MFoCS II tactical server, but builds in capabilities for additional functionality such as voice-crossing banding between radios with different waveforms, additional Ethernet and CanBus interfaces along with support for Tactical LTE and enhanced GPS capabilities. It also fully integrates with our Vehicle Intercom System and multi-touch Commanders Display.

For more information on Leonardo DRS platform computing products, technologies and expertise, please visit our website at LeonardoDRS.com/platform-computing.





OMNETICS

CONNECTOR CORPORATION

A leading global provider of precision and high-reliability electronic connectors and interconnect systems.

For more than 30 years, we have engineered an extensive portfolio of innovative products, with a special focus on micro-miniature and nano-miniature interconnects. With over 300 direct employees, all products are built in the Minnesota factory in compliance with ISO 9001 offering QPL products to MIL-DTL-83513 and MIL-DTL-32139 and are ITAR registered.

Our connectors are among the smallest on the market and deliver exceptional performance in challenging work environments. As interconnect technologies continue to evolve, we design next-generation products that help bring transformative ideas to life.

Our connectors are highly sought after by designers working in the military, aviation, aerospace, medical and other leading-edge industries. We are also leaders in high-mobility interconnects for

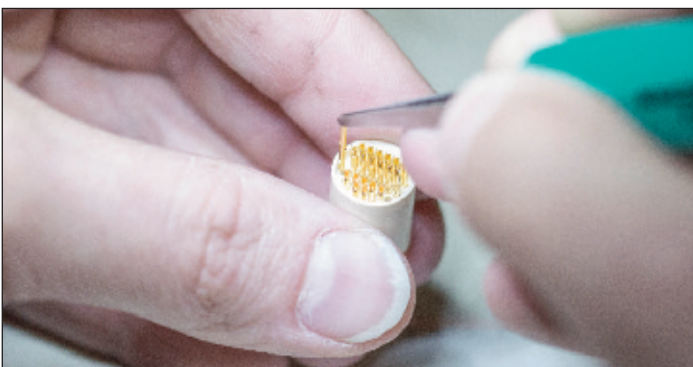
applications in robotics, surveillance systems and orbital satellite technology.

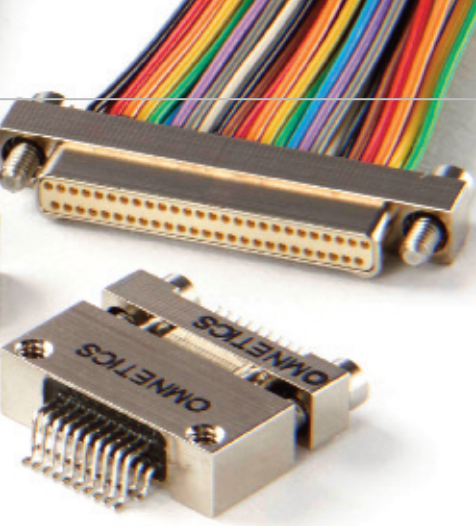
Omnetics understands the rigorous operating conditions mission-critical applications endure and our solutions include EMI shielding, IP sealing, polarization, rugged materials, and other elements that ensure connectivity under pressure. We maintain a large inventory of COTS products.

Our high-reliability portfolio

Omnetics' range of nano, micro and hybrid connectors are ideal for defence programmes, where factors such as size, weight, signal integrity and reliability are thoroughly considered. We provide a variety of reduced size and weight interconnection systems:

- Micro and Nano strip connectors
- Micro and Nano circular connectors
- Bi-Lobe ® / Nano-D
- Polarized Nano connectors
- Squeeze-latching Nano-D and Micro-D connectors
- MIL-DTL-32139 Nano-D connectors
- MIL-DTL-83513 Micro-D connectors
- Hybrid connector configurations
- Cable assemblies
- Wire harnesses





The Flex Pin Design

Omnetics' groundbreaking Flex Pin contact design pre-dates the advent of the MIL-DTL-32139 nano-miniature specification and today all MIL-DTL-83513 and MIL-DTL-32139 sockets mate properly with the Flex Pin. The one-piece unit is stamped from ASTM B194 beryllium copper (BeCu) to deliver high conductivity, low interference, and high resiliency. Its excellent spring properties enable it to withstand shock, vibration, and other rugged conditions and it easily passes military specification requirements. Flex Pin contacts are plated with 50 micro-inches (1.27µin) of gold over 50 micro-inches (1.27µin) of nickel and are rated at 1 amp each for Nano connectors and 3 amps each for Micro connectors. All pins are plated post-forming verify a non-porous surface. Each one is inspected by our quality assurance experts to guarantee perfection and performance.

Our expertise in ruggedized miniature connectors for military applications

Modern soldier electronic systems are being developed and deployed at a tremendous rate. Key parameters include short run interconnections, high portability, small size, low weight, rugged performance and higher speed electronics. Combining all of those parameters within one operating interconnection unit takes a lot of engineering, which is where Omnetics comes in.

Quick and efficient engineering is completed to meet the objective of the application needed for the mission. Often times, system designers consider ruggedized connectors currently available, and when existing products don't meet their application requirements, must consider modified connector designs. They may be needed to meet the challenge of their new products and how they are used. Omnetics assists by not only offering samples of the standard connectors for evaluation, but will have a "solid model" design team leader work directly with you to modify the interconnect design to meet your requirements.

New connector formats evolve and the changes can be reviewed with those involved directly in the electronics they will be used with. Omnetics begins by using proven connector components from existing QPL certified and military tested connectors. Omnetics connectors employ a BeCu (beryllium copper) spring pin to socket system in their rugged interconnects proven to exceed the shock and vibration testing in Mil. Spec 83513 and 32139. A new connector can be formatted quickly for early field testing with assurance it will perform well in the battlefield arena.

When designing Micro and Nano sized cable and connector systems used in advanced systems, consider Omnetics. Our advanced design group works directly with your engineers and forwards early designs

to our fast-turn product development group. Early samples give the system designer a big advantage in formatting and modeling our next generation soldier electronics package.

Our Three-Step-Process

New connector forms are rapidly designed using proven connector and materials as a reference to modify shape, size and function. Tailored connectors will often solve new instrument needs and secure high reliability performance based on proven materials and processes from our established standards.

Omnetics is a world leader in miniature connector solid-model design partnering with customers to provide perfect-fit cable and connectors for advanced applications. Using 24-hour 3D material added processes designers can conceive, model and build test devices quickly to meet their needs.

Omnetics has a direct Three-Step-Process. Our application-specific connectors will meet customers' needs and be available on-time!

- **Designers can view miniature connectors with proven performance on our website or discuss with our sales team. If one looks close, ask for a sample or discuss variations on email or the phone.**
- **Connect with an Omnetics connector designer for on-line collaboration making a new solid model of exactly what is needed. This should take less little as 2 days.**
- **When you like the solid models, ask for a 3D sample made using automated material added process. This should take less than 24 hours.**

The new 3D model is shipped to the customer to fit it into his new application for final approval or/and re-define some specific change needed.

Modified connectors are highly used to combine signals in what we call mixed-signal or hybrid connectors. Coax and power signal are routed through the same connector and cable as multiple digital signals. This significantly reduces the size, weight and routing complexity for the system designer. Specific applications using Omnetics connectors include high speed soldier borne and helmet communication cables, connectors for cube satellites, orbital radio circuitry on satellites, UAV controls, surveillance system digital data connectors, missile control electronics, robotic interconnections, spinal modulation, prosthetics, catheter cable to monitors and more.

We take great pride in the products we build for you.

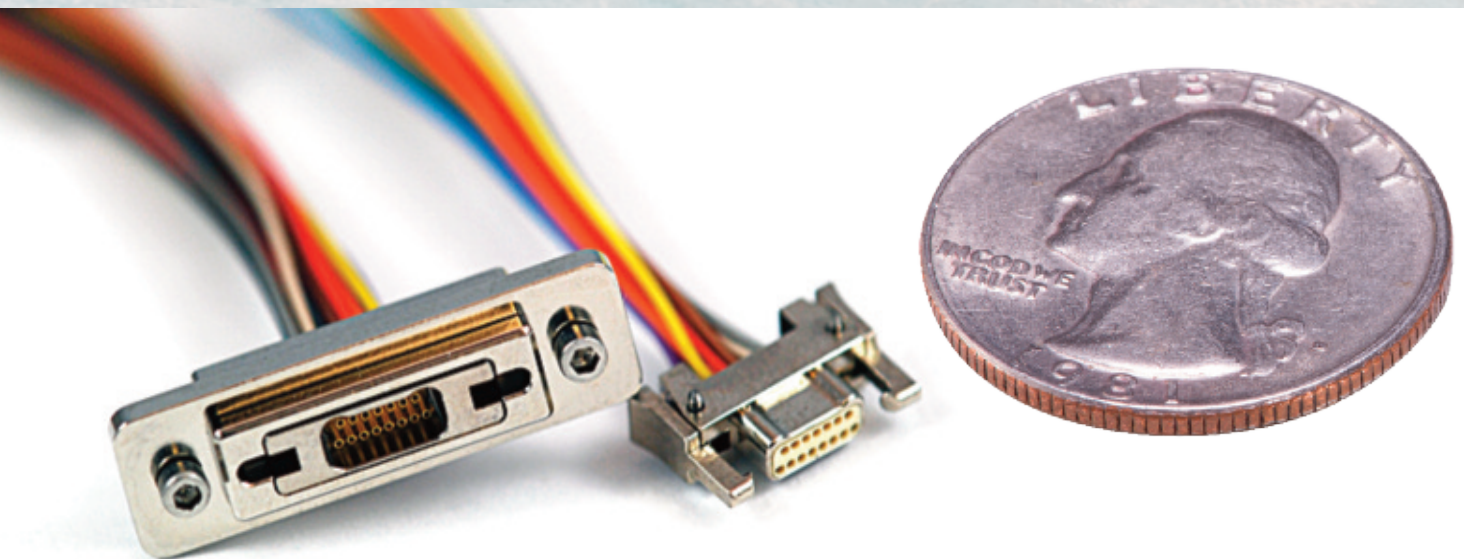
Our design team works closely with customers to create new and custom interconnect solutions for tomorrow's innovative products. Our connectors are designed, produced, and tested by hand at our plant in the United States, which features in-house automatic machining and over-moulding equipment. Omnetics is a privately held company and we exist to advance innovation wherever it is needed next.

www.omnetics.com



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Advanced Defense Helicopter Interconnection Systems

Bob Stanton, Director of Technology, Omnetics Connector Corp.

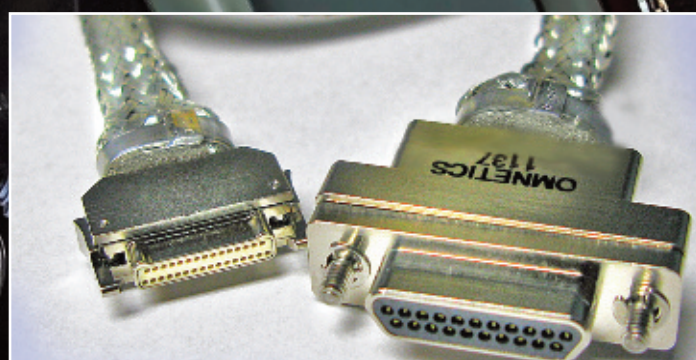


Military helicopters are packing serious upgrades throughout their capabilities from new composite rotor blades and upgraded motor systems to utilizing the most recent sensors and electronics available in the industry. Higher speed rotor and altitude monitoring circuits smooth out rapid changes in copter angle and position. Electronic steering-nulls assist pilots when challenged with multi-tasking. Sensors and cockpit displays are providing higher resolution data and images. High speed GPS positioning and mapping stays up to exactly where the helicopter is. The pilots have automated night vision and flare suppression, while talking on voice activated communications to central control. With the pilot's new biosensors, he and the command center know his personal status and health.

Modern interconnection systems have been adapted to the advanced electronics and often handle multiple functions within one mixed signal cable system. Helicopter qualified connectors have passed military level ruggedization testing for performance in both high shock and vibration applications. As a result, defense helicopters can do more, fly faster and contribute to battlefield and other extreme applications. Apache and other advanced copters can employ multiple weapon release devices that significantly empower their attack and defense capability. BAE's combined APKWS (advanced precision kill weapons systems) provide some of the most lethal instruments in the industry. Noise resistant, high signal capacity cable and connectors are required to insure immediate and proper rocket launches when demanded from the cockpit.

Helicopter cable and connectors vary in size and format based upon the specific application they are serving. In particularly noisy and if potentially cyber sensitive areas, full metal back-shelled Micro and Nano-D connectors are used with shielded cabling. This ensures high levels of EMI shielding in addition to physical protection. Higher speed signals inside the cable are separated within the cable jacket to allow combined power and differential digital signal transmission to items, like the weapon release mechanism. Direction control and target acquisition signals are received from the mothership remotely as the weapon is released. Also see autonomously guided weapons that send data and tracking back to the control helicopter. An example of very advanced electro-optical fire control technology used on defense copters today includes the Army's Arrowhead Apache system.

Helicopter surveillance information is gathered from both fire-control systems, mentioned as well as from multi-spectral camera systems mounted on the base of the ship. Pilots can now use a combination of FLIR (forward looking infra-red) and mixed frequency LIDAR (light detection and ranging) scanners to assist in decisions and tactics. The scanners can often use a combination of power and digital image signal processing that is routed from the cameras to displays inside the cockpit. These cables are somewhat smaller in diameter and designed to be more flexible. Larger gauge wire and pin to sockets are installed in one side of a Micro-D connector to handle up to 3 Amperes of power supply current. Multiple digital signal wires run within the same master cable



from the Micro-D connector with 1 Ampere differential signal capability to carry the square-wave digital information from the scanners. Each differential digital signal set contains two signal wires plus a drain wire to insure very high-speed transmission of the data. Each three-wire set is wrapped individually with metal shielding to isolate that signal from the others. Note that the video and image transmission cable also meet the SMPTE 372M standards for synchronizing video imaging performance. This insures high resolution bi-rates of 1080-pixel video at 60 frames per second. As the cable reaches within the cockpit back-panel, each digital data cable set is routed-out to various sensor and displays instruments. All of the connectors have been tested to exceed military standard reliability expectations and pre-tested and inspected for quality.

Connectors are also used to attach speaker and vision systems to pilot's helmets. Health sensors are connected to give pilot bio-med information to central control. Each cable and connector have different design requirements.

There are fast and easy ways to evaluate and select the correct connector for your specific helicopter system:

1. **List your specific electrical and mechanical needs:** signal type, current, voltage levels, size and fit for your environment.

2. **Go online and find the closest existing connector/cable format to meet your needs:** if good, order a sample first.

3. If you need size, shape, mixed signal other variations, contact your connector supplier and work directly-on-line to build a solid model. This can take less than 2 days.

4. When you like the model, ask for a 3D sample made from their prototype shop. This should also take less than 2 days.

5. Insert your new 3D model into your system to confirm fit.

6. Finally order your 1st functional model for you to test and use in prototyping.

Omnetics is a key source for rapid design and prototyping of interconnect systems.

www.omnetics.com

OMNETICS
CONNECTOR CORPORATION

LINCAD UPDATES ITS LITHIUM-ION POWER SYSTEM BATTERY RANGE WITH THE EVOLUTION OF LIPS 16

An interview with Mike Hendey, Lincad's Senior Systems Engineer



Mike Hendey

Q. Why has Lincad manufactured the LIPS 16?

A. Lincad's current range of LIPS batteries are the result of continued improvements in specific energy through the integration of new cell technology and enhanced mechanical and electronic design. The Lincad R&D team continue to evolve our LIPS (lithium-ion power system) battery range and we identified a need for an upgrade to a previous model. One of our international defence customers had also specifically requested this model be developed, so the timing seemed right.

Q. What sets the LIPS 16 apart from Lincad's previous LIPS models?

A. This is the next step in modernising our LIPS range. The LIPS 16 is lighter and has more functionality than the previous model. We have updated the electronics and updated the internal construction to keep it current and cost effective. We constantly research cell technology to ensure the cells we use are the best in the world.

Q. Is the LIPS 16 for the defence market only?

A. The LIPS 16 is primarily a military battery in the sense that it is ruggedised and has been specifically designed to be suitable for demanding military and field-based defence environments. It offers a cutting-edge upgrade to the more traditional lead acid batteries that have predominantly been used on applications such as the Hostile Artillery Locating (HALO) system. However, it lends itself well to a range of applications in different sectors that require that kind of performance.

Q. When will the LIPS 16 be launched to market?

A. The LIPS 16 will be available for purchase in 2021. We already have strong interest from existing customers, and we expect to see global demand. Due to its in-built heating system, the LIPS 16 works well across a wide temperature range. Therefore, it is suitable for use in a broad range of environmental conditions, both hot and cold.

Q. Why would customers choose the LIPS 16 over lead acid alternatives?

A. The LIPS 16's fully metallic enclosure has been sealed to IP55 to offer superior physical protection and electromagnetic screening for internal components, while other advantages can be found in the lighter weight, flexible design and an enhanced two-year storage life when in a completely discharged state.





Q. Does the LIPS 16 satisfy current regulations for transportation of lithium-ion batteries?

- A.** The LIPS 16 is versatile and offers an internal discharge feature that allows stand-alone discharge of the internal cell stack – a vital aspect for transporting lithium ion battery equipment. This feature allows the user to discharge the cell stack to levels optimised for long term storage or for transport by air in compliance with IATA regulations without the need for external equipment.

Q. What new features sets the LIPS 16 apart from previous LIPS models?

- A.** Lincad continues to take battery performance to new levels. Additional new LIPS 16 features include the ability to update the operational software and interrogate the battery memory using a mobile, tablet or PC, as well as the ability for the internal battery management system (BMS) to store periodic operational data for use in maintenance activities.

Q. What are the storage capabilities of the LIPS 16?

- A.** The step change in the electronic management systems used in the LIPS 16 offers the advantage of a two-year storage life when in a completely discharged state. The risk of an over-discharge condition, even when the battery is left on equipment, is thus greatly reduced.



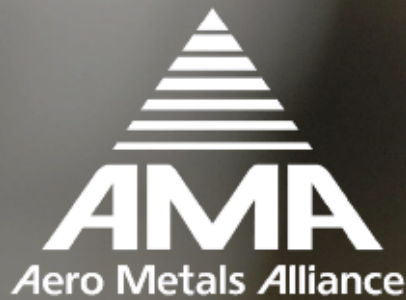
Q. What recharge capabilities does the LIPS 16 have?

- A.** Like our entire LIPS range of batteries, LIPS 16 can be recharged to return many hundreds of discharge cycles. They have been optimized to charge from our in-service range of charging systems but can be adapted to accept charge from alternative sources if required.

Q. What make the LIPS 16 peculiarly suitable for military environments?

- A.** The LIPS 16 is a solid robust battery ideally suited for military environments and has a long battery life of over 80 AMP hours. It is flexible and can be used for numerous applications from powering military radio equipment to field hospital ventilation systems. It can even be used as a generic power supply for multiple applications at the same time. ●





AERO METALS ALLIANCE

Defence Metal Suppliers

'The whole is greater than the sum of its parts' is a widely used phrase and it is nowhere more evident than in Aero Metals Alliance (AMA), an organisation formed specifically to provide a dedicated offering to the aerospace industry from five of the world's leading suppliers of metals. The aerospace industry is global and, as such, needs a global capability from its supply chain. But a capability that also recognises the value of local service and support. Through the experience and expertise of AMA's constituent partners and the geographic spread that they represent from the 13 sites located throughout the Americas, Europe and Asia Pacific, the leading OEMs and sub-contractors within the industry can

source materials, processing capabilities and supply chain management services.

The partners within AMA are the leading names within metals supply: Gould Alloys, Progressive Alloy Steels Unlimited (PASU), Service Centres Aero (SCA), Sunshine Metals and Wilsons Metals. In the markets in which they operate, the companies have established their own reputations for industry experience, knowledge and expertise. When that is brought together through AMA, the benefits to those operating within aerospace manufacturing are considerable.



The focus on buy-to-fly ratios highlights the contributing role that near net shape processing can offer. This has undoubtedly been a driver in increasing this service offering from AMA. As a major contributor in the aircraft manufacturing supply chain, this is a key area of development for AMA and its partner companies. Customers are increasingly looking to optimise their production processes. This is primarily driven by the need to maximise their own spindle time for core business activities, with AMA therefore undertaking some of the machining processes. It can take many forms, from simple cutting to more intricate processing in which near net shape pieces are supplied. Even in AMA businesses whose business is predominantly transactional (so called 'spot business') rather than contractual, the processing element is increasing. Pre-machined kits of parts to individual specifications

are becoming more commonplace. In addition to freeing up time for customers and OEMs to focus on more profitable final processing, near net shape processes can improve product quality, reduce variability and enhance component design functionality. As the industry continues to search for ways to lower buy-to-fly ratios and reduce the amount of waste, near net shape processing will have a greater role to play.

This extended range of products offered through AMA is also reflected in the range of services provided. Each partner company has its own processing capabilities which vary from business to business. In essence, the collective capability of AMA partners embodies the latest technology to meet the needs of any specific metal processing requirement, including: cutting, shape cutting, milling, surfacing, sawing, drilling, guillotining, waterjet cutting, USI testing, heat-treating or retempering, forgings and machining to near net shape.

GOULD ALLOYS

The company is a privately-owned leader in the stockholding and distribution of high integrity ferrous and non-ferrous metals. Investment is ongoing, in both equipment and facilities, building on the company's significant expansion with its move to new purpose-built premises in 2015. The production of near net shape components is a focus, with wide ranging stocks and extensive capabilities in processing. The range in both aerospace and commercial specifications/alloys includes:

- Alloy Steels
- Stainless Steel
- Aluminium
- Nickel Alloys
- Titanium
- Phosphor Bronze

In terms of processing capabilities, the company provides:

- Cutting to weight or length
- Processing which includes radiused, chamfered, turned and bored/hollowed
- Sawing facilities for both bar and plate
- Waterjet cutting
- Machine Shop (including CNC lathes, milling machines, turning centre)

www.gouldalloys.com



WILSONS METALS

Wilsons is a privately owned business and prides itself on its accuracy and service, coupled with pace and agility, in supplying high performance aerospace alloys. Wilsons is a founder of the Aero Metals Stockist industry, with extensive experience and knowledge of the aerospace market. The company has been trading successfully for over 60 years specialising in the provision of soft alloys. Long term relationships have been developed with suppliers and customers. Wilsons' expertise and capability is global and its customers value the flexible and responsive service which achieves rapid turnaround of all enquiries and accurate on-time delivery. The company carries a comprehensive stock of over 2,000 aerospace released aluminium plate, bar and sheet items and has extensive capacity and capability to cut, machine and test to customers' needs. Wilsons carries extensive stocks of customer specific items of other aerospace hard alloys in support of long-term one-stop-shop customer contracts. Naturally Wilsons holds the latest AS9100, AS9120 and ISO9001 accreditations along with numerous customer approvals. Wilsons' mission is to solve specific needs, whatever they are.

Our latest bar saws deliver high-speed, accurate and burr-free cutting of bars and other extrusions up to 540mm. Plate saws provide cut blanks up to 155mm thick and up to 4m long. Guillotine cutting of Aluminium sheet up to 10mm thick and 3m long. In addition, laser or water-jet cutting can be provided. Sheet can be poly-coated as required.

Our 5-axis simultaneous machining centre now offers customers parts machined to near net shape saving processing time and scrap. This provides very flexible high-speed machining of aluminium parts from extrusion, plates and forgings. Competitive pricing is assured through high productivity with 5-sided machining in a single set-up together with loading / unloading of parts and fixtures whilst the machine is running.

Ultrasonic flaw-detection testing, Spectrotest alloy verification, hardness testing and electrical conductivity testing is provided on request.

www.wilsonsmetals.com

W3 WILL-BURT

REMOTE LOCKING SYSTEM

Will-Burt's patent pending Remote Locking System for pneumatic masts allows an operator to lock and unlock the mast from an assured distance. No manual interaction is required to raise or lower the mast. Operation of the system is intuitive, requiring less training and reducing the risk of operator error.

The Remote Locking System is available on any Heavy-Duty pneumatic mast system or larger. Contact The Will-Burt Company for heights above 80 ft. / 24m.

ESSENTIAL FEATURES

- Ability to stand clear from payload during deployment and retraction
- Easy to understand and operate controls
- Super pins for longer lock life and increased wind survival speed in guyed applications
- Close azimuth design and two full-length keys on every mast section reduce mast movement and twist
- No routine maintenance required
- Pneumatic operation requires no fluids



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OPTICAL ENGINEERING AND MANUFACTURING

For Aerospace and Defence

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Meeting our customers' engineering and manufacturing challenges for ruggedized subsystems and components

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Simply put, we are the go-to partner for the most demanding OEM subsystem and component projects.

Components or systems or systems for defence platforms, deployed in rugged environments whatever your needs, G&H are well positioned to advise, design, engineer, manufacture, and test the products you require, when you need them.

WHAT WE STAND FOR

Our vision, mission and value proposition

Our vision

Changing the world with photonics

Our mission

Delivering world class engineering and manufacturing solutions

Our value proposition

Our technology depth and product breadth allow us to design and manufacture higher specification components, modules and subsystems.

This enables our customers to provide systems with higher performance, quality, reliability and product lifetime.



WHAT WE DO

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electro-optics**

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**Precision optics
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COMPONENTS AND MATERIALS PROCESSING	Fibre optics Electro-optics Acousto-optics Crystal optics Precision optics
MATERIALS	Crystal growth

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enable your success?

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MOD FUEL INFRASTRUCTURE

Adler and Allan has been working on MoD fuel infrastructure for over 20 years, servicing, maintaining and refurbishing mission critical assets, including; BFIs, MTFIs, heating & generator tanks, pipelines and other fuel infrastructure assets.



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We are fully conversant with the numerous regulations concerning the design, installation maintenance, inspection and testing of electrical equipment for use in explosive atmospheres including MoD specific JSP317, JSP 375, JSP 482 Chapter 8 and ESTC 6 requirements.

At Adler and Allan we have built a reputation through our collaborative approach, and today we are proud to be:

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- The largest fuel infrastructure maintenance provider in the UK to the USVF
- Vetted and security cleared to work on most MoD sites

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Fuel infrastructure design

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- Motor Transport Fuel Installations (MTFI's)

Fuel infrastructure maintenance

- 24/7 365 planned preventative maintenance (PPM)



- POL services
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A VARIED PORTFOLIO AND A VARIED LIFE IN COVID LOCKDOWN YEAR FOR LUTRA

A consulting company's life is always varied, usually challenging too. When Lutra Associates was set up the founders knew this.

It was an attraction that drew us to the field. The original aim was to concentrate on certain areas where we had strengths and expand on those. Having someone with a modicum of knowledge in target areas to view what you are doing can be very helpful particularly to entrepreneurs bashing their heads against government and large corporate inertia.

The target areas were Defence and Security market access (Into and from UK), winning business, business improvement and best practice. The Chief Executive's history suggested CBRN, EOD, Counter Terrorism, Vehicles, ISTAR, Sports/ Major Event Security and Training/Simulation would be focus areas. We were not going to manufacture anything.

Who thought 2020 would be the year that it has been? We never thought we would be involved in all of these areas dealing with all, with the exception of vehicles, at once, singularly or in combination for multiple clients simultaneously. What will the remainder of 2020 bring?

Some issues have been recurring some unique, all interesting and challenging. A flavour of our activities includes technology watch, customer support of our own manufactured products, commercial support, practical support for tests and trials, sales and marketing support and CBRN consultancy. There are more but these are good illustrations of a year in a consulting company's life.

Technology watch is a good place to start; it is the foundation of all defence programmes. Good technology, and the follow on engineering, is the wellspring of innovation which is a key driver of a successful defence programme. Today there is very little funded R&D so innovation needs to be backed by equally competent long term marketing and business development to create new and take advantage of potential programmes. Having always been interested in technology and its application to defence and security Lutra is delighted to work with a number of companies that have innovation at their heart.

Witt (Energy) Ltd fascinated us enough to make a small investment. Getting into the defence and security sectors is notoriously difficult and time consuming for SMEs as both government and large corporations are bureaucratic and slow responders to new technologies and ideas. WITT had worked out how to get a pendulum to move in six degrees of freedom so that random movement-the tides, wind etc can be ordered and captured and turned into electrical power. To target product development WITT had to find a sector that had an immediate need. Fish Farming stood out as a suitable sector. There is a need for power, and to reduce CO2, with a scalable sealed system, in, frequently, very remote difficult to access locations. The product is at the stage of final manufacturing refinements before entering service. The system is suitable for a number of defence and security applications ranging from underwater sensors to auxiliary power supplies.

Following the technology watch theme we have always been interested in a Danish company, PlastPack Defence (PPD), and their LWAC (Lightweight Ammunition Case). Put simply the mass reduction offered on a simple thing like ammunition cases by switching from steel to plastic leads to huge financial savings and operational benefits across defence.

Saving mass saves fuel, vehicles, aircraft, storage space, manpower, time and effort. Operationally vehicle and aircraft ranges and capacities increase, logistics is easier and operational activity is more secure because less vehicles means less targets and less casualties and less noise means less signature therefore less risk of enemy engagement further reducing casualties. First though there is a need to show the new is as good as or better than the old. During the Covid lockdown Lutra has been helping run and set up trials for PPD and keep potential UK customers abreast of PPD's progress and developments.

All companies struggle when dealing with government bureaucracy. Smaller companies especially so. Helping to deal with these issues, often just an experienced based explanation or a warning of a poo trap will save small companies owners hours of frustration. By sitting off the day to day grind of dealing with the issues and paper a good consultant can offer advice and make work less stressful and much more productive.

4GD have a truly innovative urban CQB training system which relies on combining several innovative technologies into a seamless whole with further innovation following along hard on the initial breakthrough. They are truly thought leaders and on the cusp of making the world of electronic assistance to training and reality ground breaking and all-encompassing with the ability to join diverse elements of training into a multi-skill, multi-level, multi-location, multi capability training system. Lutra can only make helpful suggestions and help with the marketing and commercial sides. To this end we have commented on progress and ideas and taken some of the commercial and bureaucratic load off the innovators' shoulders.

A similar role but more marketing and business development orientated has been help to assist Canadian company Survival Systems Limited (SSL) of Halifax NS access the UK market enabling them to win an order from UK MOD and become well placed to win other orders in UK. Marketing and doing the business development for this extremely competent Canadian company whose excellence is founded on R&D, mastery of their chosen subject and focus on customer satisfaction through delivery of superb products and customer support has been a joy. What SSL provide is escape trainers for underwater and surface egress from helicopters, small boats, light aircraft, amphibious vehicles and oil platforms. They are second to none. At RNAS Yeovilton they first of all provided a specialist crane for the new build escape trainer and are now building 2 underwater escape modules. Helping with the customer

support for the former and dealing with the tender response for the later without entangling the two was an interesting timing issue during the Covid lock down.

Having planned not to manufacture anything ourselves the first contract we won was a manufacturing one (the details are too complex to explain!). Providing support and upgrades for the units we delivered during the Covid lockdown was interesting. Covid lockdown really highlights the importance of CBRN to the business. Chemical, Biological, Radiological and Nuclear defence and security is a subject that was frequently brushed under the carpet. "Won't happen, not here, too difficult, defence issue nothing to do with civil life, black swan deal with it when we see one" were all phrases we have had used to tell us people at a corporate or a national level were not interested. Well it did happen, just down the road from the office as it happens and then all around us.

Salisbury and Covid were not Black Swans but White ones and pretty angry ones at that.

The C and B issues had a profound effect first in Salisbury and Amesbury and then nationally and internationally. They impacted every facet of local, national and international life. Yes it's difficult but lack of preparation nearly caused an even bigger disaster than has occurred. The difference between a military bio attack and a pandemic is vanishingly small. A nerve agent is a nerve agent is a nerve agent regardless of the target. Salisbury and Covid were not Black Swans but White ones

and pretty angry ones at that. We have devoted a lot of time to helping companies and institutions sort out what to do, when and how and make sense of some of the contradictory advice and views being offered by government and "experts". What will the rest of 2020 and even 2021 bring? In the meantime socially distance, wash your hands, perhaps increasingly important control your teens and 20 year olds and beat the virus.



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As the appointed Value Added Distributor in the UK and Ireland for Energysys, we benefit from the technical and commercial support of this global battery manufacturer. Our business activities fall into three categories of custom design & build batteries, DMS branded products and distributed products.

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Our technical team has extensive knowledge and experience of the various battery technologies and can develop and manufacture battery and charging solutions to meet your specific requirements. Our capabilities include energy harvesting systems such as solar and wind power systems. A recent contract involved the upgrade of the powerpacks for the Dillon M134D MiniGun installed on Royal Navy ships. Another contract involves the refurbishment and/or replacement of lithium batteries for location beacons on board RAF Lockheed Tristars.

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As the choice of the UK Military for over 20 years now, our 12V and 24V engine slave start units have proved to be robust and reliable. Used by militaries around the world, our packs have supported operations in the cold Norwegian winters and hot desert sun both in Op Telic in Iraq and Op Herrick in Afghanistan. Used for starting a wide range of vehicles, including small and lightweight vehicles, armoured personnel carriers, battle tanks, helicopters, light aircraft and generators.

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DMS technologies also manufactures portable remote silent power units for use with surveillance and communications equipment in use with police, homeland security units and traffic management systems. Housed in rugged plastic cases these compact remote power units are silent in operation, do not emit exhaust gases as with generators, and can be secreted, even buried, during operation.

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TRACKING FROM SHIP TO SHORE

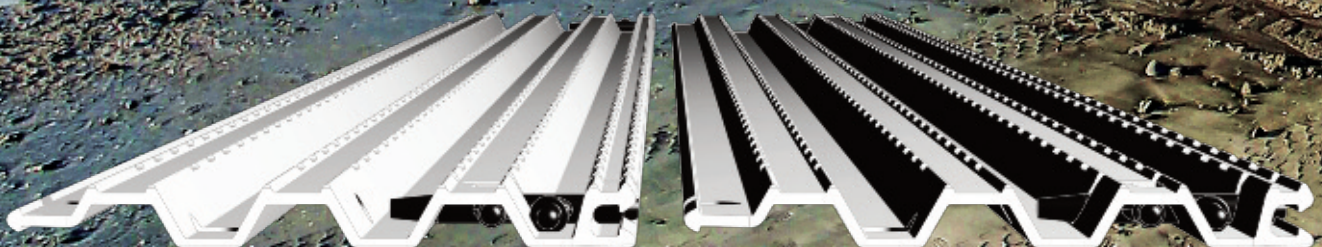
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One of the challenges that light fleets can face is facilitating beach landings.

Both wheeled and tracked vehicles can struggle to gain traction on soft ground, which makes navigating sand a complicated and time-consuming task. Vehicles can quite easily become rutted and need to be dug out to safety.

Having to stage a rescue, while causing troops to expend considerable time and effort, can also pose a real risk to personnel and assets.

Providing a high traction surface, FAUN Trackway®'s M30H Trackway® allows for the rapid deployment of over the shore access routes.





Featuring grip enhancing grooves, the M30H Trackway® maintains vehicle movement in otherwise difficult to navigate ground conditions.

Boasting an innovative design, the solution can be deployed, transported and recovered by either a Fastrack or Medium Beam Dispenser, allowing armed

forces the flexibility to integrate the system to an array of front end loaders and flatbed vehicles.

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ROADWAYS RUNWAYS HELIPADS

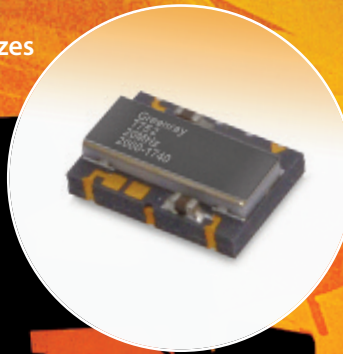
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Since 1961, Greenray Industries has been a preferred provider of precision quartz crystal oscillators to the world's leading military, defense and industrial manufacturers.

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

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

What's All The Noise About?

Radar, SATCOM, airborne communications, GPS, telemetry – these and other military systems rely on high performance crystal oscillators to perform effectively and reliably.

They are the heartbeat of the system, generating the frequency – the timing reference signal – that the system requires to function. They are designed to perform under any and all environmental conditions that the system may encounter, providing mission critical performance at all times. To do so, noise in the system, *phase noise* to be precise, must be addressed.

Phase noise is a phenomenon which is present on every oscillator output spectrum, and it often defines the specifications that are achievable in a given system. High phase noise present in the local oscillator of a receiver will limit the sensitivity required to detect very low power signals, such as weak signal returns from a distant target.

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.

While an ideal oscillator would generate a pure, noise-free sine wave, all oscillators produce noise due to active devices in the circuit. This noise arises from rapid, short term random phase fluctuations that cause instabilities.

Phase noise components in the system then spread the power of the carrier signal to adjacent frequencies resulting in noise sidebands. These sidebands subsequently mask weak signals close to the carrier frequency.

Phase noise is usually given in units of dBc/Hz. This represents the noise power relative to the carrier contained in a 1Hz bandwidth, centered at certain offsets from the carrier. The phase noise spreads out equally on either side of the carrier but according to IEEE definition, only one side is measured - hence the designation SSB, or *single sideband* phase noise.

Many advancements have been achieved in the recent decades, particularly in the phase noise performance of crystal oscillators and with the methods of measurement. These have, in turn, enabled system innovation and performance previously thought to be impossible.

Summary

Phase noise is an important and often limiting factor in determining the performance capabilities of most systems. The actual critical specification limits are highly application specific and design engineers must evaluate what maximum phase noise levels can be tolerated without affecting system performance. Care should be taken, however, not to over-specify as this can result in a more complex, higher cost unit than is needed.

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Secure packaging:

thinking outside the box to meet defence requirements



Well-packaged defence equipment, safely delivered, can be the difference between life and death for the soldier on the front line.

Here, Kewell Converters Consultant Chris Simpson tells MOD DCB features editor Julie Shennan about the vital role secure packaging plays in meeting defence requirements in the field.

Founded in 1971 and based in Kent, Kewell Converters Ltd (KCL) is a specialist foam fabricator and foam converter whose services have helped deliver equipment safely to the Armed Forces over many years. Specialising in high density, engineered performance, regular and explosive compatible packaging, it wasn't long before Kewell found its place in the defence supply chain.

Kewell Converters Consultant Chris Simpson explained: ***"Kewell Converters first got a foothold in the defence marketplace through pyrotechnics. In the late 70s and early 80s Kewell had relationships with Brocks and a pyrotechnics company that had a lot of Ministry of Defence contracts. By networking with them Kewell ended up talking to the MOD and eventually doing business with them and supplying secure packaging to them."***

With this business comes great responsibility, as Mr Simpson noted: ***"Secure packaging is critical to the defence marketplace, because having equipment turn up in a training environment or field operation and then discovering that it doesn't work is just not an option. People expect the packaging to do its job."***

"Quite often pieces of defence kit are stored for long periods without being used, so the durability of defence packaging is critical. End users need to be able to draw a piece of kit out of a box years after it has been stored and have it work in the exact same way as it did at the time you stored it."

Now having worked with both defence and civil clients, Kewell has experienced at first hand the difference between the two marketplaces.

Mr Simpson said: ***"The main difference between supplying to the defence and commercial sectors is the purchasing requirements; defence contract notices can be laid out in a more exacting way than in a civil process, because there has to be a formulaic structure to avoid misinterpretation. However, this can make it quite difficult to talk to people about what is required. Often there is a much greater sensitivity in the defence marketplace than in the commercial."***

Supplying to defence also involves other positive procurement practices, as Mr Simpson explained: ***"Defence Standards make it***



quite simple to discover what it is that you need to do to fulfil the contract. These standards are published quite widely and this makes it a relatively simple marketplace to enter.

“There are a lot of people who think defence business is more complicated than it actually is. Sure, the lead time for defence business can be longer than in the commercial sphere, but the business is more reliable and the sector contains some great customers if you can meet the stringent MOD / Defence Standards and military specifications.”

To access these customers, suppliers must first introduce themselves to then cultivate and build successful relations, often over prolonged periods of time, demonstrating and maintaining high levels of both smart design input and modern manufacturing capabilities. As a result, you can become a trusted and reliable partner within this global industry of huge potential.

Mr Simpson commented: “The Defence Growth Partnership and techUK are great for finding information on entering the defence marketplace, but nothing beats face-to-face networking.

“For instance, couple of years ago Kewell were represented at DPRTE where we met both defence buyers and suppliers. In events like this, if suppliers are not in direct competition with you they are usually quite happy to give you advice on how to approach the marketplace. If you look at exhibitions like DPRTE there is a sense of being bound together by the same industry that encourages people to divulge more.”

Giving advice to would-be defence suppliers, Mr Simpson recommended thorough contract-bidding preparation.

“If you are looking to transfer your technology from the civilian to the defence marketplace then the best way to start is to think about your quality systems and how you would write a response to a tender from a defence contractor, then give yourself an independent view of that and think, ‘what would I have to change if I was going to win?’ Most people, if they are honest with themselves, know where their strengths and weaknesses as manufacturers lie, so they can work to improve their bid,” he advised.

This approach is one that has been taken by Kewell Converters, who continue to evolve their design techniques in anticipation of defence requirements.

Mr Simpson explained: *“The challenge is determining what is likely to happen in the environment the packages are in; you need to consider what will happen to the box, whether it will be stored for a long period and what environments it will be put into. Ultimately stuff gets thrown out of trucks and planes and is not treated in the same way as something that is going to be loaded onto a civilian plane; so you have to create packaging that is designed to cope with that environment.*

“You also have to plan for extremes of temperature – whatever climate planet Earth has to offer you will find defence operations that have to deal with it; so their packaging does too.”

Added to these requirements are the growing pressures of sustainable procurement.

Mr Simpson noted: *“Environmental and cost pressures mean a greater degree of precision is needed in designing defence packaging; this means that more advanced tooling is needed to*



ensure these standards are met.

“We are seeing a demand for a reduction in size and weight and an increased need for portability in defence packaging.”

As well as the initial design, more thought is being put into the lifecycle costing of defence packaging.

Mr Simpson said: *“People are starting to understand that packaging which can be reused multiple times is worth investing in, and Cross-Linked, Closed Cell Polyethylene Foam is coming more to the fore as this is happening.”*

Closed Cell Polyethylene Foams (closed cell cross-linked polyolefin foams in particular) are foams not subject to ingress of moisture (non-porous) or gasses unlike some open cell foams – the soft material you will often find in consumer packaging. In most cases closed cell foams are hydrophilic, meaning if they get wet they will not stay wet. They can also be manufactured to have lots of special properties, for instance fire-retardant, conductive, anti-static properties or static-dissipative qualities that can be handy if you are transporting highly sensitive electronic devices or munitions. Military grade foams can be manufactured to support specific applications in defence terms when failure is not an option, giving packaging protection, durability and performance.

Bespoke packaging is becoming more common, as Mr Simpson explained: *“It is much more exciting when people come to us with their packaging problems and allow us to design the solution. If there is a lack of dialogue between defence buyer and packaging supplier then the buyer is not getting the full design skill benefit of the supply chain.”*

He concluded: *“In the future I think defence packaging will be smaller, lighter, more portable and easier to manage. So, all round, packaging is likely to become more sophisticated and design orientated.*

“Kewell will keep apace of these changes by continuing to invest in different types of industry-leading machines and software and to grow the skills of its valued staff to supply a high standard of specialist and custom high-tolerance foam products.”



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THE PHOENIX

Comfortable air permeable CBRN protection

How was it developed?

In our endeavour to reduce thermal burden for wearers of CBRN suits we have become well aware of the importance of air permeability. Achieving high air permeability whilst maintaining protection has been a challenge.

In the Phoenix we have achieved that objective and produced the most air permeable and comfortable CBRN protection suit. This makes it ideal for a wide range of military and first responder missions.

The thermal impact on the wearer, when compared with conventional CBRN suits is demonstrably lower. End users have told us that the reduction in heat stress is 'significant'.

How does it do this?

By combining the most effective carbon technology with a highly air permeable outer shell fabric, the Phoenix enables the end user to maximise their full operational capability.

Why is it important?

Users, both military and civil suffer from heat stress in traditional CBRN suit systems. The need to remain both operationally efficient and fully protected has been fundamental to the development process.

Who are we?

OPEC CBRNe is a British based designer and manufacturer of level C CBRN suits with a strong appetite to innovate.

With a manufacturing presence on three continents we have the flexibility to service a range of MOQ's. If the problem of maintaining operational efficiency whilst remaining CBRN protected is familiar to you, please get in contact:



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CBRNe

Contact us...

For more information on the Phoenix, or any of our other systems contact us at:

info@opeccbrne.com
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HMG Paints expand Defence Coatings

Following a period of growth and development of cross-sector partnerships and international collaborations, HMG Paints, the UK's largest independent coatings manufacturer, have expanded their Defence Coatings team, product range and testing facilities.



Brendan D'Arcy has joined the Manchester based company to lead the Technical Sales for the Defence Industry, Brendan will be working closely with both specifiers and applicators within the industry to ensure smooth adoption of the HMG product range. Brendan will be supported by two new Technical Application recruits who will assist in training of customers and applicators at HMG's Riverside Training Centre or on site at customers spray booths.

Defence Stan Coatings Made in UK

Following their attendance at DSEI2019, HMG have seen an increase in demand for its Def Stan 80-225 product range. The new standard, which was introduced towards the end of 2018 and replaces Def Stan 80-206, Def Stan 80-207, Def Stan 80-208 and Def Stan 80-209. The HMG products in this range are free from Chrome VI, meet low VOC requirements, and are IRR and CARC resistant. As an agile UK based manufacturer, HMG Paints is able to provide products on demand reducing extensive lead times previously experienced within the market. The Def Stan 80-225 system comprises of a choice of primers for ferrous and non-ferrous parts and an IRR and CARC resistant topcoat, which is available in an assortment of colours suitable for military vehicles and non-aircraft equipment.

Def Stan 80-9	PAINT FINISH ALUMINIUM
Def Stan 80-27	AIR-DRYING PAINT FOR FINISHING AMMUNITION
Def Stan 80-37	RED OXIDE FINISHING PAINT
Def Stan 80-41	IRR ALKYD CAMOUFLAGE TOPCOAT BS381C285 NATO GREEN
Def Stan 80-54	FUEL RESISTANT GENERAL FINISHING PAINT GLOSS
Def Stan 80-55	QUICK DRYING AMMUNITION GENERAL SERVICE PAINT
Def Stan 80-56	SMALL ARMS STOVING LACQUER
Def Stan 80-68	MARKING PAINT
Def Stan 80-69	MARKING PASTE
Def Stan 80-72	ACID AND ALKALI RESISTANT TOPCOAT
Def Stan 80-125	WATER BASED PAINT FOR CANVAS
Def Stan 80-129	TYPE 2 INSULATING VARNISH
Def Stan 80-161	ENVIRONMENTALLY COMPLIANT 2K EPOXY TOPCOAT
Def Stan 80-211	EPOXY WALKWAY ANTI-SLIP COATING
Def Stan 80-213	WALKWAY COATING ANTI-SLIP FOR LAND VEHICLES. LOW VOC NATO GREEN
Def Stan 80-215	A TEMPORARY PAINT FOR THE EXTERIOR SURFACES OF LAND SERVICE VEHICLES AND EQUIPMENT
Def Stan 80-218	TEMPORARY PAINT REMOVER
Def Stan 80-225	PRIMER TYPE 1 LOW VOC PRIMER FOR FERROUS METALS
Def Stan 80-225	PRIMER TYPE 2 LOW VOC PRIMER FOR NON-FERROUS METALS
Def Stan 80-225	2K PU IRR & CARC TOPCOAT

HMG provide a wide variety of additional Def Stan coatings from Temporary Marking Paint and Walkway Coatings to Environmentally Compliant 2K Epoxy Topcoats, HMG Paints truly are one name that covers everything. The full portfolio can be accessed by visiting www.hmgpaint.com or contacting the Defence Team.

Coatings in COVID Times

Like many businesses, HMG Paints is also now utilising remote meeting and communications technology when working with customers. Customers are now able to book video calls with the HMG sales representatives and technical team to discuss their defence coatings. The HMG paints Defence team are available to discuss your coatings requirements via Microsoft Teams, Zoom or Google Meet and customers can book meetings by emailing defence@hmgpaint.com.

“The current pandemic has presented a number of challenges for our customers but throughout HMG the adaptability and determination of staff has shone through and we’ve continued to supply our customers within the critical industries such as Defence in a safe manner.” Alan Sharples, HMG Defence Sales Manager. *“The agile nature of our manufacturing site and defence product portfolio gives us a natural ability to rapidly react to the demands of our customers and markets.”*

Research and Development

The company have also invested in its Research and Development laboratory with new equipment and testing facilities, along with a selection of new products for a variety of Defence applications. The new products developments also contain a number of bespoke product developments for OEM's which required unique performance criteria and utilised a number of emerging technologies, development of cross-sector partnerships and international collaboration.

Alongside Defence Standard products, HMG produce a wide range of approved high-quality coatings for practically every purpose for the defence industry. Made in the UK, HMG's product range is suitable for equipment such as containers, trailers, vehicles, bridges and armour. HMG are renowned for their innovative approach to coatings including corrosion resistant primers, functional topcoats plus CARC and IRR materials approved to UK defence standards.

Alongside their extensive product portfolio HMG work alongside customers to create tailored solutions and provide market leading technical support and training.



www.hmgpaint.com

HMG

HMG Paints Ltd

**INDEPENDENT MANUFACTURER OF
COATINGS FOR THE DEFENCE INDUSTRY
INCLUDING CARC AND IRR (DEF STAN 80-225)**



**For more information on our full range of products or to
arrange a trial please email defence@hmgpaint.com**

www.hmgpaint.com

One name that covers everything



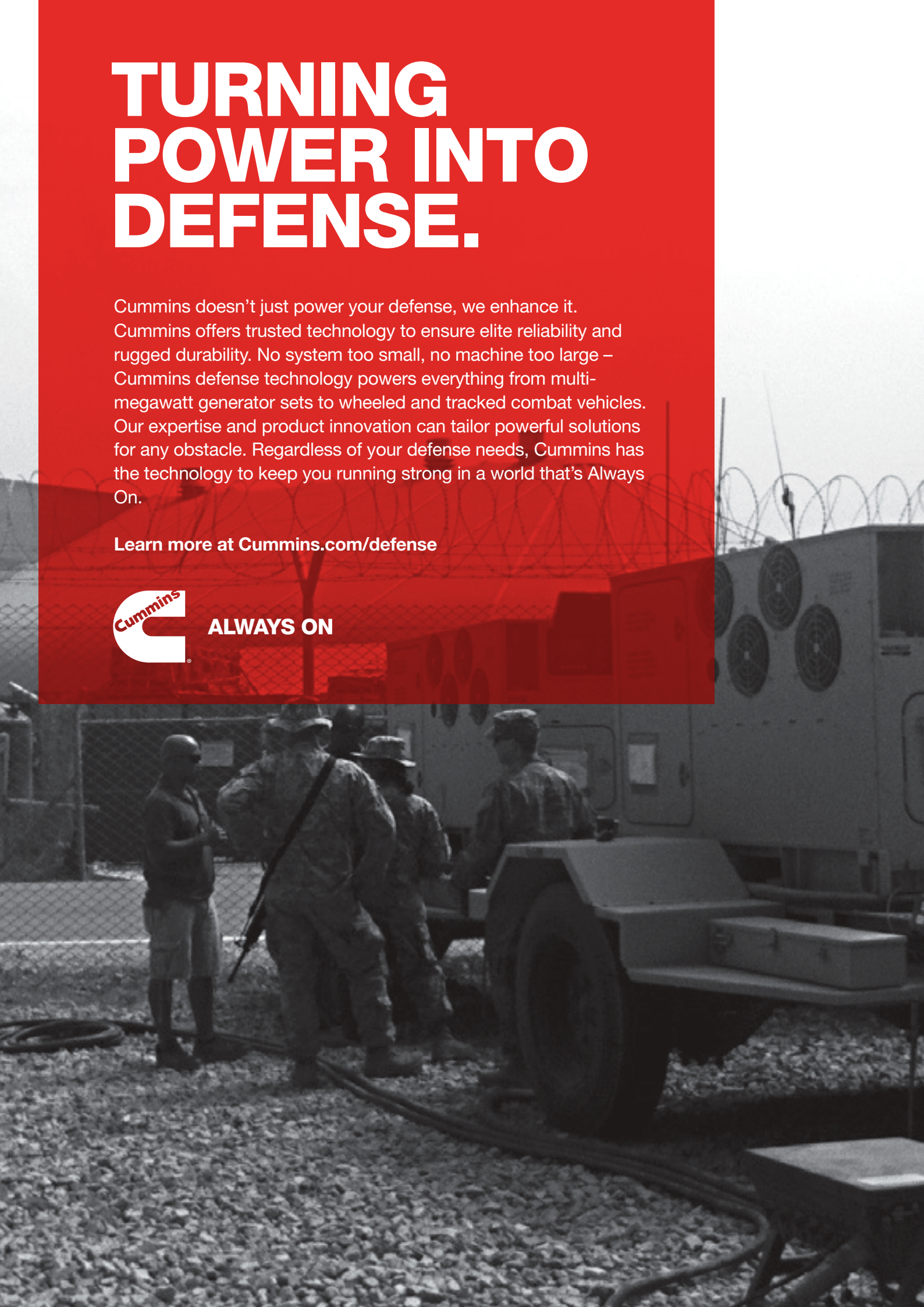
TURNING POWER INTO DEFENSE.

Cummins doesn't just power your defense, we enhance it. Cummins offers trusted technology to ensure elite reliability and rugged durability. No system too small, no machine too large – Cummins defense technology powers everything from multi-megawatt generator sets to wheeled and tracked combat vehicles. Our expertise and product innovation can tailor powerful solutions for any obstacle. Regardless of your defense needs, Cummins has the technology to keep you running strong in a world that's Always On.

Learn more at Cummins.com/defense



ALWAYS ON



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

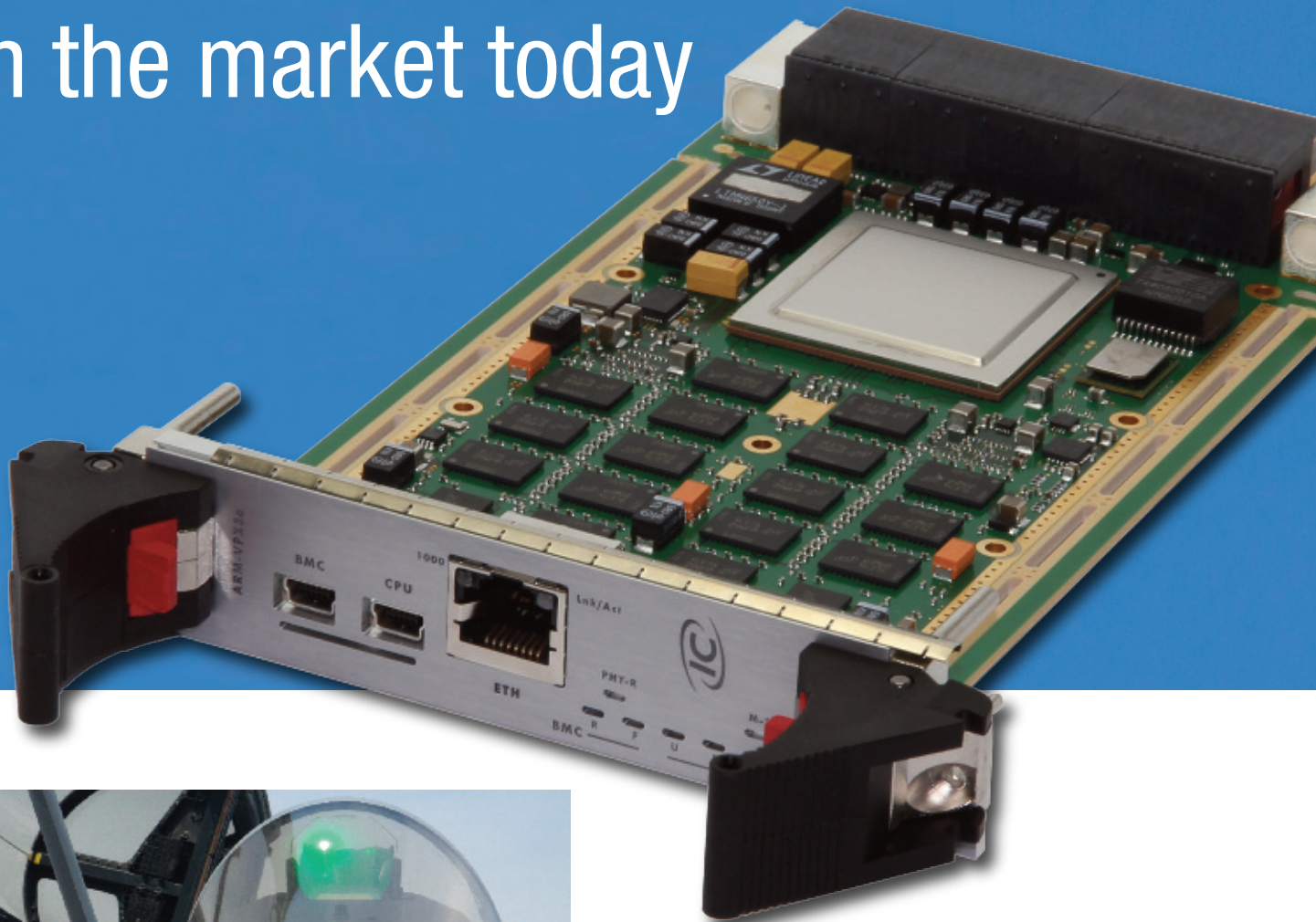
CUSTOM APPLICATIONS

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

The first 3U VPX Single Board Computer based on the NXP LX2160A processor, available on the market today



Interface Concept, a leading designer and manufacturer of embedded high-performance boards announced today the new high-performance 3U VPX Single Board Computer offering the latest technological innovations with this new Multicore Communications Processor. Interface Concept is the first company to offer a new 3U VPX SBC based on this new processor technology.



The IC-ARM-VPX3a features a LX2160A processor with 16 Arm® Cortex®-A72 cores up to 2.2GHz, up to 32GB DDR4 memory with ECC, security offload, traffic management and supports up to 100 Gbit/s Ethernet routed on the backplane. It significantly improves high bandwidth required in 3U VPX systems' high-processing applications.

This new board, designed in alignment with the SOSA™ technical standard, meets systems integrators requirements, who were looking for 25 Gbit/s Ethernet interfaces on a 3U VPX system backplane currently specified by the Sensor Open Systems Architecture (SOSA™) working group.

In addition, the IC-ARM-VPX3a provides local storage options (eMMC and M.2 slot), PCIe Gen 3.0, SATA3, USB, UART and multiple 10/40 and 25/100 Gigabit Ethernet interfaces available on the backplane.

"Interface Concept is proud to be the first company on the market to release a 3U VPX Single Board Computer"

supporting 100 Gigabit Ethernet on the backplane. It will fulfill the growing demand of higher backplane bandwidth in small form-factors systems" said Franck Lefèvre, Sales Manager at Interface Concept.

This board complies with VITA 65.0 standard. It comes with a boot loader and a Linux or VxWorks BSP.

It is available in air-cooled and conduction-cooled versions..

www.interfaceconcept.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.

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

Email: info@runflatinternational.com

Phone: +44 (0) 1384 414 845

www.runflatinternational.com



BRACE

Survival Systems Limited (SSL) of Halifax Nova Scotia recently won orders in the UK for new equipment for the Royal Navy Centre of Maritime SERE and Underwater Escape Training (RNCMSUET) RNAS Yeovilton. The two contracts involved the infrastructure of the new facility and then the training equipment.

Together the two contracts partly illustrate what SSL do. The first contract involved a good deal of technical advice to Galliford Try the builder of the £20 million new facility, and the provision of an SSL Personnel Rated Gantry Crane (a TGH™ 12000) to allow safe operation of the underwater escape trainers. Personnel rated cranes are a key part of the whole maritime under water escape training landscape. Imagine trying to winch people from the water with a crane without built in redundancy in the event of an incident.

The escape trainer modules popularly known as “dunkers” but more correctly as Helicopter Underwater Egress Training Systems (HUETS) are designed to simulate what happens when a helicopter, light aircraft, small boat or amphibious vehicle gets into trouble in the water. Usually this involves submersion and frequently an overturn. The first order was followed by winning an MOD competitive tender for two new HUETS to replace existing and outmoded units that were largely beyond their useful life.

The second order will be satisfied by the provision of 2 SSL Modular Egress Training Simulators (METS®). The METS® are being built for imminent delivery. A METS® model 5 is designed



BRACE

to simulate WILDCAT and similar smaller helicopters and a METS® Model 40 is designed to simulate MERLIN and similar size helicopters e.g. CHINOOK. A key feature of METS®, as the name suggests, is modularity. Thus one base platform allows several types of craft to be constructed using standard panels enabling a complete new lay out to be achieved by trained maintainers within approximately half an hour. With SSL's worldwide span of operations it holds a library of many different operational platforms and configurations. This enables operators to re-role their platforms, or even buy new, without having to buy new HUETS because a simple fidelity pack can quickly adapt METS® to the new role.

A key element of the contract is access to SSL's outstanding customer support involving training maintainers and the instructional staff of RNCMSUET. A further key part of SSL's winning bid was a support package and warranty extending for several years. SSL are able to offer this sort of support because the personnel crane and the METS® and their related safety equipment are designed to operate together. The safety systems and design features allow for fail safe operation over a very wide range of scenarios and usage conditions. This integrated response is the result of years of R&D and experience and a culture of doing right by the customer and more importantly the people who travel in these platforms. The whole is best summed up by SSL's purpose; "To enhance and preserve workers' lives through safety education, training technologies and applied research and development."

SSL also offers bespoke training either at the customers site or in specially designed training theatres which it: owns and operates, or leases, or advises on design, or builds for customers. These simulate the reality of a bad day at the office; waves, rain, fog, lightning, pitch black darkness and high winds and then being upside down in a downed helicopter or aircraft or in an overturned boat or vehicle. They also simulate salvation in the form of rescue helicopters.

www.survivalsystemsgroup.com



INTRODUCING THE NEW ERV3

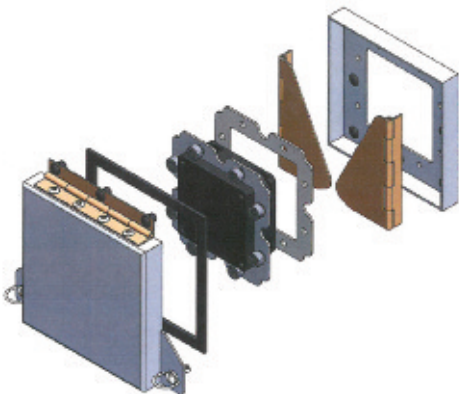


Our reliable and innovative ERack design has been a customer essential since its inception in 1995. In regular use by customers worldwide for the transportation, storage and protection of 19" rack-mount electronics. Our experienced product engineers have now developed many enhancements but retaining the same proven functionalities of the ERack design. Introducing the third generation of ERack (ERV3).

Lightweight rugged enclosure

You know the phrase 'if it's not broken, don't fix it'... well our ERV2 design was a hard act to follow, never mind improve on - but we know we have succeeded in encapsulating all of the ERV3's predecessors' best design features. With a lightweight rugged enclosure as our starting point, and matching the weight and strength of the ERV2, the new body design features large radiused edges and additional choices on venting and sunshade options.

The lids are press formed to give increased rigidity and stiffness, the precision formed lids dispense with all welding processes; thereby eliminating potential leak paths. A choice of recessed rotary latches, or surface mounted side latches remain available, together with options on connector panels. ERV3 lids can also accommodate customer branding, by either debossing or screen printing.



Hollow section extruded aluminium is CNC formed for the male and female profiles that are bonded to the body and lid to ensure a perfect 'mate'. This provides the silicon gasket with a repeatable compression set forming the weatherproof protection for the interior of the EVR3 which are MIL-STD 810G and IP65 accredited.





New rotary latch design

The newly designed rotary latch is simple and comfortable to use – even with gloved hands. It provides a simple functional closure that resists shock and vibration and is calibrated to provide consistent compression for the weather gasket to seal perfectly.



Stacking Rubber Buffers and improved AV performance

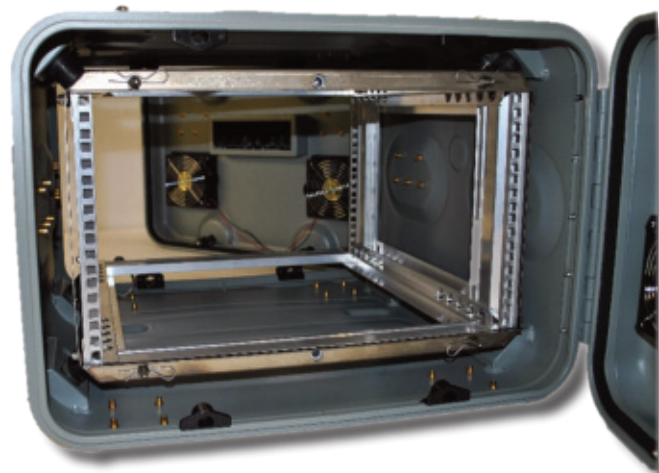
A new feature on ERV3 is the option for large external self-stacking buffers. The 80 shore hardness TPEV rubber buffers provide additional protection in rough transit conditions through the non-slip positive stacking feature.



A new elastomeric AVM design has improved elastomeric excursion. This enhances the ERV3's protection against shock and vibration.

Structural Bonding

ERV3 employs aerospace high performance bonding technology, with two-part acrylic adhesives that offer excellent shear, peel, and impact performance. These toughened products provide improved adhesion to plastics and metals, featuring a fast cure rate, providing structural strength in minutes. Similar high-performance engineering has been used in other applications such as [aeroplane manufacture](#) and F1.



19" Chassis

The ERV3 enclosures include the pioneering lightweight CV2 high tensile extruded 19" chassis. This gives the design infrastructure torsional rigidity and stiffness when the Rack is under severe loads. The Chassis is resistant to shock, drop, impact and vibration. CV2 chassis have been separately tested and accredited to MIL-STD-810G, and are iridited (surface coat conversion) when incorporated into EMC applications.

EMC Shielding

With the growing requirement for secure communications and protection from cyberattack, electromagnetic screening is often required to help prevent system hacks when in high risk environments. Specialist conductive gaskets, use of wire mesh braid, embedded wire and Faraday cage features can be incorporated into the ERV3's design. This offers the customer various levels of EMC screening.



ERack products that incorporate EMC shielding are fitted with appropriate venting and pressure relief systems that perform to prerequisite emission Db levels.

It's durability, functionality and lightweight monocoque construction makes the new ERack design the perfect ruggedised 19" rack enclosure for defence and commercial applications.



PlastPackDefence

TESTING TESTING

Ever since the first prototype of PlastPack Defence's LWAC[®] (Light Weight Ammunition Case) was available there has been a clamour to test it and prove it against the accepted norms for ammunition carriage and storage to meet a series of UK, NATO, UN and National tests.



This is only to be expected when LWAC® is expected to replace an item that has been in service since 1942.

Some of these tests were official, made against a variety of test specifications; others were unofficial made against what a particular individual saw as a requirement. All were devised using best information when they were formulated. Needless to say the LWAC® has passed them all. That is not to say improvements were not possible, they were and have been made. The LWAC® now in production have benefited from these improvements. Similarly some of the tests are now being rethought to reflect a more modern age. LWAC® passes these revamped tests too.

The final test for the UK has been a series of advanced burn tests carried out in early September 2020. Delayed by about 4 months by the Covid-19 pandemic precautions the final tests were carried out at Kynamco Ltd's independent test range by Enhanced Performance Ltd(EP) and these tests were witnessed

by the UK MoD, as have many of others. All the other tests have been independently carried out by similarly independent test facilities such as NAMMO in Norway.

The UN and NATO tests, colloquially known as “drop, topple and stress” or “shake, rattle and roll” are designed to test equipment to ensure it is safe to transport and store but more importantly following these activities safe to use. To that end LWAC® has been individually, and as a pack of cases: bashed, smashed, frozen, heated, vibrated, shocked, dropped on the flat sides, dropped on corners, burnt, submerged, shot at, subjected to low and high atmospheric pressure, and many other forms of abuse. All are designed to test structural integrity in the event of a mishap or even a disaster.

LWAC® delivers a huge benefit to the user. LWAC®'s mass is so much lower than the item it is replacing that the savings in fuel, energy, other transport costs and improvements in environmental performance for the users are compelling. Being plastic it is different but it still does the same job as its steel predecessor. There are some obvious tactical and operational benefits, less noise, easier to track and account for etc. However the tests have revealed some unexpected benefits including that by melting in a fire rather than containing the vaporised propellant LWAC® do not explode sending parts and fragments of the case and embers into the surrounding spaces and ammunition stacks so there is less collateral damage and an inherently safer situation.

PPD have been assisted in these test by Lutra Associates Ltd. The datas collected in this latest test series will be submitted to the UK Health and Safety Executive, as previous ones have, to help justify UK Certification.

PlastPack Defence PPD
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VPX Technologies

Overview

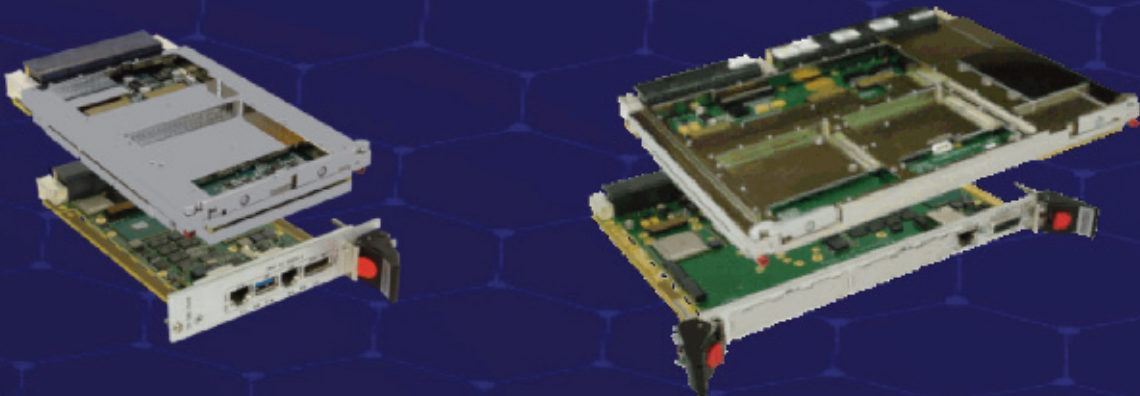
VPX products are widely deployed in military and aerospace environments due to their robust, high performance nature. Rugged variants are usually available based on a rigorous testing cycle to ensure reliability in severe operating temperatures, shock, vibration, altitude and other environmental factors.

Standards

The OpenVPX framework defines the clear interoperability points necessary for integration between Module to Module and Module to Backplane and Chassis. The Specification describes the technical implementation details for 3U and 6U VPX payload and switch modules in an attempt to provide clear guidance on how to build interoperable computing and communication platforms.

Technologies called for in VPX specifications include:

- Both 3U and 6U formats*
- High performance connector now rated up to 25 Gbit/s*
- Choice of high-speed serial fabrics*
- Direct coaxial (VITA 67) and fibre (VITA 66) connections*



Benefits

One key benefit of using VPX technologies, is the fact it is widely adopted and promoted. VPX boards feature in a number of applications, including: Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR), Radio Detecting and Ranging (RADAR), Signals Intelligence (SIGINT), Electronic Warfare (EW), and a number of test and simulation applications. Due to the high level of adoption and promotion, there is a constant push for newer, more progressive innovations. We have seen, in the past 10 years or so, a great deal of development towards ever higher connection speeds, and more recently roadmap towards PCIe Gen 5, 100GbE technology.



Not ready to switch over to VPX?

Concurrent Technologies
have a wide range of VME,
AdvancedMC and
CompactPCI Boards
available to suit your
critical application needs

Click here to see
Concurrent Technologies'
full product portfolio





PELI
BioThermal™

Peli BioThermal's patented Golden Hour™ technology

There's good reason Peli BioThermal's patented Golden Hour™ technology received the U.S. Army's Greatest Invention Award in 2003.

Prior to this, there was no effective container to safely transport critical blood to troops fighting in far forward combat areas away from fixed medical facilities. That fundamentally changed when we invented Golden Hour technology — aptly named because it provides troops access to the whole blood, platelets or plasma they need to save lives during the critical first hour after injury.

This innovative thermal transport container protects the products you need no matter the location or extreme conditions on the battlefield. For the last 17 years, military personnel have trusted our technology to securely, reliably and safely transport pharmaceuticals, tissues, biologics, diagnostics, vaccines, blood supplies and more from anywhere in the world — to where they need it most.

The award-winning Original Golden Hour™ technology was developed to protect troops' lives on the base and on the front line in the harshest of environments and climates. Today, Peli BioThermal's packaging solutions provide the most reliable, longest temperature control duration on the market — 96 hours of thermal

protection. Life-saving materials are housed in smaller, lighter weight, rugged and durable temperature controlled Crêdo™ shipping containers without the need for dry ice or water / gel packs.

PELI BIOTHERMAL PROVIDES:

- *A full range of single use and reusable temperature-controlled packaging options that cover the full range of the military's needs — chilled, frozen, controlled room temperature (CRT).*
- *Optimised payload ratio that reduces distribution costs by minimising outer dimensions and maximising interior payload capacity with 100% available for product.*
- *One hundred percent recyclable components that reduce your impact on the environment.*
- *A web-based asset management software solution (Crêdo ProEnvision) to track individual shipments around the globe, set up automatic maintenance, next shipments alerts and produce customisable reports.*



OUR PRODUCTS:-

Golden Hour™ Mobile

Also known as the Original Golden Hour™, this product is the foundation stone of our business and the Winner of the 2003 "US Army's Greatest Invention Award".

WHY SELECT GOLDEN HOUR™ MOBILE?

- *Ease of use – modular design for quick assembly and efficient inventory storage*
- *Nimble and tactical for delivery of whole blood to the point of injury within a crucial window of time*
- *Designed and tested to last in the harshest conditions.*
- *Quality, durable construction*

Temperature ranges - +2C to +8C, +15C to +25C

Volume -2L

Duration – 48 to 72 hours

Golden Hour™ Medic

A recent addition to our range, the Golden Hour™ Medic is a nimble and tactical option for delivery of whole blood to the point of injury within a crucial window of time and can be easily transported to the front line. Golden Hour™ Medic replaces traditional cumbersome containers and can keep 2 units of blood cool for up to 24 hours in extreme conditions, 3 days in optimal conditions.

CreDo™ Cube

Superior thermal protection in a convenient mid-size container. The Crêdo Cube™ is a passive and reusable shipper qualified to hold chilled medical materials at a safe temperature for up to five days. This system is ideal for reducing shipping costs or for circumstances in which unexpected delays may occur. Available for volumes from 2L to 96L, frozen, chilled and ambient

temperature profiles. Also available with a hard, impact-resistant outer shell – CreDo™ Duracube HD

CreDo™ Duracube HD

The Crêdo Duracube™ product line offers a selection of superior thermal protection in a comprehensive range of lightweight and heavy duty hard shell outer containers (between 2L and 96L) designed to strike an optimal balance between case weight, durability and duration of transit capabilities while providing a 10-15% increase in thermal performance over outer corrugated material. Available in frozen, chilled and ambient temperature profiles

CreDo™ ProMed

Designed specifically for the dynamic needs of emergency first responders, the Crêdo ProMed™ product line currently consists of three different sized temperature-controlled portable medical transport bags that thermally protect the integrity of valuable pharmaceuticals and medical supply payloads for 72 - 96 hours. The outer bag is constructed of highly durable ballistic nylon fabric and the patented TICTM panels with phase change material and VIP components contained within, are qualified to consistently protect medical materials such as blood, platelets, bio-pharma product samples within two ranges, chilled and ambient

CreDo™ Xtreme

This high performance, extremely durable and reusable passive temperature controlled pallet shipper is offered in two sizes (371L and 807L) and is ideal for consolidating large domestic and international cargo shipments. Peli BioThermal's Crêdo™ patented technology provides a revolutionary cost effective temperature-controlled pallet shipper that ensures secure transport of bulk pharmaceutical products – qualified to maintain the required temperature range for 120 - 144 hours. Easy removal and installation of the TIC™ (PCM) system, greater volumetric payload size and a reduced risk of product compromise.





ABOUT US:-

Pharmaceutical companies — and other organisations looking to make significant cost and quality improvements in their cold chains — are switching to Peli BioThermal for single-use and reusable temperature-controlled packaging. Our innovative, patented technologies and consultative services ensure product quality, mitigate excursion rates, reduce packaging costs and drive Total Cost of Ownership across your entire supply chain. Our global network of consultative cold chain experts provides our customers with consistent packaging and logistics experiences wherever they do business. Our temperature-controlled packaging solutions meet the complex needs of the world's healthcare organisations and comply with the strictest GDP, quality assurance and health and safety standards.

Peli BioThermal is a division of Pelican Products, Inc., which is a portfolio company of Behrman Capital, a private equity investment firm based in New York and San Francisco.

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Youtube - Peli BioThermal Official



ROUTE PROVING & CLEARANCE

INCREASED CAPABILITY, REDUCED RISK

The **Route Proving and Clearance (RP&C) multi-tool** provides military commanders with a single multi-purpose module for the counter-mine/IED route clearance mission, with the capability to detect and defeat explosive threats, in order to prove routes at tempo using existing in-service vehicles.

**PEARSON
ENGINEERING**



Ground Penetrating Radar (GPR) for detection of metallic and non-metallic buried threats.



Metal Detection (MD) confirms metallic threats and reduces GPR false-positive rates.



Infrared (IR) and visible camera systems enable visual detection of surface threats and ground-sign.



Excavator Manipulator Arm (EMA) supports interchangeable attachments including sensor head (as shown) and heavy-duty EOD tools.



Wire Detection (WD) for detection of buried command wires ahead of the vehicle.

T: +44 (0) 191 234 0001 **E:** pearson@pearson-eng.com

www.pearson-eng.com

Aqua Lung Military & Professional

A close-up photograph of a diver in military camouflage gear. The diver is wearing a helmet with a camouflage pattern, a diving mask, and a wetsuit. They are holding a handgun in their right hand, which is wearing a black glove with white markings. A wristwatch is visible on their left wrist. The background is a blurred view of water and greenery.

The Aqua Lung Military & Professional (M&P) division focuses on key user groups: Military, Public Safety & Commercial divers, Water Safety Rescue & SAR personnel and Aviation.

Our product categories include military rebreathers, open circuit regulators, BC's drywear, diving helmets and a complete range of dive accessories including instruments, knives and fins. Aqua Lung has a trusted name and a global reputation for reliability and performance. Apeks Marine Equipment Ltd has been part of the Aqua Lung family since 1997.

History/Background

Apeks Marine Equipment Ltd (Apeks) was first founded in 1973 to manufacture scuba diving equipment. By the Mid 1990's Apeks had developed the first cold water regulator to pass EN250 tests, the TX range. This range is still in use today and is looked at as a solid working regulator, currently in use by military's around the world, including the British MOD. Since then Apeks has continued to develop regulators that are world class and a leading brand for technical and commercial diving. In 1997, Apeks was acquired by Aqua Lung Int, founded by Jacques Cousteau, who is considered the founder of SCUBA diving. Apeks has, throughout its time been the leading brand in SCUBA diving equipment, both for recreational, technical and professional use.

Capability

Apeks has its design and manufacturing centre in Blackburn so the design, developing, testing and manufacturing of its own equipment is UK based and under one roof. This enables Apeks to tightly control the quality and design of its products. This also gives Apeks an almost unique ability to customise its designs to the end users technical requirements. In 2018 Apeks sold over 60,000 regulators worldwide. This manufacturing plant has been quality accredited ISO9001 for over 19 years and is accredited to ISO14000 environmental standard.

Apeks now currently manufactures some of the highest specification regulators on the market, including its MTX range of extreme cold-water regulators and Low Magnetic Regulators conforming to STANAG 2897.

Apeks not only produces equipment for the diving industry, but using its specialised knowledge of compressed air reduction and control systems it also specialises in Compressed Air Emergency Breathing Systems (CA-EBS), used for aviation and its products are used throughout many other industries that use compressed air products.



The design departments technical capabilities include, working within all ISO9001 requirements, utilizing Finite Element Analysis (FEA), using FMEA assessment and documentation techniques, underwater breathing testing facilities, has on site Rapid Prototyping Machine and Engineering Machining capabilities

Apeks has been involved in several tenders for the MOD including its current open circuit diving system, providing Passenger Short Term Air Supply System (PSTASS) units for aviation and providing PSTASS spares and support. Throughout these contracts Apeks has become known for its friendly approach to the contracts and when needed provided quick design services to meet the operational changes required by the MOD.

www.aqualung.com/militaryandprofessional



AQUA LUNG
Military & Professional



**Military Integrated
Safety Solutions**

Efficient Integration with other mission critical equipment e.g. helmets.

Enhanced Situational Awareness - GSReS offers a passive speech diaphragm, voice projection unit (vpu) or integrated microphone to 3M™ PELTOR™ ComTac™ solutions

GSReS is a Modular Respiratory Protection System (MRPS) with the ability to function as a PAPR and / or SCBA.

Low Physiological Burden – Low Breathing Resistance CBRN Filters, and on demand hydration and auto-sweat removal systems

Patented secondary filtration technology provides increased levels of protection against biological & radiological particulates.

Trusted partners. Innovative solutions. A safer world.



Always read and follow User Instructions and ensure proper fit and PPE compatibility.

RUBB REFURBISHES 25 EFASS FOR MOD'S OP REGAIN

Rubb UK is assisting the MoD with Operation Regain, an effort to consolidate all MoD assets which are spread across the globe.

Where necessary, these assets will be refurbished and updated to current specifications before being redeployed. That's where Rubb comes in.

Twenty-five 20.4m span x 30m length EFASS will be delivered to Rubb for refurbishment. Delivery complications are avoided, as Rubb's 20.4m EFASS range can be easily dismantled and each one packed inside a single 20ft ISO container for shipping. This is especially impressive when considering the trident doors to the gable ends of each hangar.

Once on site, Rubb will refurbish the hangars and bring them up to 2020 specifications—electrical regulations, for example, have changed since their original construction and will be upgraded to Zone 1 electrics.

Rubb Sales Manager Andy Knox commented: "There are numerous EFASS military shelters deployed around the world. Many will be returned to the UK to undergo refurbishment work to bring them back up to A1 (new) condition. The modular nature of the EFASS means that the aluminium framing system, steel components and PVC covers can be reused to create a variety of configurations to suite changing requirements. A typical refurbishment to bring the building back to 'good as new' will cost less than 20% of the cost of a new hangar."

Many of these hangars are from the fifty-two EFASS structures which were supplied to the RAF in 2002, the initial launch of the range. For up to 20% of their original cost these hangars are given new life in 2020, after 18 years in the field.

In 2002, most of these hangars were used for Tornado aircraft storage. Once refurbished and brought up to 2020 specifications, they will be utilised to house the RAF's newest F35 jets.

After almost 20 years, the EFASS range continues to be the flagship for Rubb's excellence in engineering, and a symbol of our continued relationship with the MoD.

Rubb Managing Director Ian Hindmoor said: "We are always looking for ways to add value to the products and services we provide. This process is an excellent example of adding value to the ways in which we can help our client base. Our customer care goes beyond just one sale and into aftercare commitment, maintenance, delivery of improved solutions to existing and changing requirements and a dependable system of ongoing R&D and engineering in the fabric building industry. We take care of your building investment for you, prolonging the life of your EFASS and providing savings on long term costs."

www.rubbuk.com





RUBB SUPPLIES MOD'S DE&S ASHCHURCH WITH FIRST EVER THERMOHALL® EFASS

Rubb has supplied two EFASS structures to DE&S Ashchurch, the MoD's primary location for vehicle maintenance, storage, and distribution in the UK.

These newly erected 25m span x 52m length and 25m span x 24m length EFASS buildings will support the MoD's vehicle operations. The larger 52m long building will serve as a vehicle maintenance and testing shop, while the smaller 24m long structure will store the vehicle parts to assist with this.

The larger building of the two marks a milestone for Rubb's EFASS range, as it is the first EFASS to be clad with 150mm inner-skin Thermohall® insulation. The MoD specified that an ambient temperature of 18°C was necessary for this project, which can easily be met with Thermohall®'s excellent performance. This temperature is maintained by an environmental control unit for heating and air-conditioning. The result is a workshop that meets insulation building regulations, while keeping workers comfortable throughout the year.

The smaller 24m long structure is not without heating options, however, as it is fitted with an electric radiant heating system. It also comes with 300 lux LED lighting, four double power sockets, and is fitted with racking to efficiently store the vehicle parts.

Similarly, the larger EFASS comes with 500 lux LED lighting, and eight double power sockets.

Both structures are fitted with emergency lighting, as well as L2 automatic fire alarms.

The buildings are clad with a sand-coloured PVC, but the inner-skin insulation on the larger structure allows for a clean, white interior that creates a bright workspace.

Each structure is complete with 5.1m high x 6m wide roller shutter doors to each gable to accommodate the servicing of large vehicles, as well as access doors for pedestrians (four for the larger EFASS, two for the smaller).

Rubb is thrilled to launch our first ever Thermohall® EFASS with this exciting project for the MoD, which has continually utilised the EFASS range throughout the hangar system's twenty-year history.

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Rubb's Expeditionary Forces Aircraft Shelter System is uniquely suitable for the military and aviation services, designed to be rapidly deployed and erected anywhere in the world. With unmatched relocatable buildings in action across the globe, Rubb has the ideal solution for storage and maintenance requirements.



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excellence in engineering

VIALITE LAUNCHES NEW MIL-AERO RF OVER FIBER LINK

The RF over fiber experts at ViaLite Communications have launched a Mil-Aero 10 MHz to 6 GHz RF over Fiber Link Pair.



The new products' design and features have been specifically tailored for demanding air force and navy applications, army telemetry systems, signals intelligence (SIGINT) deployments, tethered aerostat and drone applications, plus multi-service military electronic warfare systems; where fiber is an essential replacement to coax.

As one of ViaLite's most versatile RF over fiber links it covers bands from HF, VHF and UHF through to telemetry and satcom bands P, L, S and C. It also offers the best Spurious Free Dynamic Range (SFDR) performance in its class, making it ideal for high bandwidth applications or where the application has a large range of RF signal powers. The link is further enhanced by a low noise figure (NF), optional gain and 1 dB compression points (CP).

Supporting distances of up to 50 km, the Mil-Aero link is available in rack chassis card or OEM module format, including ViaLite's new black OEM design which is outdoor rated. All formats come with a 5-year warranty as standard - the industry's longest included warranty - providing protection and reassurance for customers.

Craig Somach, ViaLite Director of Sales, said: ***"I am very pleased to be supporting our Mil-Aero customers with this new and exciting solution that exceeds current solutions in almost every key category related to SFDR, NF and 1 dB CP."***

"The feedback from our users has been very positive and consistently shows the new ViaLite Mil-Aero Link Pair to be setting a new design standard of higher electrical performance and mechanical integrity, along with superior quality and reliability."

Contact ViaLite now to request a copy of the product datasheet, email: sales@vialite.com.



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David Brown Santasalo has been an integral part of the defence industry for more than 100 years. Internationally recognised, their gear systems and service solutions underpin assurance critical applications in industries where failure is not an option.

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THE ROLE OF CONNECTORS & CABLE ASSEMBLIES IN ELECTRONIC WARFARE

Electronic Warfare (EW) involves the use of the electromagnetic spectrum to sense the enemy, better defend against attacks, and initiate effective attacks. It takes place in the air, on the land, and over the sea, but the actions involved in EW often remain invisible to the naked eye. There are no dramatic explosions or grandiose shows of military power, yet it is every bit as dangerous. And this type of warfare necessitates robust, reliable connectors and cable assemblies.

Engineering Challenges in Electronic Warfare

As with any military application, reliability is the first priority: failure is not an option - even in conditions that might involve exposure to rain, dust, corrosive chemicals, and extreme temperatures. In addition, interconnects for implementation in EW applications must be lightweight and as small as possible. Military equipment must have electronic components that include rugged, reliable, high-density connectors that support wide bandwidth.

The Role of Interconnects and Assemblies in EW

An excellent example of where interconnects and cabling fit into EW, is radar jammers aboard Navy jets. Radar jamming is used to degrade the effectiveness of enemy radar systems and falls

in the category of EW aircraft applications. While the concept of radar jamming is certainly not a new one (dating back to the 1960s and earlier), modern systems have shifted from an analog approach to a digital one.

Along with this shift, engineers have been focusing on how to provide wider threat coverage, better precision, and substantially improved reliability. Both interconnects and assemblies form an integral part of the state-of-the-art electronic systems used in EW. For example, a radar jamming system alone may require several cable assemblies and numerous connectors and interconnects. If just one of these connectors fails, the entire system is compromised.

Engineered Connector Solutions for EW

Several different connector and cable assembly options meet the stringent requirements of military applications. These

and modular jacks, and D-Sub. They also work with both filtered and sealed D-Sub filter terminal blocks, as well as snap-in and bolt-in filtered headers.

Versatile D-Sub Connectors

Another commonly used electronic connector is the D-Sub type connector. These connectors are typically utilised in defence and aerospace applications and can be customised to meet even the strictest of regulations. D-Sub connectors include military-type connectors (e.g., MIL-DTL-24308), Micro-D connectors, and models qualified by NASA/GFSC. D-Sub connectors are available in many different layouts and mounts, as well as in high-density variants. A lot of the layouts combine signal contacts with RF or high-power contacts, which greatly increases the versatility of the connector. Available brands include ITT Cannon, Amphenol, TE Connectivity, Cinch Connectivity Solutions, and Harting.



Rugged Micro-D Connectors

The Micro D-Sub connectors provide the power of a D-Subminiature connector while requiring only half the space of a standard D-Sub connector. These connectors, known for their ruggedness and reliability, can be found in missiles, navigation systems, and aeronautics. Micro-D connectors are available in a range of terminations and hardware options, including several products that support high-temperature applications as well as value-added ITT Cannon MDM and MDSM Micro D-Sub connectors, in addition to standard MIL-DTL-83513 from well-established brands such as Cinch Connectivity Solutions.



particular connector types are known for their ability to perform in harsh environments.

Protective Filter Connectors

Filter connectors are especially critical in applications like radar jammers, as they are used to protect sensitive electronic applications from contamination and interference.



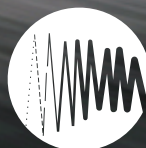
Dependable products include Amphenol filter connectors and terminal blocks and FilConn filter connectors, all of which are used extensively in aerospace and military applications. These filter connectors offer EMC compliance, improved EMI control, and effective EMI/RFI shielding. This series supports various connectors, including planar, tubular, micro-ribbon, RF

Reliable Solutions for Critical Situations

EW is rapidly expanding in its capabilities, and with that comes an increased demand for connectors and cable assemblies to make those capabilities possible. Some of the ideal electronic connector solutions for EW applications include filter connectors, D-Sub connectors, and Micro-D connectors that are available in both standard and customised configurations.

PEI-Genesis offers custom, engineer-supported solutions for almost any imaginable scenario, when lives are at stake and reliable parts matter the most. Our military and aerospace connectors provide the reliability, compact size, and bandwidth needed for even the most demanding of EW designs.


www.peigenesis.com



PEI-Genesis™



WHEN THE DESIGN MATTERS,
PEI-Genesis DELIVERS.



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

PEI-Genesis has what you need.

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



RF over Fibre for Defence, Government & Mil-Aero

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- C-band satcom links (500 MHz – 7.5 GHz)
- VHF, UHF, L & S-band links
- Digital Data links
- SIGINT & antenna remoting
- Optical delay lines



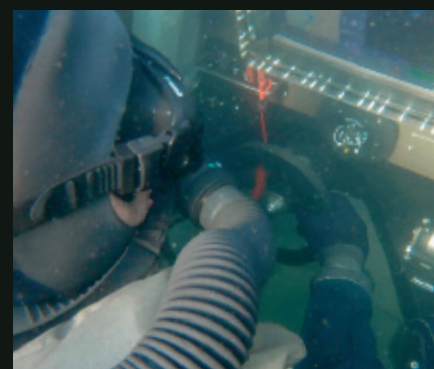


CRITICAL MISSION SUCCESS REQUIREMENTS

Safety, Speed, Stealth.

When the mission requires rapid passage over a large expanse of water before submerging to avoid detection, you need to be confident that the vehicle you are using is able to transport you and your equipment safely, quickly and covertly.

JFD's SEAL Carrier is an 8-man surface planing free flooding submersible designed for the covert insertion and extraction of maritime Special Operations Force (SOF) personnel. Able to operate as a high speed craft on the surface, semi-submerged awash and fully submerged. The operationally proven JFD SEAL Carrier is the only craft designed and built for such exacting operation requirements.



confidence under pressure

jfdglobal.com



Enhancing Special Operations Forces Capability by Prioritising Equipment Performance, Safety and Reliability

Deploying maritime Special Operations Forces (SOF) has always presented significant challenges. These challenges are further compounded when insertion and extraction is undertaken at sea over long distances. In today's geopolitical environment the response to evolving threats demands a rapid response capability. As a consequence, more than ever, SOF requires reliable, safe and rapidly deployable advanced technology with integrated solutions to ensure they are able to complete their mission efficiently and effectively. To optimise capability, reduce operational risk and enhance mission success, all potential operational eventualities must be considered. The performance of the equipment necessary to support these eventualities must therefore meet the very highest standards of safety and reliability as once submerged, the life of the SOF Operator is literally dependent upon it.

Crossing the 'water-gap' over large distances has typically been undertaken by small raiding craft, which although discrete, are not covert and are readily detected with modern surveillance systems when in the operational arena. To maximise compromise mitigation, numerous maritime SOF have employed Swimmer Deliver Vehicles (SDVs); free flooding submersible crafts that remain submerged throughout the operation. Despite being covert, such systems are relatively slow and place significant physiological and psychological stress upon the Operator, who might be submerged for extended periods in cold water.

To enable rapid surface insertion and extraction beyond the surveillance horizon, together with a covert sub-surface capability, JFD offers the SEAL Carrier. This advanced operationally proven multi-mode craft fulfils today's maritime SOF requirements for a safe, covert and reliable means of rapidly transporting Operators over long distances on the surface and sub-surface. Readily deployed by land, sea or air, SEAL Carrier is not dependent upon fleet submarines to serve as a 'mother craft' providing Commanders and operational planners the very highest levels of operational flexibility.

JFD's SEAL Carrier is an eight-man high speed surface planing free flooding submersible which operates in three modes; surface, semi-submerged and submerged. At the surface it can transit at speeds of up to 30 knots before switching to semi-submerged and finally submerged mode for a final covert approach at 4 knots. Integrated advanced on board sensors, navigation, life support and communication suites work together to minimise Operator, and Crew, fatigue providing safe and accurate positioning day and night both above or below the surface of the water, regardless of vehicle speed or environmental conditions.

In addition to SEAL Carrier, for shorter range subsurface insertion and extraction operations, JFD offers a range of smaller submersible vehicles such as the Torpedo SEAL, also readily deployed by land, sea or air.

Development, testing and trials of JFD's submersible vehicles initially took place in the Stockholm archipelago, Baltic Sea and the waters off the West coast of Scotland, UK. These temperate and sub-arctic climates demonstrate their functionality in low temperature waters. Recent enhancements and intensive testing have now conclusively demonstrated vehicle performance in environments at the other end of the environmental spectrum such as the tropics.

Using unrivalled submarine engineering expertise, combined with maritime SOF operational experience, JFD ensures those working under the toughest environmental conditions have high performance free flooding manned submersible vehicles that are designed, built and tested to the highest industry related safety standards.

In addition to the submersible vehicles and to facilitate the full mission profile, JFD offers 'state of the art' Underwater Life Support Systems that include long endurance rebreathers, both mechanical and electronically controlled. This complete mission capability can include a comprehensive through life integrated support package that optimises capability availability throughout the operational life of the equipment.



confidence under pressure

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AllanWebb

Allan Webb Ltd (AWL) is delighted to have been awarded with the Silver Award from the Armed Forces Covenant Employer Recognition Scheme.

Having worked in the Defence sector for over 60 years, the contribution of our veteran and reservist community has been invaluable.

Their insight and experiences when helping deliver an array of core supportability



engineering outputs to the MoD and Industry Partners has helped AWL stand out as experts in our field. We are proud that currently over 20% of AWL employees are veterans.

Allan Webb's Dedication to the Armed Forces

At the end of 2017 AWL signed the Armed Forces Covenant (AFC) to officially declare the

company's wholehearted and enthusiastic support for the Armed Forces community and any member of staff who is, or is considering becoming, a Reservist. Becoming a signatory has helped AWL focus its policies and working environment to take into account the unique demands placed upon service personnel and their families.

AWL is fully conversant with the skills, capabilities and ethos that ex-Military can bring to the company but is also cognizant that transition to civilian life can be both exciting and challenging. We are fully engaged with the Career Transition Partnership (CTP) to employ suitable service leavers wherever possible and have support structures in place to assign appropriate mentors to new employees to ease their integration into the company. The mentor scheme also helps ensure that our new joiners' true potential is met and training is provided wherever possible.

We have comprehensive policies in place to support Reservist employees during times of mobilisation; through pre-deployment preparation, deployment and re-introduction back into the company on demobilisation. Our Reservists and Veterans have also built up a positive internal network to support any 'non veterans' who are considering joining the Reserves and, as a company, we ensure that information is readily available to aid in the decision making process.

It is also important to AWL to support the Armed Forces outside of company employment. We nominate an Armed Forces Charity every year, with the company matching the money raised by employees' individual fundraising efforts. We are also a longstanding supporter of SSAFA, the armed forces charity, attending and sponsoring many events to help raise funds for the amazing work they do.

"We, as a company, are delighted to be recognized for our commitment to our Armed Forces", exclaimed Steve Rigsby, MD of Allan Webb Ltd, "our Veterans, Reservists and spouses of military personnel are such an integral part of the Allan Webb Ltd family. We will continue to do our bit to support all of them and have a great platform to do so through the Armed Forces Covenant Employer Recognition Scheme".

What is the Employer Recognition Scheme?

The Defence Employer Recognition Scheme (ERS) is primarily designed to recognise and encourage private sector employers who support defence and inspire others to do the same. Awards are tiered Bronze, Silver and Gold and are presented to organisations that pledge, demonstrate and advocate support to defence and the armed forces community and align their values with the Armed Forces Covenant.

In order to be awarded the Silver Award, participating organisations are required to:

- Have signed the Armed Forces Covenant
- Proactively demonstrate that service personnel/ the armed forces community are not unfairly disadvantaged during the recruitment process.
- Employ at least one individual from the armed forces community emphasised in the ERS.
- Actively ensure that their workforce is aware of their positive policies towards defence people issues.
- Demonstrate support to mobilisations or have a framework in place with regards to Reserves.

Click here to find out more about, or get involved with, the Defence Employer Recognition Scheme.

www.allanwebb.co.uk





unival group GmbH ANNOUNCES STRATEGIC EXPANSION OF ITS MOBILE SCREENING SOLUTIONS RANGE

unival group® is a German security innovator and manufacturer, specialized in design, development, manufacturing and implementation multi-level security systems. Headquartered in Bonn, Germany and founded in 2003, the company provides customized and comprehensive security solutions for governmental and private organizations worldwide.

With experience in security and defense sector of nearly 20 years, unival combines the expertise of a manufacturer, a security integrator, consultant & project implementation organization. Precise product and project management allows for the company to deliver solutions of the highest quality, meeting the exact needs and expectations of our customers. The strategic focus of unival is to ensure that every solution delivered to customer matches their exact requirement and serve as a practical tool to tackling a particular threat, challenge or targeted at minimizing a security risk. Our philosophy has been welcomed by customers and partners in over 50 geographical markets and we have a strong ambition for further progression in the market of security globally.

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

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

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

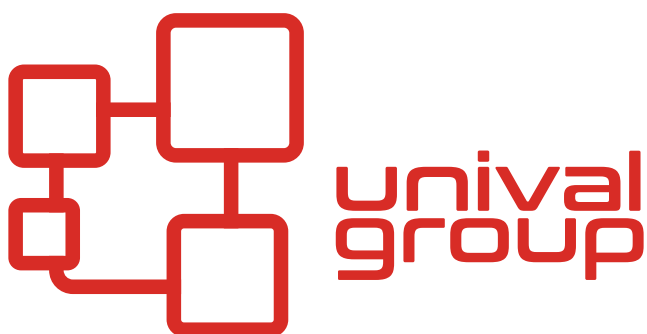
As different scenarios require different solutions, the range of unival Mobile Security systems gives law enforcement agencies the possibility to find the right match for their security needs and further tailor the selected model to their operations, without any compromise.

The new Mobile Security range includes the following models:

MSS – MOBILE SCREENING SOLUTION

MXV SV - SINGLE VIEW X-RAY VAN

MXV DV - DUAL VIEW X-RAY VAN



unival group GmbH | Am Hofgarten 4 | 53113 Bonn
FON: +49 228 926858-0 | info@unival-group.com | www.unival-group.com

MSS | MOBILE SCREENING SOLUTION



MSS | MOBILE SCREENING SOLUTION is the first ever completely autonomous mobile security checkpoint, featuring a fully integrated, highend Walk-Through Metal and Gamma radiation Detector, X-ray baggage screening system, integrated Video Surveillance, advanced alarm management, Liquid Explosive Detection, trace detectors and other technologies, forming a comprehensive checkpoint.

MXV DV | DUAL-VIEW X-RAY VAN



MXV DV | DUAL-VIEW X-RAY VAN is the first dual-view mobile X-ray scanner BV 100100DVM from ADANI with a tunnel opening of 100×100 cm. Dual View screening with the possibility to incorporate a number of complimentary security solutions makes this system a comprehensive solution for Customs, Border Control, VIP Security and a number of other applications.

MXV SV | SINGLE-VIEW X-RAY VAN



MXV SV | SINGLE-VIEW X-RAY VAN is the 'light' version of the MXV DV system with an integrated single-view X-ray inspection system, allowing for installation of additional inspection equipment inside the vehicle, such as trace detectors, LEDs and others. Additionally, allowing for a wider selection of the vehicle chassis by customers.

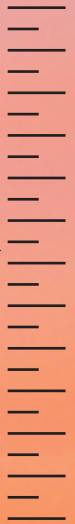
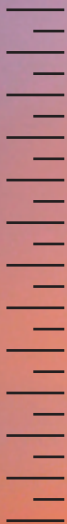


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All of our products are highly impact resistant and waterproof up to 330 feet.

LEARN ABOUT THE TRILOBYTE™

Our Cutting Edge Series of Helmet Lights for advanced IFF and C2 Operations

See why we are unmatched for in-field electro optic communication



International Version Shown



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For all inquiries email support@adventuretactical.com

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The Trilobyte™

The latest line of helmet lights from Adventure Tactical brings together over two decades of experience in designing and developing solutions to the complex needs of IFF and C practices in high stress environments.

The simpler models of the Trilobyte™ offer highly reliable performance at a competitive price point, while the more premium models make full use of our award winning patented technologies, delivering cutting edge features that are only available from Adventure Tactical.

Basic Features

The Trilobyte™ has a rounded design free of snag hazards. Its sandwiched polymer construction provides superior impact resistance. Like the majority of our product offering, it is waterproof up to 100 metres.

User Interface

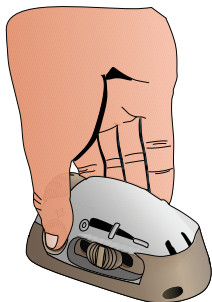
One of the great achievements of the Trilobyte™ is its intuitive design that organizes a wide range of functions in an easy to navigate system. Two control switches on the left and right sides of the light control output colour and functions, while the two side buttons can adjust output intensity within 5 levels. All positions feature unique raised position nubs that allow for positive tactile feedback, ensuring controlled operation of the light.

Dual Polarity Program Switching®

Pressing and holding the two side buttons for specific lengths of time (varying from 1, 3 to 6 seconds) will toggle the Trilobyte™ through its various programs: IR, Visual and - in more advanced models - Programming Mode. This effectively prevents accidental overt identification and separates programming settings from in-field functions.

The various modes available in each Trilobyte™ are accessed by pressing and holding the two side buttons, labelled (+) and (-), and counting to a designated number of seconds before releasing.

Modes include IR Mode (default), Visual Mode, and Programming Mode on specific models.



Output Colours

The majority of Trilobyte™ models feature four output colours: Red, Green, White and IR. The most affordable model, the Trilobyte™ Base, simply has White and IR. SWIR output is also available in the Trilobyte™ Gen5, one of our premium options. SWIR and IR outputs are always separated from visual outputs through our Dual Polarity Program Switching®.



US Version Shown

AutoSync™ Technology

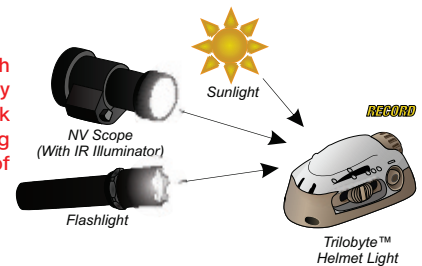
With very few exceptions, every model of the Trilobyte™ features our patented AutoSync™ Technology. This allows for synchronized group flashing using a highly encrypted RF ad hoc mesh network. This is ideal for immediate group identification, even in environments with large amounts of light pollution.

Mockingbird® Technology

Mid to high tier models of the Trilobyte™ contain our Mockingbird® Technology, allowing for the recording and playback of custom flashing signatures which are saved into the product's internal memory until reset.

Signatures can be recorded with any external white or near IR light source, including sunlight. No external tools are needed.

Trilobyte™ models with Mockingbird® Technology can record and playback custom flashing signatures using any external white or IR source of light, including sunlight.



Broadcast Group AutoSync™

The most advanced iterations of the Trilobyte™ combine our AutoSync™ and Mockingbird® Technologies, resulting in groundbreaking flow and precision for in-field electro optic communications.

Groups of these Trilobyte™ units can send and receive recorded signatures to each other and flash in unison. Individual, synchronized flashing groups can be set up for specialized C tactics. Unique identifiers can be easily and locally redefined if needed to relay operational status or disorient enemy intelligence.

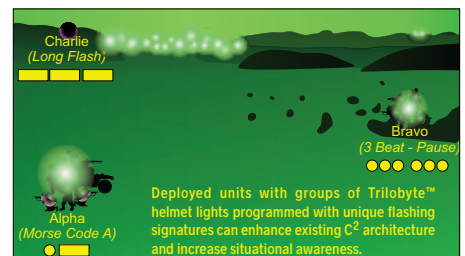
Deploying units with identifiable flashing patterns further enhances data from satellite / aerial imagery, presenting a refined Common Operating Picture that easily associates to in-field elevated and ground views.

While complementing existing Command and Control Battle Command Systems, Trilobyte™ units that feature Broadcast Group AutoSync™ function independently from them and will continue to operate even if digital technology is compromised.

Aerial View



Ground View



Deployed units with groups of Trilobyte™ helmet lights programmed with unique flashing signatures can enhance existing C² architecture and increase situational awareness.

Engineering for Specific Applications

We manufacture all of our products in house and pride ourselves on our ability to cater to the needs of our clients. We have already produced several custom mods of the Trilobyte™ to fit customer specifications.

Get in touch to learn more by emailing info@adventurelights.com or visiting our website at www.adventuretactical.com

Clear vision in all conditions is a mission critical advantage.

With weapon systems capable of engaging targets at extended ranges during the day, the aim is to match that capability at night.

However the human eye only receives information from a narrow band of the Electromagnetic Spectrum and it has limited Night Time ability. To see at night, several technologies have been developed. You can illuminate the scene you wish to observe (Visible, IR) but this can give away your position. You can use Intensification of the visible light reflected by the scene and you can use Thermal Imaging (IR) – or a combination of these.

Cooled and Uncooled Thermal

Thermal Imaging converts IR Energy radiated by objects into a visible Image. The system senses and measures IR Radiation and creates a video Image suitable for viewing. A cooled Thermal camera uses the addition of a cryocooled sensor and can detect very small temperature differences. Image Intensification - The Image Intensifier absorbs light energy and converts it into electrons that are multiplied thousands of times. Fused thermal / image intensified - To overcome the shortfalls of both systems and to maximise the advantages Qioptiq have created Fused or Blended sights. These systems use thermal and image intensified technology, combined in a powerful light weight package to deliver both identification and recognition.

Thermal Sights

DRAGON S (Sniper) turns up the heat! This new Uncooled Thermal Imager - In-line Thermal Weapon Sight provides mission winning capability.

DRAGON-S12 is the new In-line Thermal Sight, and is part of the latest development in thermal imaging technology. Providing snipers

with 24hr surveillance and target engagement capability, the sight is designed specifically to meet target and surveillance requirements for military customers and law enforcement agencies, providing high performance within a lightweight compact and rugged military qualified design. This delivers a capability to detect, recognize and identify man and vehicle targets 24hours a day, in poor visibility, in total darkness and through battlefield obscurants.

DRAGON-S12 utilizes a state of the art 640x480 format 12µm, 60Hz uncooled thermal sensor coupled with a near silent shutter, delivering class leading sensitivity and uniformity. The sight attaches to Picatinny and NATO accessory rails in front of the day sight via a quick release throw lever, providing 24hr capability without the need to remove or re-zero the day sight.

Cooled Sights

PHOENIX rises to deliver enhanced range target location & engagement. The potential to integrate the mwir-hot technology into a robust, reliable and swap traded weapon sight has become a reality.

PHOENIX, is a suite of Dismounted VAS products that will provide the Warfighter with enhanced Observation, Target Location and Target Engagement capabilities, based upon a common thermal core and operating architecture, enhanced connectivity and capability growth potential. **PHOENIX-S** provides long range observation and engagement capability - well aligned to the range capabilities of modern 0.338" and 0.5" Sniper Rifles and Ammunition, whilst still being sufficiently compact and lightweight to be utilized on 7.62 Sharpshooter / Support Weapon platforms.

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PHOENIX-H shares the HOT Thermal Core and central processing with PHOENIX-S for commonality, but also features a digital day channel, Laser Range Finder, Laser Pointer, GPS and an advanced AHRS (Attitude and Reference Heading System) which provides accurate own and target location. The PHOENIX systems are ITAR free solutions, whilst utilizing the latest in sensor and display technologies.

Image Intensified

MERLIN LR proves mastery over the night. This new long range image intensified weapon sight delivers mission critical enhancements.

MERLIN-LR is a new Image Intensified Clip-On weapon sight. This state-of-the-art sight is fully military qualified and is designed to be compatible with variable magnification day scopes for medium to longer range surveillance and target engagement. It attaches to Picatinny / NATO rails in front of the day sight via a locking quick release throw lever, and provides 24hr capability without the need to remove or re-zero the day sight.

MERLIN-LR is equipped with a high performance catadioptric objective lens and a bright, sharp, large aperture collimating optics to give a lightweight, compact yet rugged package. It is available with the latest P43 and P45 phosphor Image Intensifier Tubes, from the world's leading suppliers. The sight is suitable for a wide variety of weapon systems including AR Platforms, Designated Marksman Rifles, and Single Action Sniper Systems up to and including 12.7mm/0.50 Calibre.

Blended Sights

SAKER Fused Sight Soaring Above the Competition The latest Image Intensifier / Thermal – Fused Weapon Sight for medium range surveillance and target engagement operations.

SAKER is the new Medium Range Fused Weapon Sight, providing the Dismounted Warfighter with an enhanced, multi waveband Detect, Recognize & Identify capability. The sight is fitted with a 12µm, 60Hz uncooled thermal sensor coupled with a High FOM Image Intensifier Tube, in either Green or White Phosphor, delivering class leading sensitivity, uniformity and system latency.

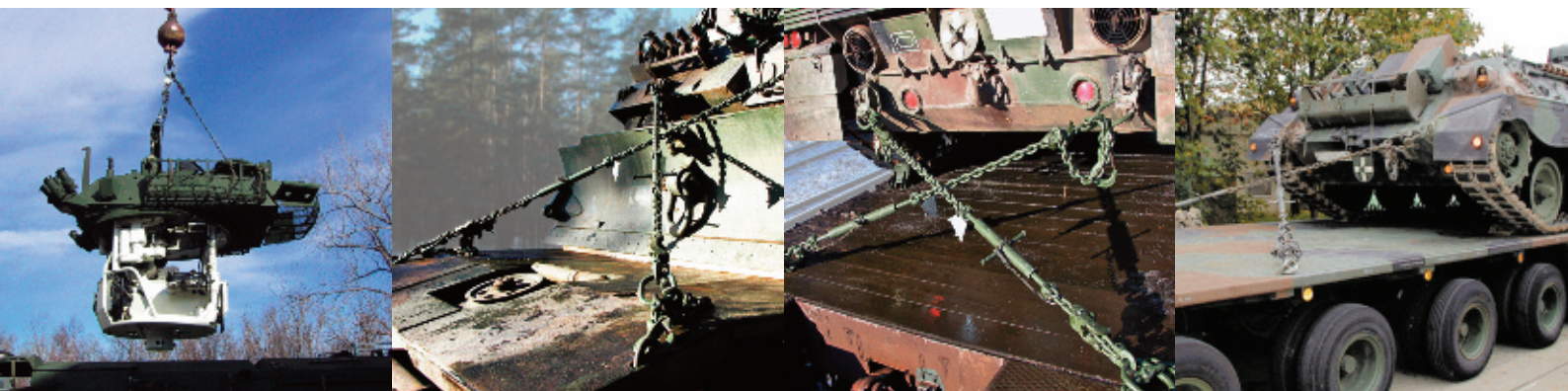
SAKER provides a low power architecture and is a fully military qualified. Designed specifically for medium range surveillance and target engagement operations, it attaches to Picatinny or NATO accessory rails in front of the day sight via a quick release throw lever, providing 24hr capability without the need to remove or re-zero the day sight. **SAKER** is a state-of-the-art system combining the latest Image Intensification and uncooled Thermal Imaging capability in a single lightweight, compact yet rugged package.

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BATTERIES AND CHARGERS FOR MODERNISING FUTURE GLOBAL DEFENCE PROGRAMMES

An interview with Peter Copplestone,
Lincad's Operations Director



Peter Copplestone

Q. Why is Lincad currently investing in a large-scale upgrade programme of its UK facilities?

A. These improvements are all part of our programme of preparing for future demand and growth. Over the past few months, we have invested in upgrading our manufacturing and engineering facilities and head office building. Additionally, we have purchased new automated cell testing equipment to ensure the performance and quality of batteries supplied to our customers. We are doing all this so that we remain ready to meet increased global demand for our military batteries and chargers for all types of defence missions such as on the battlefield, peacekeeping operations and dealing with natural and environmental disasters.

Q. As Defence modernises, how will Lincad evolve to keep up with future military battery requirements?

A. The Lincad team are constantly updating and evolving our range of military batteries and chargers to meet the requirements of today and the future. At Lincad we can

use any cell technology, which means we can adapt to meet future requirements. We see our batteries as mission centric and playing a key part in future technology-connected defence forces. There are many developing technology advances in the defence arena particularly within autonomous systems.

Q. Why do you continue to see demand from the defence sector for lithium-ion batteries?

A. Lithium-ion batteries are currently the most cost effective and most suitable cell type for the defence market. In our view lithium-ion batteries are the most energy and power efficient option for defence applications. In the future that could well change as new cell types come to market and we stand ready to adapt to meet any such changes.





Q. How is Lincad working towards meeting the challenges of future soldier needs?

- A.** We continue to make lighter, more energetic and more powerful batteries for man-portable soldier equipment. All our batteries and chargers are designed to be suitably ruggedised and simple to use. The Lincad R&D team are currently working on battery solutions for integrated man-worn batteries and are also looking at developing a single power source for soldiers in the field.

Q. Is Lincad developing batteries for military robotics?

- A.** We already have lots of experience in manufacturing batteries for robots. For many years we made the battery system for the CUTLASS bomb disposal robot. So yes, robotics is an area we are watching closely and expect to see growth.

Q. Will there be increased demand for batteries for military autonomous vehicles?

- A.** We believe in the future that robots are likely to replace humans in a number of military scenarios. There will be remotely piloted military vehicles of all types as we enter the era of robotic warfare. This will in turn result in an increased requirement for mission critical batteries and chargers.

Q. Will Lincad see growth outside the UK in the future?

- A.** Although the majority of our work is here in the UK for the MOD and leading defence primes, we also currently provide batteries and chargers to defence organisations in a number of different countries globally. As armies modernise, we aim to match or exceed their requirements to continue to provide the best state-of-the-art batteries and chargers for their missions. ●





4GD SMARTFACILITY & THE THEORY OF DECENTRALISED TRAINING

Many consider John Boyd's OODA loop to be a seminal work on the decision-making process. The loop provides a simple framework as to how decisions are made and is characterised by four steps; observe, orientate, decide act.



However, proper application of the theory is far more complex. The key phase is orientation. Here the causes, both historic and immediate, of an individual or group's behaviours are considered. The aim is that you Decide and Act before the opposition does. The faster you move through the stages, the higher your chance of success and the deeper the adversary finds themselves within your loop. There are two key methods of doing this:

1. Observing your adversary and acting before they observe you.
2. Having a shorter loop than them. Even if they see you first, you Act before them. Thus, your operational tempo, or speed, must be quicker than theirs.

When designing our training facilities, 4GD have applied this theory with the lessons learnt on contemporary military operations, to deliver state-of-the-art urban training facilities. We believe training should be designed around increasing situational

awareness and decision-making speed: getting your loop as small as possible. The following are some of the ways that better training infrastructure can achieve this;

- **Observe (Active – “How to see them first”):** increased use of Night Vision; increased practise with joint assets through a synthetic environment.
- **Orientate and Decide (Active – “How we pivot first”):** increased regularity of tactical training, improve team tactics, cohesion and accelerate decision making.
- **Act (Active – “How do I act more decisively”):** regular training, under realistic combat conditions, to reduce the training to operational reality gap.

The McRaven Model:

The loop provides a fantastic basis but is not the only work of relevance. Admiral William H. McRaven's book, Spec Ops, offers another brilliant framework. He lays out six principles for achieving relative superiority that have also been fed into the SmartFacility™. Speed can be increased through repetition, provided for by greater access. Repetition can be kept fresh through a reconfigurable training space. Surprise can be practiced and honed in a facility that records your every move, down to the acoustic level of a clearance team. Security is a quiet and protected environment to test, develop and train. Simplicity and Purpose, initially considered operational principles, when applied to training, allow it to become a way of life.

Balancing Collective Training:

While collective training is critical, it must be balanced with low-



level training opportunities and facilities. Collective training infrastructure is expensive and, more critically, is dislocated from units and not always available. Similarly, collective training does not often allow the frequency of action, at lower levels, needed to build the cohesion required for enhanced operational tempo. Moreover, the contemporary operating environment remains hugely complex, with the influence of Major General Charles Krulak's Strategic Corporal unlikely to wane. Whatever the operational context it is highly likely that it will involve team size groups operating in an urban environment. All this has led us to believe that enhanced collective operational tempo can be successfully achieved through state-of-the-art tactical level training.

Winning through Immersive Training

The study into the theory of winning left us with some clear direction which has shaped our SmartFacility concept further.

On-Site: High quality training infrastructure should be decentralised and delivered to individual units. This provides huge benefits such as the ability to conduct training in a secure environment and an ability for units to design their facilities to suit their specific mission set. However, the primary benefit is that decentralised facilities is more frequent training which can be run by the strategic team leader, engendering a true sense of mission command.

Dynamic: The contemporary operating environment is hugely confusing, and facilities need to reflect this. Adaptable spaces which enable 360 Degree force on force engagements are a must. This enables a huge tactical advantage enabling dynamic clearances to be practised (as far back as 1967 the US Army were awarding a five times force multiplier ratio for rear strikes on exercise).

Tempo: The tempo of training needs to match the tempo of operations. Centralised training facilities cannot be used continuously whereas decentralised facilities can be. This availability would enable a warrior training cycle to be forged, where achieving an hour of combat training a day would be realistic. Moreover, Maj Gen Hyams in his talk at RUSI, discussed

a training environment where it was safe to fail, we contend that frequency facilitates this.

Smart Facility™ Specific Design Theory:

Applied, these theories and principals form the basis of the four levels of our SmartFacilities. This modular approach is central to growing facilities in line with requirements and budgets but also ensure they can be updated in an ever-shifting world, both in terms of adversaries and available technology.

Level 1 – Complexity: Facilities need to be completely reconfigurable to ensure users are constantly challenged. Fighting the facility must become a thing of the past if users are going to become comfortable overcoming uncertainty.

Level 2 – Immersive & Responsive: Facilities must be as close to reality as possible and ensure all the senses are immersed. Only when this is achieved will the gap between training and operational reality be closed. However, the technology that achieves this needs to be intuitive to reduce the burden on the instructor. It needs to react to the users, it needs to monitor trends and it needs to enable 24 hour black light training.

Level 3 – Realistic Adversaries: Non-ballistic facilities allow 'real' enemy to train against. However, high-tech responsive targetry still has utility; not least to evaluate accuracy. 4GD's targets behave like a real person. From being able to verbally engage with operators to reacting to noise or motion. Trainees will learn how to make judgments and shoot when operating in a high-stress combat environment.

Level 4 – Blended Simulation: One of the key benefits of collective training is the availability of higher-level assets. To enable a thorough decentralisation of training these assets need to be replicated virtually to encourage junior commanders to become comfortable with the technological dimension of observation, orientation and decision making within a combined arms environment.

4gd.co.uk

Armour Mobility®

There was a time when Commercial Armoured Vehicles (CAV) such as the Toyota LandCruiser, Nissan Patrol and Mercedes G-Wagen needed protection only against guns.

B6-armoured vehicles quickly became the standard in a rapidly developing industry.

The wars in Iraq and Afghanistan presented a new threat with the Improvised Explosive Device (IED) and called for new types of vehicles: the Mine Resistant and Ambush Protected vehicle and Armoured Personnel Carrier (MRAP and APC). Protection against IEDs also inspired the development of the V-hull, which deflects an IED blast up and sideways. However, MRAPs and APCs are not suitable for all types of mission. That is why it is not uncommon for CAVs these days to be built to military standards, such as VR9, VR10 and even STANAG 4569 level 2. The vehicles are designed to protect the occupants against blast, severe firepower and sometimes even CBRN(E) threats. In such cases, weight becomes a serious issue. After having been armoured, a

soft skin can almost triple in weight. OEM-components such as the rims and brakes are no longer strong enough and should really be replaced by high-quality heavy-duty upgrades which are specifically designed for the vehicle's new purpose.

This is why TSS International BV, an ISO-9001 certified Dutch family business just south of Rotterdam in The Netherlands, has made it its mission to make sure (Commercial) Armoured Vehicles can keep moving under the most difficult of circumstances. TSS Heavy Duty Runflat Wheels, Rodgard™ (FINABEL-compliant) Runflat inserts, MOV'IT Security™ Brakes, TSS ProtecTank® self-sealing fuel tanks, B&G Vehicle Intercoms and SKYDEX Technologies shock mitigation products are all part of a carefully selected portfolio, designed and tested to internationally recognised standards. Keep reading to learn more about what TSS calls Armour Mobility®.

TSS was the first on the market with serial production of tested and certified high-payload alloy rims. Starting with 1500kgs capacity, constant developments have enabled 2000kgs payload per rim, which can be delivered fully assembled and ready to mount on the vehicle. TSS Heavy Duty Wheels are available for most CAV platforms and are always delivered with Rodgard™ Runflats, suitable for the high payloads, including tyres suitable for the vehicle and its mission.

Installing MOV'IT Security™ Brake upgrades, means you are increasing the friction between the pads and discs; optimising ventilation; strengthening the brake calipers and reinforcing the brake lines. As the weight distribution of the vehicle has changed, this has also been incorporated into the design of the brakes, ensuring shorter stopping distance and a reliable and consistent braking performance for vehicle weights in excess of 6000kgs.





TSS ProtecTank® is the truly self-sealing fuel tank protection system, allowing for significant weight savings in the armouring process. No vehicle modifications are necessary: the production makes use of the OEM fuel tank, which is tailor-made to fit as intended by the OEM.

B&G Vehicle Intercoms allow for closed-door, 2-way communication with bystanders of your armoured vehicle. Various versions for communication between vehicle compartments and Public Address systems are available as well as configurable sirens and red-blue LED lights for in the grill.

The latest addition to TSS International's product line-up is intended to enhance the mobility of the occupants of an AV. Due to the geometry with a flat underside, most CAV's transfer a lot of kinetic energy of an under-vehicle IED blast upwards, potentially crushing any feet resting on the floor. Placing SKYDEX Convoy Deck on the floor can significantly limit the negative consequences of an under-vehicle blast. These shock mitigation mats are easily retro-fittable, but can also help reduce the weight of the vehicle if integrated in the design of the vehicle, possibly eliminating the need for an elevated floor. With new versions of the Toyota LandCruiser and Mercedes G-wagen becoming the new standard, it is a good time to think about raising the bar for personnel protection on these vehicles. TSS has already delivered SKYDEX Convoy Deck for several certified vehicles used by European Armed Forces.

TSS International products are tested and certified by institutes such as TNO, Beschussamt, IABG, TÜV, MBDA, RDW and KIWA. TSS is a registered UNGM and NAMSAs supplier and member of NIDV, ESTA and Fleet Forum. A number of TSS' products have been allocated NATO Stock Numbers.



To find out more about Armour Mobility, visit

www.TSSH.com

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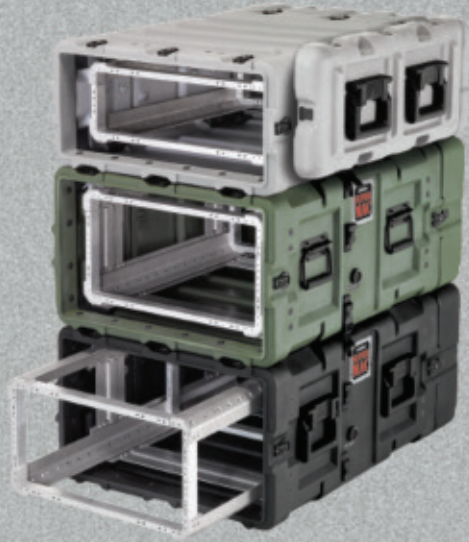
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We have a team of talented web designers, graphic designers and copywriters on hand, to do justice to the quality and excellence of your products with stylish and accurate marketing collateral.

Whether it's printed material which looks more vibrant than your current offering, some compelling content written and designed into a press release or a download, or you're looking for help with a new website or exhibition stand, we can certainly help you.

The management team behind DDA is shared with MS&T – we know

from talking to our customers in the industry that creative marketing probably isn't something which comes naturally to you. If you have your own team, that's fine. But many defence businesses would love to be able to outsource the marketing and design work to a trusted partner who understands the industry and also has avenues on hand to get the brand out there. That's where we come in.

Take a look at our services below and visit the dedicated pages for more information about what we do, who we've worked with and for some testimonials from our many satisfied customers. We're sure you'll find us a reliable partner.

Here's how we can help:

Events and Exhibitions

We know how difficult it can be to show your wares off worldwide – the logistics is hard enough without worrying about design and technicalities. Let us take the burden off your shoulders. Organising events and exhibitions around the world can be a trying experience. From liaising with various suppliers in different countries, transporting products to a specific place at a set time, to organising stands... if you add in technical and creative demands as well, it can be a challenge, to say the least. That's why many of our clients prefer to pass the responsibility for exhibition display management and design over to us. We'll coordinate every aspect of the build – from registration and fee negotiation, to electrics, lighting, furniture designing and printing. Let us work with you as your creative partner,



so you have a faultless stand when you arrive at the show.

On design, DDA's graphics team can create bespoke graphics for any event, at any size, giving your products the impact they deserve. We'll work closely with you on design, editing imagery, on layout and printing.

Brochures and Data Sheets

They're one of your most important sales tools, but they're often neglected. Make them sing! We'll turn your documents into dynamic collateral which does justice to your products. Often neglected, brochures and data sheets are one of the most important sales tools a company can produce. Done right they're informative and engaging, communicating important information about your products' key features.

Easy to download digitally, brochures and data sheets work well when printed as a tactile and engaging piece of sales and marketing collateral. They're really important.

So why not create something which matches the quality of your product? DDA has a back catalogue of stunning, bespoke brochures and data sheets which we have produced for our defence clients. We have a team of professional graphic designers and print managers with years of experience, on hand and ready to work with you to achieve your required goal.

Things to consider are your target audience and the key benefits which need communicating. We can help you draw those out, then complement our advice with compelling copy, concise product specifications and stunning technical illustrations to maximise impact.

We're happy to enhance your existing collateral within your current brand guidelines or, if you want, we can help you develop something completely new.

Websites

Sales prospects will increasingly end up here as a first introduction to your products, so you need to strike the right first impression. We can host, design and maintain your website so it does what you need it to. Increasingly, websites are the first port-of-call for potential customers. All too often they're clunky, hard to navigate and lacking in style – an inferior representation on the quality products they're supposed to support.

DDA has supplied custom built websites to a range of small and

medium-sized defence companies and associations. The process starts by establishing and articulating your requirements and goals, so our designers can create conceptual ideas before instructing our experienced developers on how to execute the build process.

A good website is one of several key elements of your digital marketing strategy. We'll help you find something which properly represents your brand, a one-of-a-kind site which is tailored to your specific requirements.

And websites shouldn't be stagnant – they need to be updated as your offering changes. So we can provide ongoing hosting, management and maintenance packages so that your site remains fresh and relevant.

Adverts and Editorials

It's a competitive world out there and it's hard to attract eyes and keep them focused. We can help draw attention to your products and provide written content which tells the right story. How do you make your products stand out from the crowd – the one which eyes rest on, while a reader is flicking around a website, online publication or a print magazine?

Creating an advert or an editorial which has genuine impact is no simple feat. If you're trying to sell a product, promote a brand or highlight company news, DDA has the creative insight and industry experience to create something with real impact that engages with your customers.

Adverts which are designed with style to communicate key messages to potential customers. Editorials which pull in and engage readers, raising brand awareness while telling them a story at the same time. It's tricky stuff to get right, but we can help.



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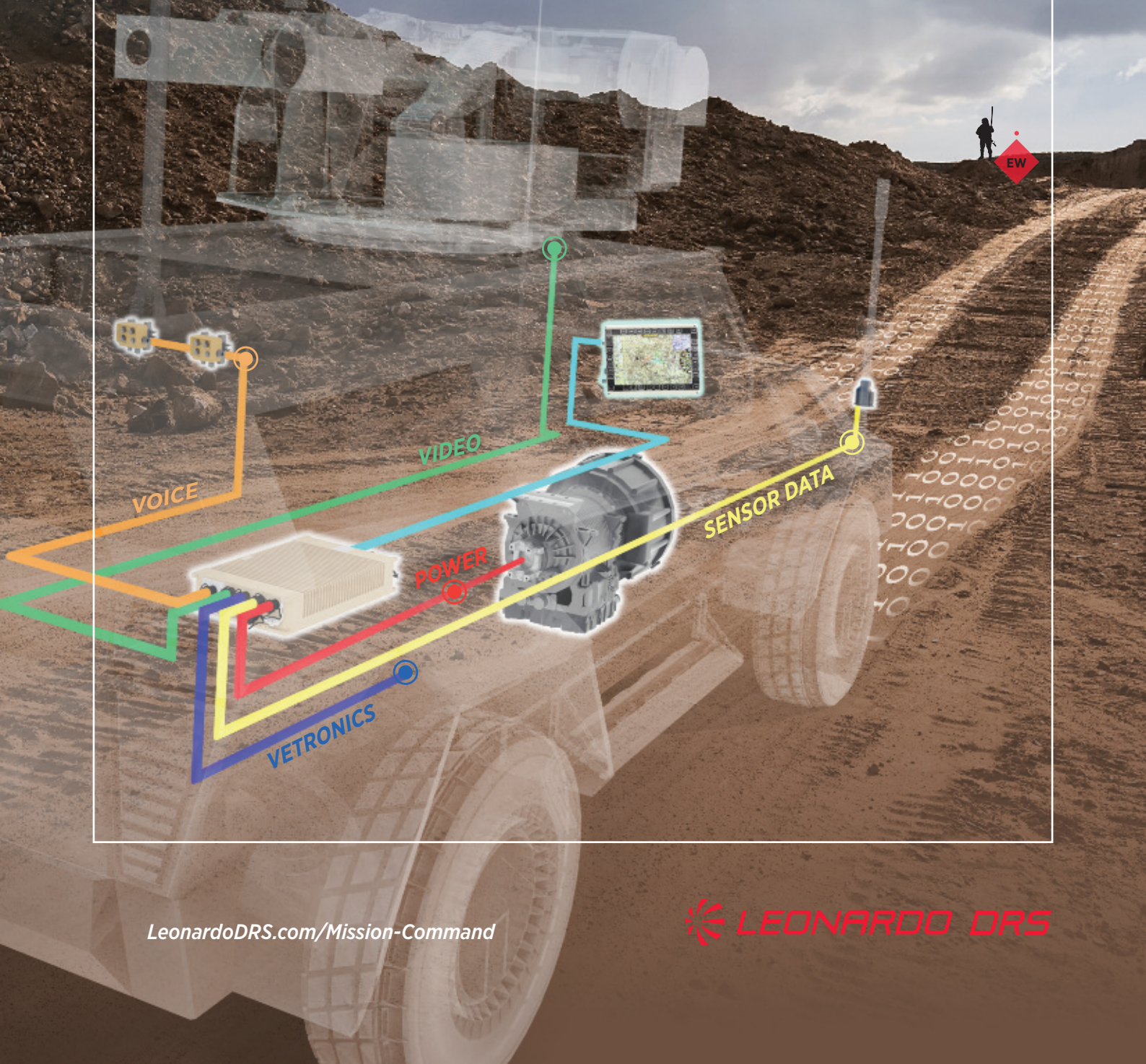


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