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DISPLAY TECHNOLOGY
VALENT APPLICATIONS
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...& MUCH MORE

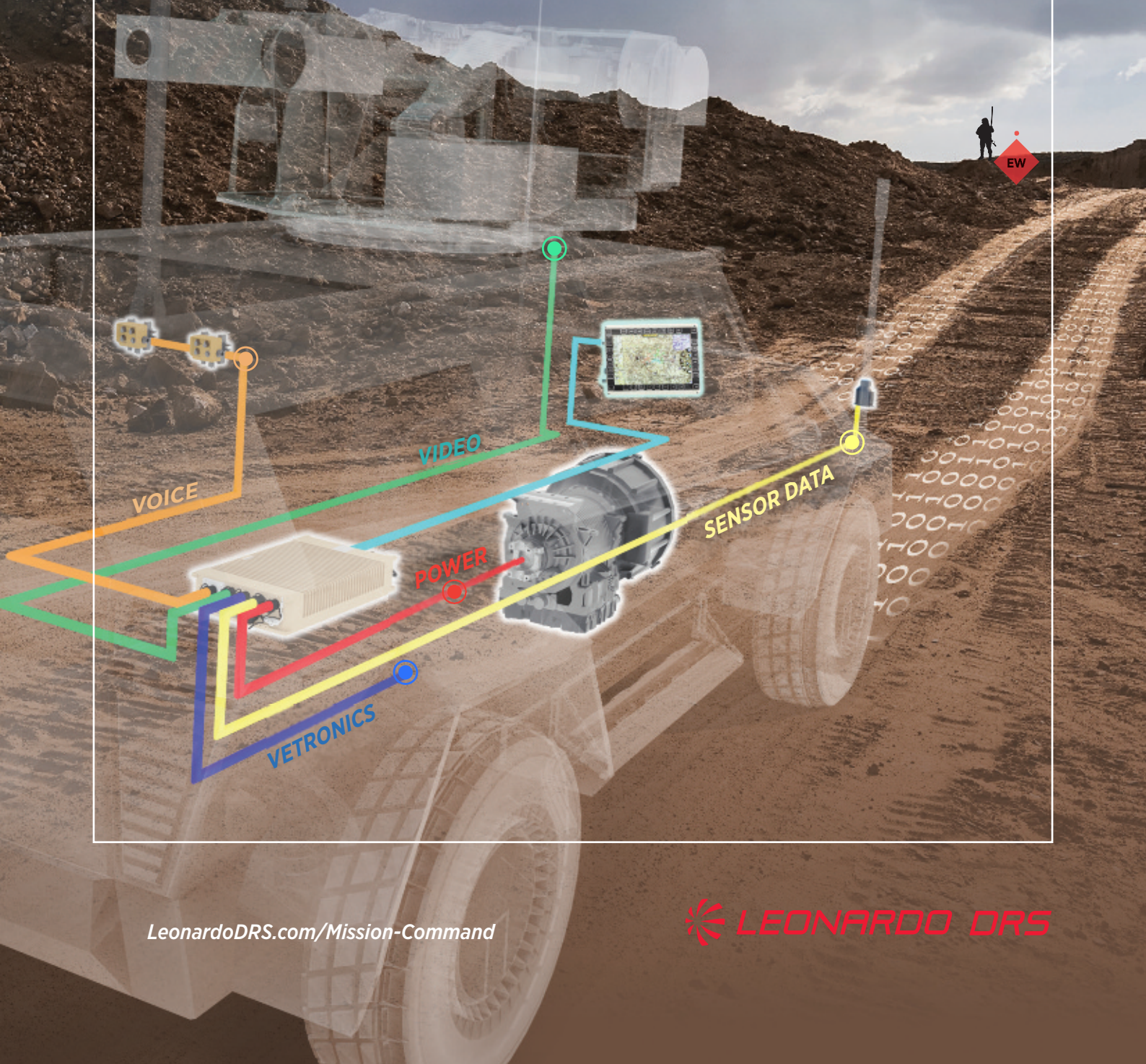
*Cover image - Leonardo DRS
U.S. Army Mounted Family of Computer
Systems provides Blue Force Tracking
and Battle Management in the most
extreme tactical environments.*

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Integrate. Analyze. Visualize. Command.

Fully-integrated networking, communication, power generation and cyber-protected systems deliver the tactical advantage in the toughest environments. Comprised of our Data Distribution Unit (DDU) Tactical Computer, GVA Displays, Vehicle Intercom System, Titan On Board Vehicle Power system and the seamless integration of mission-essential C4 applications and sensors, Leonardo DRS delivers scalable, platform-agnostic mission systems that offer your soldiers the advantage in every domain.



LeonardoDRS.com/Mission-Command

 **LEONARDO DRS**



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

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

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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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TYRON RUNFLAT
PEI GENESIS
JFD
AIRBORN ... & much more



Innovative Integration

Transforming Tactical Command & Control Capabilities

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

When warfighters' lives are on the line, detecting and locating the enemy or fellow soldiers on the battlefield is critical. Situational awareness is a crucial part of understanding current conditions in a Multi-Doman Battle environment to ensure the warfighter can integrate Army, joint, interorganizational, and multinational capabilities that allow him to visualize and create windows of multi-domain superiority through fire and maneuver to positions of relative advantage in decisive tactical and operational level operations for the mounted platform and dismounted user, leader, or commander.

To do this, mission command uses a combination of hardware and software to enable centralized interaction while integrating Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR). Also, integrating Electronic Warfare (EW) platforms and weapons subsystems into one holistic capability can give the warfighters the ability to monitor, control, and interact with the entire system simultaneously.

In 2014, Leonardo DRS Land Electronics, in partnership with key industry partners, undertook a substantial C4I demonstration of a new tactical command & control capability for a Middle Eastern customer. The experience Leonardo DRS had derived from delivering similar capabilities to the US Army on FBCB2 as well as the Mounted Family of Computer Systems (MFoCS), and with the British Army on Bowman, was the base on which its capability had been designed and built. At the core of Leonardo DRS' approach to this new C4I capability was a highly innovative piece of technology called the Data Distribution Unit (DDU). The DDU, also referred to as the 'Magic



Mounted Family of Computer Systems

Box,' enables voice, data, sensor and video applications and vehicle services to be integrated via a common line replaceable unit (LRU). This is ideal for a tactical vehicle & command post environment where space is tight and an effective approach to size, weight & power (SWaP) is a key requirement.

The DDU-3, the version of the DDU used for formative phases of this key project, is where all the primary system functions meet and get integrated. It is open and agnostic and supports multiple Virtual Machines (VM), one of these supporting the Systematic SitaWare™ BMS and Mission Planning application. It also interfaces with the tactical radios. For this Middle Eastern customer, as it is with many such systems, the ability to fully utilize the existing tactical

communications infrastructure was vital. The DDU's ability to interface to up to four (4) concurrent tactical radios, potentially each from a different vendor and with disparate waveforms, was key to providing the voice and data interoperability. An inbuilt Wave-engine provides the ability to securely cross-band between say a Harris 7850M and Thales PR4G or even a 4G/LTE connected user interface (UI) device. The library of supported radios is continuously expanding and now embraces most of the popular variants in common use.

This capability, coupled with the ability to interface the same DDU-3 to SatCom and LTE systems, was a game-changer and provided a degree of flexibility not possible before. The DDU-3 also benefits from an embedded GPS (either commercial or Selective Availability Anti-spoofing Module (SAASM)) and as a backup to GPS, the option of interfacing enhanced long-range navigation (eLORAN) or L-Band for beyond line of sight Blue Force Tracking (BLOS BFT) services is also possible. The DDU-3 can also be interfaced to an INS/INU to provide system applications with a continuous dead reckoning of position, and velocity. The DDU-3 was the foundation of delivering smart and cost-effective integration of the communications and sensor environment.

A highly effective Vehicle Intercom System (VIS) solution could also be integrated via the DDU-3, either to the network or standalone via its own Radio Interface Unit (RIU). The Leonardo DRS VIS is a digital-quality and resilient solution to provide cost-effective voice communication within tactical vehicles and command posts. The success of the live evaluation followed by implementation of an initial brigade of the new capability was the



Vehicle Intercom System

trigger for the this key customer to roll out the system across additional Brigades where DRS will be providing an enhanced version of the DDU in the form of the DDU-4 along with upgrades to the Vehicle Intercom System and a new multi-touch Commanders Display.

As tactical vehicle environments have become more complex over the years, Leonardo DRS has been required to develop new hardware and software capabilities for the DDU. The Galileo Situational Awareness system being delivered to a SE Asian customer integrates several primary vehicles' systems into a capability that significantly reduces the reaction time to a threat and decision time taken to engage with this threat. The system also provides the means to share situational awareness both on the platform and with other networked vehicles in the same area of operations, as well as with high-echelon command posts and Headquarters (HQ). An interface connects the DDU-4 and the shot detection acoustic array, with the weapons system turret and the infrared radiation (IR)/day



Data Distribution Unit IV

camera and the Battle Management System (BMS).

The system integrates many C5ISR capabilities. A prime example of these capabilities, and one of the primary functions of the system, is to detect a gunshot and locate the source automatically. The system can then geolocate the source of the shot, pass a message to the overhead weapons system and automatically put its weapon and associated sensors, such as the camera and laser range finder, on the detected threat. The commander of the vehicle is presented with this data, and the related imagery from the weapons system and other vehicle cameras through the high-resolution touch screen display and can, in conjunction with other vehicle crew, decide how to engage with the threat. This entire sequence takes seconds and dramatically increases the ability to react rapidly to the threat. The DDU is also connected to the BMS and as a result, the tactical network. The BMS application can be an application running on the DDU or could be an existing BMS system hosted by another processor.

The DDU application has several critical pieces of data that are crucial to sharing any given event with other vehicles that it is deployed with and can assist in suppressing the threat or would

benefit from knowing about the threat. The DDU can pass this data to the BMS application, and in turn, the BMS application can plot the details of the detected shot on a battle map that is shared across the network. Data including azimuth and inclination of the vehicle along with Laser Range Finder (LRF) data can also be shared, significantly increasing the level of situational awareness.

Leonardo DRS understands that enhanced situational awareness capabilities will be required to integrate with the military, civil and non-military land and sea platforms in a multi-domain battle environment. The integration includes hosting a variety of software applications on the DDU and interfacing with the various vehicle platforms, its subsystems, current military and commercial networks, and a variety of existing and new sensor technologies.

This integration could potentially include platform sensor integration, leveraging additional military and commercial radios and networks for failover communications, weapons systems integration, video collection and distribution, etc. Leonardo DRS has a portfolio of fielded proven capabilities that could enhance any military's position by providing a set of already developed mature technologies that together will provide enhanced

situational awareness. These features include but are not limited to the following: advanced IP routing and switching, sensor integration including weapons systems, commercial and military radio integration, voice cross banding, video integration, Battle Management System (BMS) integration and the ability to leverage commercial cellular networks.

Further enhancements to the DDU-4 hardware and software are already in development including options for an embedded Alternative Positioning Navigation & Timing (APNT) module providing assured data in a GPS denied environment and enhanced cyber security capabilities which will enable end users to build cyber secure systems from the ground upwards. Leonardo DRS is committed to the continuous evolution of the DDU capabilities ensuring that end users can stay a

step ahead of the ever-evolving threats they face in tactical environments.

The DDU's functionality combines traditional computing, networking and distribution technologies into a small form factor, and embedded technologies allow the DDU to be deployed in a non-obtrusive manner without infringing on critical space or power requirements. The DDU provides an "everything over Ethernet" back-bone, allowing one or multiple users to access all electronics data within the vehicle and network. Numerous standard and non-proprietary interfaces are available on the DDU to allow connection to existing legacy mission equipment as well as support future integration requirements. To learn more about the Leonardo DRS mission command systems, please visit LeonardoDRS.com/mission-command.



The Digital Transformation in Centralized Defense Systems on the Battlefield.

Bob Stanton;

Director of Technology; Omnetics Connector Corp.



Dismounted Soldier in Contact with Satellite

In the multi-domain battlefield, the dismounted soldier is a vital link in a cohesive network that is in constant communication with central command collecting, transmitting and receiving surveillance data regarding their battlefield. New sensors monitor the state of the soldier including; hydration, fatigue, stress, and temperature, and the soldier's helmet can constantly collect and transmit visual data from the monitoring satellites above. Advanced helmet vision systems offer GPS position and routing, direct verbal communications and image collection. Use of microwave and higher speed digital signals are evolving to becoming a key element in timely information management. With new circuitry that operates on ruggedized CCD, or GaAs chips in the gigabit signal range, miniature process boards convert analog and millimeter data to useful digital information within the units themselves. These modules are interconnected with miniature Nano connectors and cable assemblies to master units on-board the dismounted soldier or equipment in the loop. Portable computers are designed onto one circuit board and continue getting smaller, running faster all while being built to withstand the rugged behavior of operating in a battle environment. Soldiers also have the capability to control autonomous vehicles as well as communicate with planes or unmanned aerial systems over the battle space. Advancements in military satellites

deployed overhead continue to carry the main load of processing capability while providing precision point positioning accuracy for personal and weapon strikes.

In support of signal collection and signal routing, Omnetics' Nano connector family of products are specifically designed for high-density applications in military and aerospace. They solve the packing density issue needed in rugged portability and fit well on printed circuit boards as well offer cable to board applications in high-density, lower voltage circuitry. Nano-D connectors are certified to MIL-DTL-32139 for high reliability and have years of proven reliability in continual portable applications and extreme environments. Nano-D connectors use a 17,200ksi beryllium copper spring-pin-to-solid-socket design that ensures signal integrity during use. As speeds go up, the wavelength of each signal is shorter, and at lower voltages, vibration and circuit noise could interfere with the signal. This challenge is solved by keeping Nano-D connector resistance as low as 12 to 15 milliohms with a capacitance of 2.0pf to 2.4pf. This design level is ideal for most circuits with low current flow and low voltage. With increasing speeds, capacitive coupling is also controlled by adjusting the connector insulator spacing to match the specific needs of the application. In



Five Gigabit Soldier Com. Cable

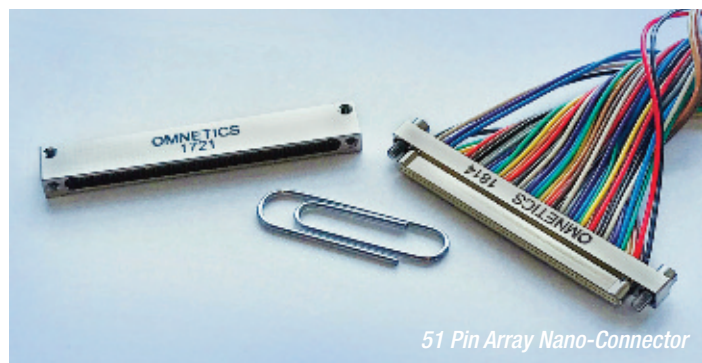


conjunction with the nano connector, low-skew cable designs are used to match cable performance to the needs of higher switching and signal speed interconnects.

Omnetics' Nano circular connectors are often connected from mounted or permanent modules to devices in helmets, such as night vision, or on the uniform, network hubs and radios, with miniature round cables for flexibility and strength. Breakaway connectors with alignment keys provide blind-and-quick connection and rapid disconnect when desired. For reliability, the Nano Circular connectors are built using the same elements from their MIL-DTL-32139 rectangular Nano-D connectors. This supports the goal of highest reliability interconnections in miniature circular formats. Ultra-miniature circular connector formats comply with IP67 and IP-6X testing and are some of the smallest and most useful in the industry beginning at less than .36-inch diameter for the six positions and less than one-half inch diameter for the 28 position Nano circular connectors. Beryllium copper spring-contacts are gold plated to the highest military standards and crimped to copper leads. Circular metal shells house the connector assembly to provide strength and handling for rugged applications. When shielded cable is included, the metal cable shielding is wrapped in a 360-degree contact system to the metal housing for EMI sealing. Over-molded strain relief styles are available, when needed.

High speed cable can include shielding or drain wire systems, similar to Fire Wire cabling with 100-ohm impedance. Differential pairs, are used to improve digital signal transmission speeds, reduce EMI and to match the circuits designed to those specifications. Hybrid or mixed signal connectors offer flexibility to combine power and USB digital signals within one device. Future-soldier military programs utilize the mixed signal cabling and connectors to reduce size and weight for soldier borne uniforms and backpacks in the battlefield.

Nano-D and Nano circular connectors have proven reliability on military satellites offering constant data supporting ground control on Lidar and Phased array radar systems in the sky. Surveillance drones to helmets and autonomous systems benefit by the marriage and rapid evolution of miniature connectors and cable design.



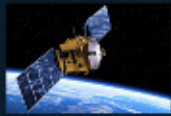
51 Pin Array Nano-Connector

Coax wiring combined with digital differential signal pairs can be combined within the same small connector and cable system for new designs.

As military designs are being expanded to customized systems for high-speed, rugged and portability, combinations of coax, high speed digital and power are being included in smaller and lightweight systems. System designers can work directly with Omnetics on-line to insure proper selection of standard connectors and/or to vary the designs to meet packaging and or wiring requirements. As digital speeds increase, designers can work directly with "High Speed Digital" design specialists using solid model imaging and signal speed simulation software to solve the issue. Special shielding and selection of unique plating metal is available. Outer shell, over-molding can be added to improve the connection processes for gloved soldiers. Unique shell shapes and keying requirements are quickly adapted to the military quality interconnect designs by collaborating with your Omnetics sales person on your applications specific requirements. Standard connectors are readily available from Omnetics and on-line at Digi-Key.

OMNETICS

CONNECTOR CORPORATION



SPACE

Missile Warning
SATCOM
PNT Signals
ISR



COMMAND

GPS Guided Artillery
IR Guided Missiles
High Power Microwaves



AIR

IO Broadcast
Radar EA
IFF Signals



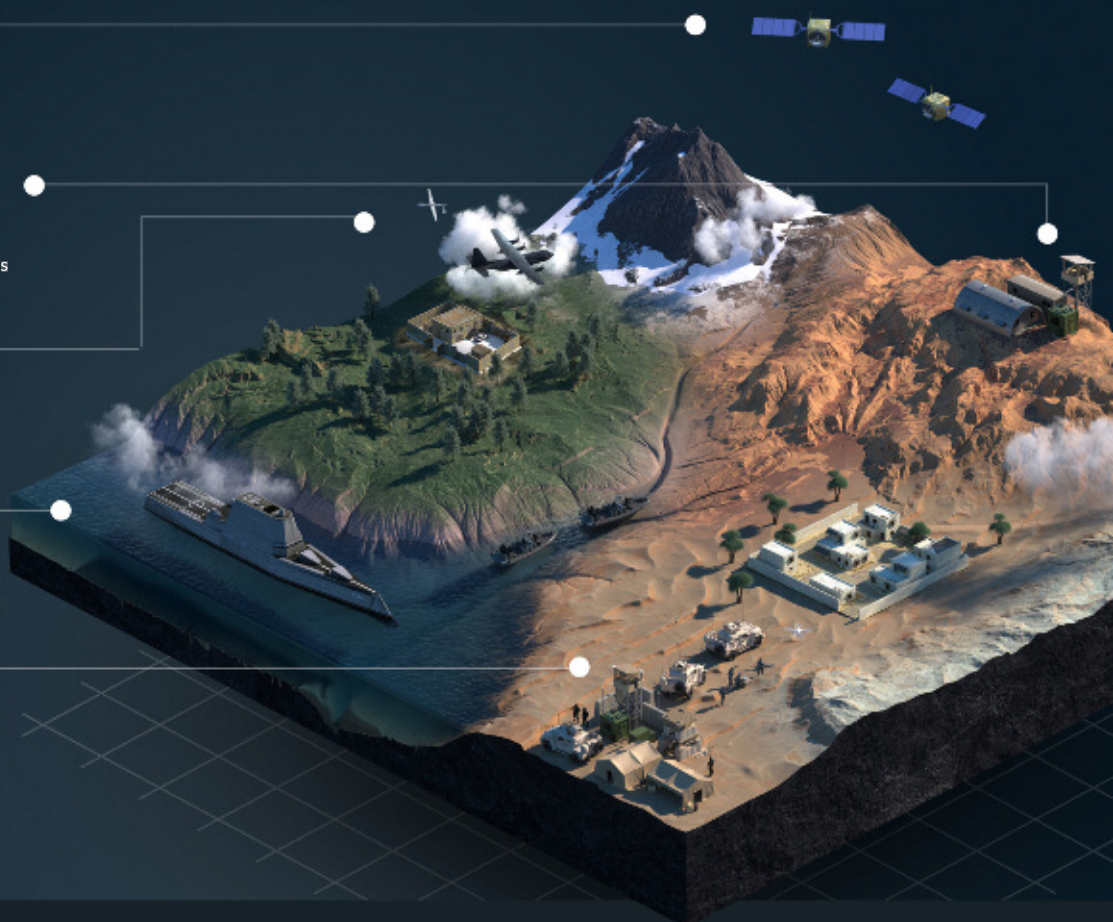
WATER

Radar Guided Missiles
RF Sensors
Laser Comms



LAND

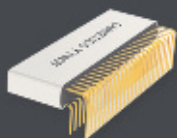
Tracking Radars
Laser Dazzler
Laser Guided Munition



MICRO - D



NANO - D



NANO STRIP



HIGH SPEED

Ruggedize micro-miniature interconnect solutions for high reliability applications.

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



R150 LIGHTWEIGHT PRECISION



PUNCHING ABOVE ITS WEIGHT CLASS

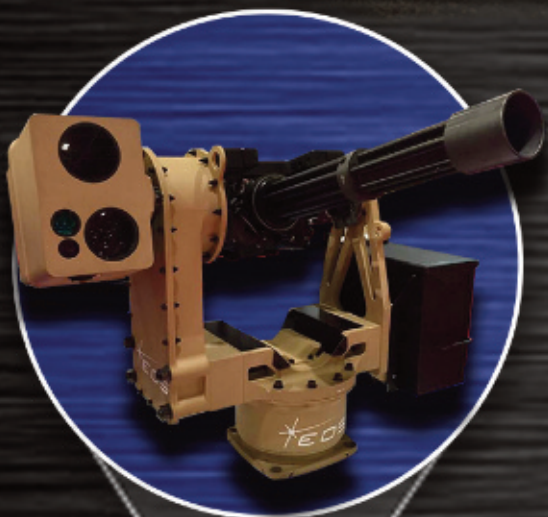
Mounts M240 / M134 / M2 / .338MG

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Targeting beyond 1000m

Weights < 330 lbs for lightweight lethality

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High bright monitors fit for today requirements on a Naval vessel

According to Naval Technology*, updated technology is going to be rolled out across all future defence platforms and should be completed by 2030 for all warships, aircraft and land systems.

**<https://www.naval-technology.com/>*

Naval Technology

The importance of today's warships being equipped with the correct technical equipment is of high importance. Recognised as one of the largest platforms to carry complex weapons, equipment and today's technology.

According to Naval Technology the goal is for all naval ships to undertake long endurance missions with less human interaction through advanced technology *. Naval Technology later went on to say the core to the competition is developing technologies that change the way the British Armed Forces approach decision-making, mission planning

and automation, with a key goal of the competition's second phase being the exploitation of a 'human-machine network that could work collaboratively on military platforms.'

**[naval-technology.com/news/uk-mod-awards-funding-to-rolls-royce-for-naval-autonomy-technology](https://www.naval-technology.com/news/uk-mod-awards-funding-to-rolls-royce-for-naval-autonomy-technology)*

Experience is the key

With over 25 years in the business and working with many MOD project based applications, Display Technology Ltd understands the importance of robust, reliable and efficient equipment in Displays and Monitors.

To support the current demand for advanced technology, Display Technology Ltd specialises in high bright sun light readable monitors/displays. The range of high bright displays offer brightness from 1000+ cd/m² up to 4500 cd/m², with a wide operating temperature range ensuring reliability in extreme conditions.

Aside from the high bright displays there are a number of services Display Technology Ltd can offer to make your product unique and as advanced as you like.



Services offered

1. Touch Screen Components

Display Technology Ltd have a specialised team in touch integration to help you find the right solution.

Options available:

- Sizes from 2.2" to 65"
- Control via USB, I²C and RS232 interface
- Glass thickness up to 15mm
- Water, salt and blood detection
- Customised tale position

Advanced Infinite Touch options:

- Special coatings such as, AG, AR or a privacy filter
- Shatterproof cover glasses in different strengths for public areas
 - Chemically strengthened glass
 - Aluminosilicate glass (Dragon, Gorilla, Panda, Xensation)
- Antibacterial glass (E. coli, S. aureus), optionally with AR or easy-clean coating
- Glass processing
 - Cut-outs / holes
 - Fingertip recess or slider (circular / elongated), polished or ground
 - Edges, steps or grooves

2. Optical Bonding

Optical Bonding is a technique that give you high quality sharpness and colour. It reduces the reflection of light on the surface by 99%.



What is Optical Bonding?

It's bonding a cover glass or touch screen to an LCD cell. It eliminates air gaps by inserting an adhesive, such as silicone gel, epoxy or urethane between the cover glass and the LCD.

The benefits of optical bonding:

- Increased vibration and shock resistance
- Increased Contrast
- No condensation or fogging
- Zero contamination (of dust and dirt)
- Improved heat dissipation (heat can dissipate through the front glass)

Monitor Housing

At design stage there are options for robust housing to ensure the monitor can endure harsh vibration and shock. For more information visit their website:

www.displaytechnology.co.uk
or contact them on **01480 411600**.

G&H launches the StingRay NightCrawlIR HD CZ motorized MWIR lens series

The StingRay
NightCrawlIR™
series represents
a revolution in
cost and
performance in
the HD MWIR
lens market



Building on decades of heritage in the midwave infrared market, G&H presents a no-compromise approach to conquering today's demanding thermal imaging requirements.

Purpose-built from the ground up for the demands of high resolution applications, our NightCrawlIR™ series utilizes unique aperture-specific foreoptics and a modular base to maximize performance without breaking the budget.

Each lens in the series is ruggedized for tactical application with a sealed front lens flange interface and additional features for convenient payload, enclosure, and dewar installation.

All NightCrawlIR lenses ship standard with our StingWare™ controller featuring metric zoom, metric focus, and active athermalization functionalities. The controller leverages integrated hardware on the lens cells to minimize system hysteresis to accurately and repeatedly report back exact focal length and object distances. This means never losing steps, no drift over temperature. Absolute position always.

Key Features

- Aperture specific configurations – no extenders
- Ruggedized for tactical application: IP67 at front lens. Optional DLC coating
- 19-22 mm cold shield heights supported
- Supports up to 16.4 mm HD image formats

Key Benefits

- StingWare™ controller included on all lenses – Metric zoom and focus mechanism and athermal compensation
- Fully configurable controller interface with multiple communication protocols and adaptable for power supplies from 12-24 V

Applications

- Border surveillance and security
- Land vehicles
- Fixed wing/rotary aircraft

Contact G&H Keene (StingRay) today and a representative from our technical sales team will respond within 24 hours.

www.stingrayoptics.com/nightcrawlir

EMAIL: info@gandh.com





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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Innovative designer and manufacturer of power transmission systems for land and marine defence gearing applications

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www.dbsantasalo.com



David Brown Santasalo

David Brown Santasalo

...to work with Krauss-Maffei Wegmann and WFEL on the UK Mechanised Infantry Vehicle Programme.

David Brown Santasalo (DBS) is pleased to confirm they will work with Defence manufacturer, Krauss-Maffei Wegmann (KMW) and WFEL on their UK Mechanised Infantry Vehicle (MIV) Programme. The scope of the project

is to supply fully assembled and tested BOXER MIV powerpacks over a 10-year period. The finished units will then be delivered to WFEL in Stockport, where they will be integrated into the BOXER vehicles.



The multi-million-pound project is one of most prestigious Land Defence contracts and solidifies DBS's position as a key supplier to the UK MoD.

DBS has been a well-known and integral part of the Defence industry for over 100 years, headquartered at a state-of-the-art facility in Huddersfield, UK. DBS is internationally recognised as one of the most demonstrated and innovative suppliers of bespoke land and marine power transmission systems. Their gear systems and service solutions underpin assurance critical applications in industries where failure is not an option.

As DBS embarks on this exciting new project with KMW, DBS brings not only extensive experience and expertise as a proven major sub-system supplier, being versed in UK MoD procedures, but also a significant contribution to the stipulated localised content. The contribution made by world renowned UK Defence suppliers like DBS ensures that the UK develops, retains and maintains its Defence capabilities for many years to come.

Steve Watson, Global Defence Director and Managing

Director UK said, ***“Through the development of this key partnership with KMW, we are delighted to continue to contribute to the UK economy and our local community through job retention and creation of new roles. We relish the opportunity to continue to strengthen our local team.”***

A strong leader in global mechanical power transmission systems for applications in major industrial sectors such as mining, power generation, land and naval defence, DBS's operations span six continents with 30 locations worldwide. DBS has a long-standing heritage and can trace its roots back to 1860 when David Brown in the UK commenced cast gear manufacturing. In 2016, David Brown joined forces with Santasalo to become one of the world's leading gear engineering brands.

www.dbsantasalo.com

AEGIS™ CASES



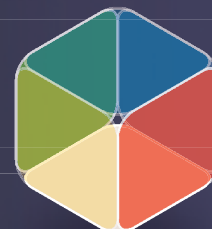
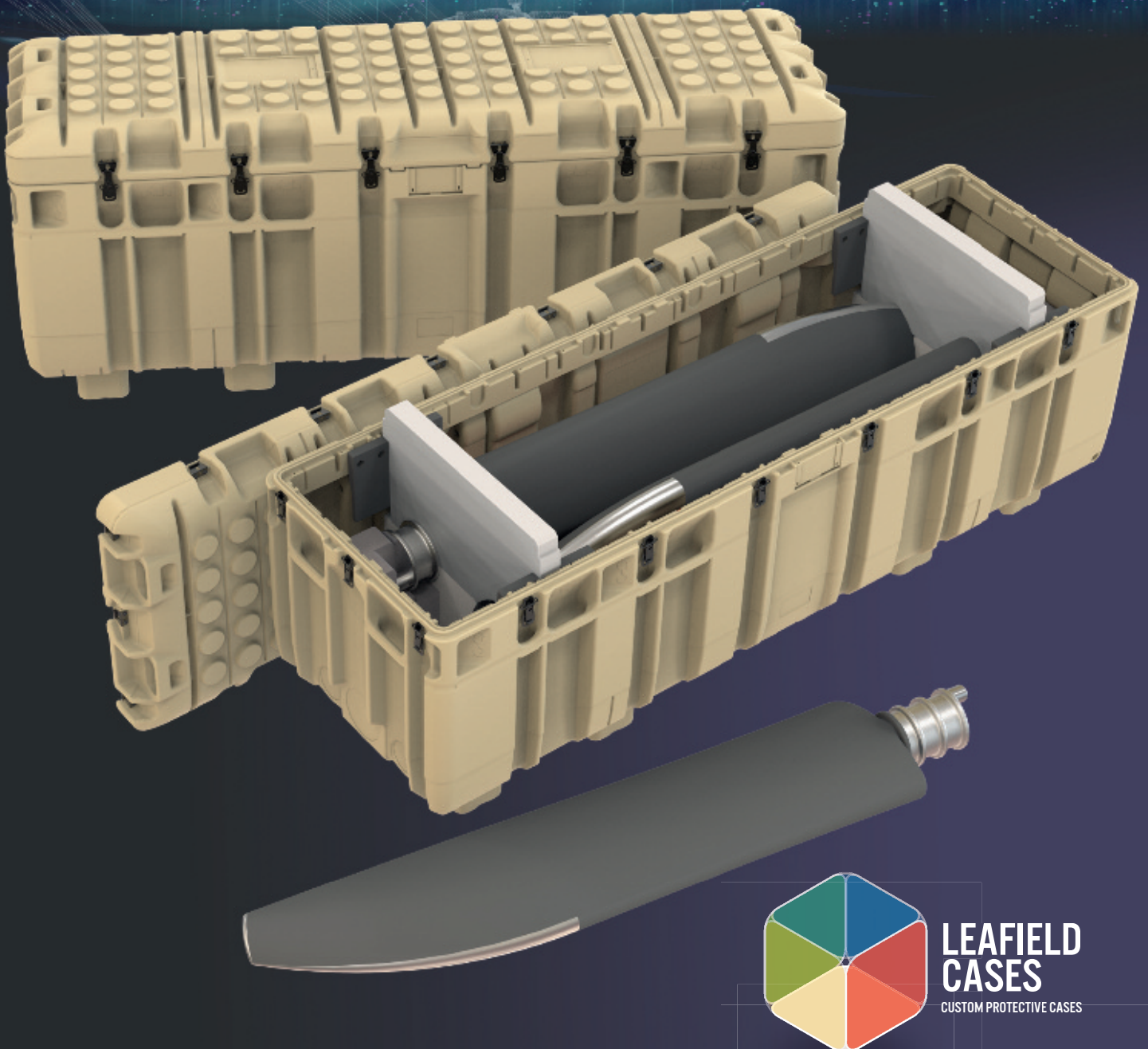
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CompactPCI Technologies

Overview

CompactPCI (CPCI) was introduced around 1995, with the aim of providing a modular approach to building embedded systems. CompactPCI is a versatile form factor and is suitable for use in a wide range of industries including: industrial, defense, test, transportation and telecommunications. Applications using these boards have achieved long life-cycles, the modularity enabling technology transitions when required.

Standard

The CompactPCI specification is owned by the PICMG standards body, cards use metric connectors with a 2-milimeter pin spacing and have either 32-bit and 64-bit PCI bus signals for primary communication. Many of the other connector pins are available for user-defined I/O and Concurrent Technologies boards offer combination of new and backwards compatible I/O options.

Performance Comparison

CompactPCI is a simple to use parallel bus architecture that enables multiple processor cards to operate in a single system. Concurrent Technologies processor boards will typically operate as the system slot controller, peripheral controller or as a satellite board without the CPCI interface for flexible system configurations. Whilst high speed when introduced, the PCIbus interface is limited to a 66MHz transfer rates and so offers relatively slow throughput compared to modern serial fabric architectures like VPX and AdvancedMC. Enhanced versions of the CompactPCI standard that offer higher throughput rates are available but have not achieved sufficient market adoption for Concurrent Technologies to support them.

Benefits

CompactPCI boards are available in 3U and 6U form factors to suit application needs: 3U boards are more attractive to lower functionality applications; 6U boards offer more panel space for I/O functions and typically offer the ability for two PMC/XMC expansion mezzanines. One of the key features that differentiates CPCI is that it supports hot swapping of boards. Whilst not widely used in defense and test applications, it enables mission critical systems to remain operational where necessary.

CompactPCI boards from Concurrent Technologies are typically known for long-term availability, making them an ideal choice for those embedded applications that need stability from regular update cycles. In addition, the latest boards are available with enhanced security capabilities to be suitable for defense and sensitive test applications.



Not looking for a CPCI product?

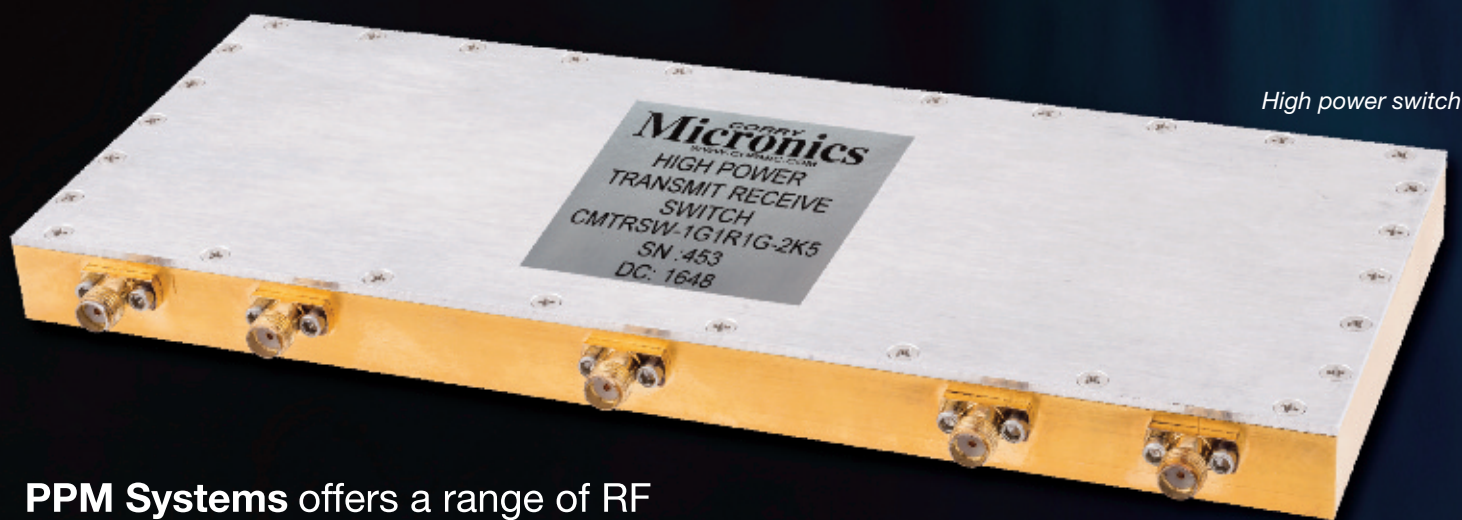
Concurrent Technologies have a wide range of VPX, VME and AdvancedMC Boards available to suit your critical application needs

Click here to see Concurrent Technologies' full product portfolio



Guide to Choosing High Frequency RF Switches/Matrices

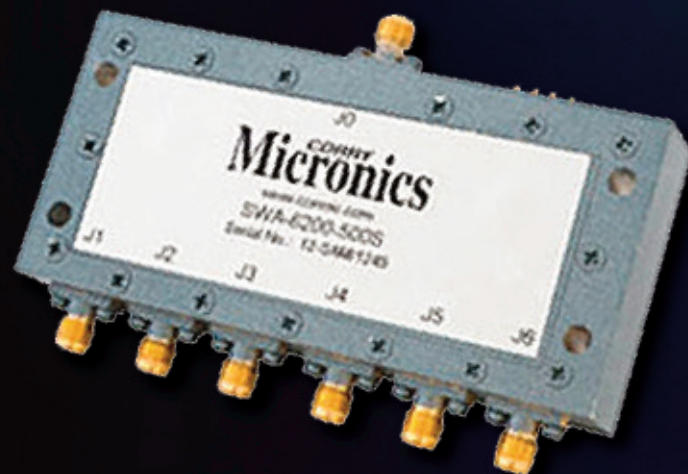
With the implementation of new equipment such as 5G, defence users are seeing more activity and potential threats in higher frequency bands and power levels.



High power switch

PPM Systems offers a range of RF switches and switch matrices with broad frequency ranges up to 40 GHz. Which switch to choose comes down to determining the properties most important for the application and acceptable trade-offs, whether it's switching speed, insertion loss, or useful lifetime.

For applications involving high power (many hundreds or thousands of watts), mechanical switches and PIN diodes have the edge. These switches can handle up to 5 kW peak



Pin diode switch

RF power. Switching is done in a power off state and can be as low as 50 ns depending on the frequency and power handling required.

Mechanical switches can handle the highest powers over a broad range of frequencies. They offer excellent isolation and the lowest insertion loss. On the other hand, their switching times are slower and their operating lifetime is limited to millions of cycles, because they involve physical movement. Therefore, they are more suitable for applications requiring intermittent switching.

A mechanical switch can accomplish switching speeds ranging from 50 ns to 275 ms depending on the model and type of switch selected. To achieve higher switching speeds, there are trade-offs to consider in terms of power and frequency.

Switch Matrices

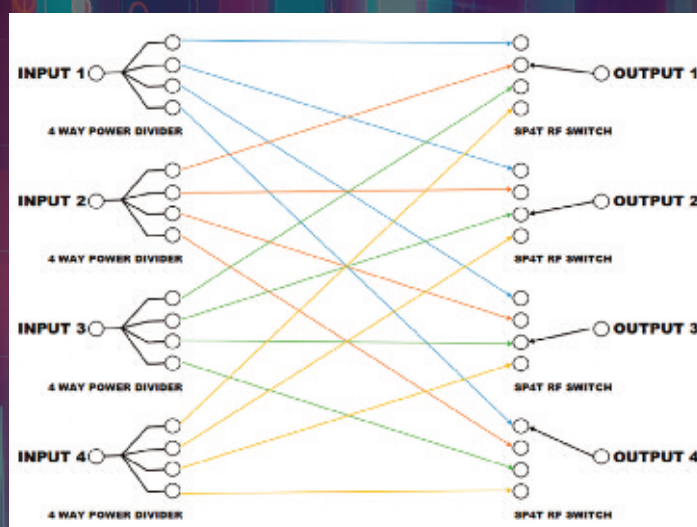
The considerations above can be applied to RF switch matrices, with the added benefit of automation of the switching process. They eliminate the need to manually move connections by routing signals (via user control) from their input ports to their output ports, providing convenience and speed.

The RF switch matrices available from PPM Systems are capable of up to 40 GHz frequency handling and high RF power. Typical applications include automated production testing and routing in a lab environment requiring measurement of multiple RF components.

There are three different types of matrices that provide different functionality: blocking, non-blocking and super non-blocking. A switch matrix can be designed to requirements, with different quantities of input and output ports. This could be as simple as a 1x2, as complex as a 256 x 256, or anywhere in between.



Switch matrix



Non-blocking switch matrix configuration

PPM Systems' technical experts can discuss your requirements and help determine the best RF switch or switch matrix for your application. Visit www.ppmsystems.com to find out more.

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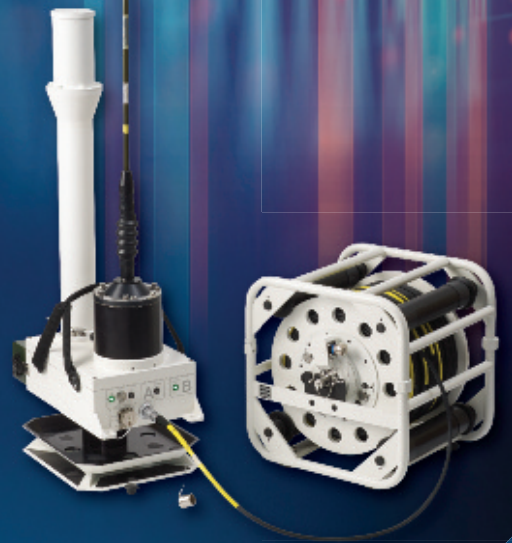
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Supply Chain Resilience with Defence Coatings Made in Britain

With supply chain disruption due to Brexit and the pandemic, HMG Paints, the UK's Largest Independent Paint Manufacturer, have been working with a number of new defence clients to help them build supply chain resilience.

Ahead of its attendance at DSEI 2021 later this year HMG Paints, Alan Sharples, HMG Defence Sales Manager commented, ***“2021 has seen us working with a number of companies who’ve been impacted by the current situation. Many have struggled to acquire paints and coatings which were previously imported from abroad”***. The company will be showcasing its range of Made in Britain paints and coatings to the defence industry from **stand H4-415** at the Excel London between 14th to 17th September.

The Manchester based paint manufacturer has a vast portfolio of products including paints free from Chrome VI, low VOC, and IRR and CARC resistant coatings. Companies working with HMG are looking for resilience in their supply chain along whilst still ensuring they receive a premium quality product and service. HMG Paints were the first independent UK Paint Company to be awarded British Standards quality BS5750 (FM1524) and have won the Coatings Care Award numerous times which is important for customers looking to work with suppliers based on their socio-environmental impact.

“With more and more paint manufacturers offshoring production and decision making we feel HMG can provide a unique offering to OEM’s and refinishers within the defence market” commented Alan. ***“Before DSEI2021 we’ll be visiting and working alongside a number of new partners to assess their coatings needs and support them by supplying a range of standard Def Stan coatings or working with them to develop innovative bespoke paint and coatings solutions.”***

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 by simply emailing **defence@hmgpaint.com** to discuss their coatings needs or can utilise the online chat support across HMG’s various online channels.

All coatings, including additional Def Stan coatings from Temporary Marking Paint and Walkway Coatings to Environmentally Compliant 2K Epoxy Topcoats are Made in Britain and distributed across the globe and supported by industry leading technical support. The company will be offering product advice and technical support on **stand H4-415** at DSEI 2021. If you’d like to book a meeting slot or require information on the HMG Paints products you can email **defence@hmgpaint.com** and a member of the team will assist you.

To see a full list of HMG Paints products and services visit **www.hmgpaint.com** via the website you can also find out more about the company’s history and partners. You can see a full profile of HMG Paints on the Made in Britain website by visiting: **www.madeinbritain.org/members/hmg-paints**

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



Ground-breaking

Oxley lights featured during unveiling of the new KF-X Fighter in South Korea.

South Korea has unveiled a prototype of the new KF-X fighter jet, which features a full set of external LED lights designed and prototyped by the Oxley team in Ulverston, Cumbria. The KF-X, which will be named the KF-21 Boramae when deployed by the South Korean military, is the first domestically designed and built fast jet in South Korea, developed by Korea Aerospace Industries. It is an advanced multirole jet with extensive avionics capabilities.

Oxley secured its globally leading position in aerospace LED lighting after being selected by Korea Aerospace Industries in 2017 to develop the full external lighting system. Oxley has worked with KAI on the development

programme over four years and has now supplied a fully qualified external LED lighting system for the prototype aircraft which includes; Landing light, Taxi light, Refuelling light, Formation lights, Wing tip lights and an intelligent lighting controller. The system provides complete integration into the digital interface and dynamic health monitoring of the lighting system advising the aircraft when the lighting system requires maintenance. The suite has been designed specifically for the new jets and the lights outperform existing technology to deliver high performance and reliability.

Oxley Technical Director, Mark Jordan explained, 'The comprehensive technical development process covered



design, prototyping and testing, this has been completed by a dedicated Oxley project team of mechanical, optical, electronics and software engineers at the Priory Park site in Cumbria. As part of the development, smart technology health monitoring has been integrated into the lights enabling predictive maintenance which minimises the need for unscheduled repairs.'

The full unveiling ceremony can be viewed here: **[Arirang Live] SHOWCASE: KOREA'S 1st HOMEGROWN FIGHTER JET - YouTube** The jet will undertake ground tests this year with flights expected in 2022. President Moon said South Korea would have at least 40 of the new jets combat-ready by 2028, and 120 by 2032.

Darren Cavan, Oxley Group CEO commented, *'This an incredibly proud moment for the Oxley team who have been working closely with the team at KAI for a number of years. The opportunity to work on the design of this prestigious advanced technological platform is confirmation of our world leading position in the provision of high performance lighting for military aircraft.'*



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NANUK PROTECTS MISSION CRITICAL GEAR

Since 1984, NANUK[™]/Plasticase has been designing and building waterproof protective cases for military users in North America, in Europe and more than 45 Countries around the world. Specialized in injection molded cases using the best-in-class technology and top-quality materials, NANUK elevates the protective case industry.

NEW PRODUCT INTRODUCTION



As an industry-first this August, NANUK will launch the world's most configurable waterproof protective case series: NANUK 975. It's designed with modular features, so there's a version for hundreds of end-uses. The full-featured base model 975 includes our rigid, two-stage retractable handle and four (4) strong polyurethane wheels with stainless steel ball bearings. On the other end of the spectrum, our 975M is lightweight and features oversize ultra-strong team-carry handles. Want even more choices? Try the 975W and 975T. Both are infinitely configurable, with available accessories for immediate or future needs. We call that long-term value in a protective case!

What to expect from the NANUK 975:

- 4 configurations to choose from: 975, 975W, 975T and 975M
- Built and tested to survive unforgiven conditions
- Military grade: MIL-C-4150J MIL-STD-810G
- Temperature ranges Min -67°F (-55°C) Max 158°F (70°C)
- Two large oversize ultra strong team-carry handles

WHY NANUK CASES ARE RECOGNIZED AS THE WORLD'S BEST PROTECTIVE CASES?



INDESTRUCTIBLE & LIGHTWEIGHT NK-7 RESIN

Indestructible, lightweight, and armed with NK-7 resin bodies, NANUK protective cases are designed with rounded corners, thick walls, and oversized details. No matter what nature throws its way, NANUK is built to survive the harshest of conditions. NANUK is shock-absorbent to prevent damage to the case and, more importantly, to safeguard critical equipment where failure is not an option.



MIL-SPEC

NANUK cases stand up to heavy impacts and withstand repetitive shocks that can occur during loose-loaded transportation, extreme vibration resistance, rainfall, water submersion and heat. NANUK indestructible cases keep weapons and gear secure, and safeguard sensitive instruments from the repeated blows, drops and shocks that happen in the field.



WATERPROOF & DUSTPROOF IP67 RATED

NANUK protective cases are sought after for search and rescue missions, marine transportation, and diving. This is due to its reliable waterproofing, which resists deformation and fatigue. NANUK ensures a long lasting, watertight seal - nothing gets in.



POWERCLAW SUPERIOR LATCHING SYSTEM

Ensuring your gear stays well protected from the elements, NANUK's patented PowerClaw superior latching system uses compressive force to clamp your case tight. Integrated slide locks offer added security, preventing your case from opening during transport or in the event that it is dropped. The super tough nylon construction ensures that the content stay safe no matter where your journey takes you.



SOFT GRIP HANDLE & SPRING LOADED HANDLE

Made for ultimate comfort and maximum durability a soft grip handle is featured on every NANUK case. The frame of the handle is created using the same NK-7 lightweight and indestructible resin as the rest of the hard case. The handle is coated in an impact-resistant soft grip making it more comfortable and easier to carry around. On some models, you'll find the added benefit of two extra long spring loaded handles that retract when released, minimizing the chances of damage during transit.



STACKABLE

Each NANUK case is stackable with other cases of the same size. Integrated feet on the rear of the case interlock with the front of the case, allowing for multiple cases to be safely stacked on top of each other to save space or for transport.



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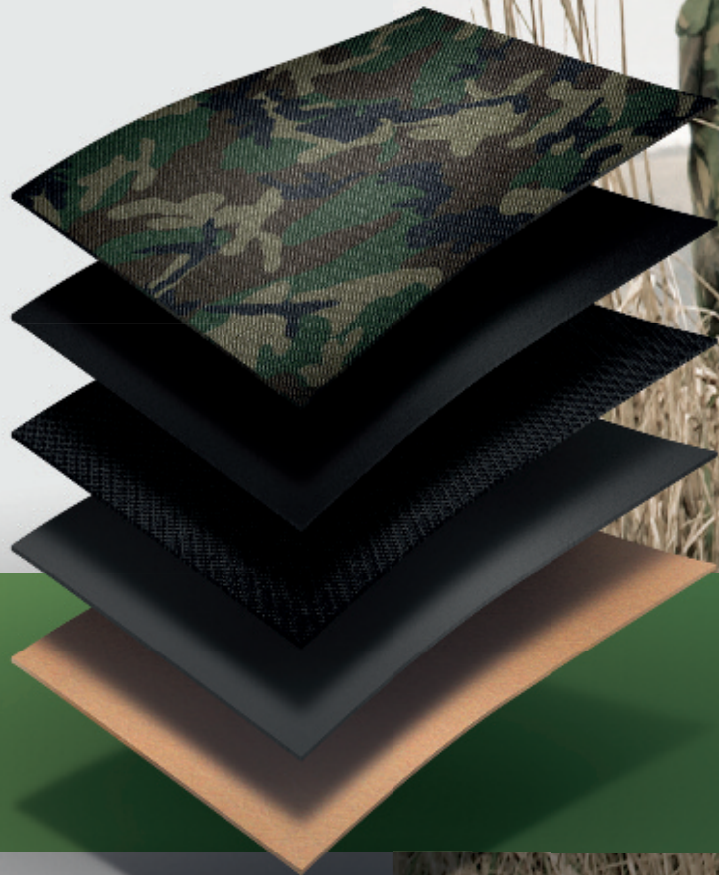
Flexzorb™ - The flexible, lightweight protective textile that is widely used by many of the world's leading defence vendors, making us the leading provider of activated carbon cloth for defence applications.

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Integrated Realities

An Introduction

In January this year, 4GD launched two of its most cutting-edge products. ECFECTUS, a tactical performance data collection and analysis system, and the ACIES synthetic trainer.

The latter introduces a new virtual concept, Integrated Realities, whereby actions taken in the real-world have an effect in the virtual and, importantly, actions taken in the virtual world have an effect in the real; essentially creating a virtual-physical loop. As this is a new concept, we thought we would use this article to explain it more detail and describe how it relates to other virtual reality concepts – Augmented and Mixed – that the reader might be familiar with.

Reality/Synthetic Spectrum

When considering the various verticals of the synthetic world, we like to consider them along what we term as the Reality/Synthetic Spectrum. At the left of the spectrum is Physical Reality, our day to day lived experience. At the right is Virtual Reality (VR), where the user is entirely immersed in the digital world. Between sit Augmented

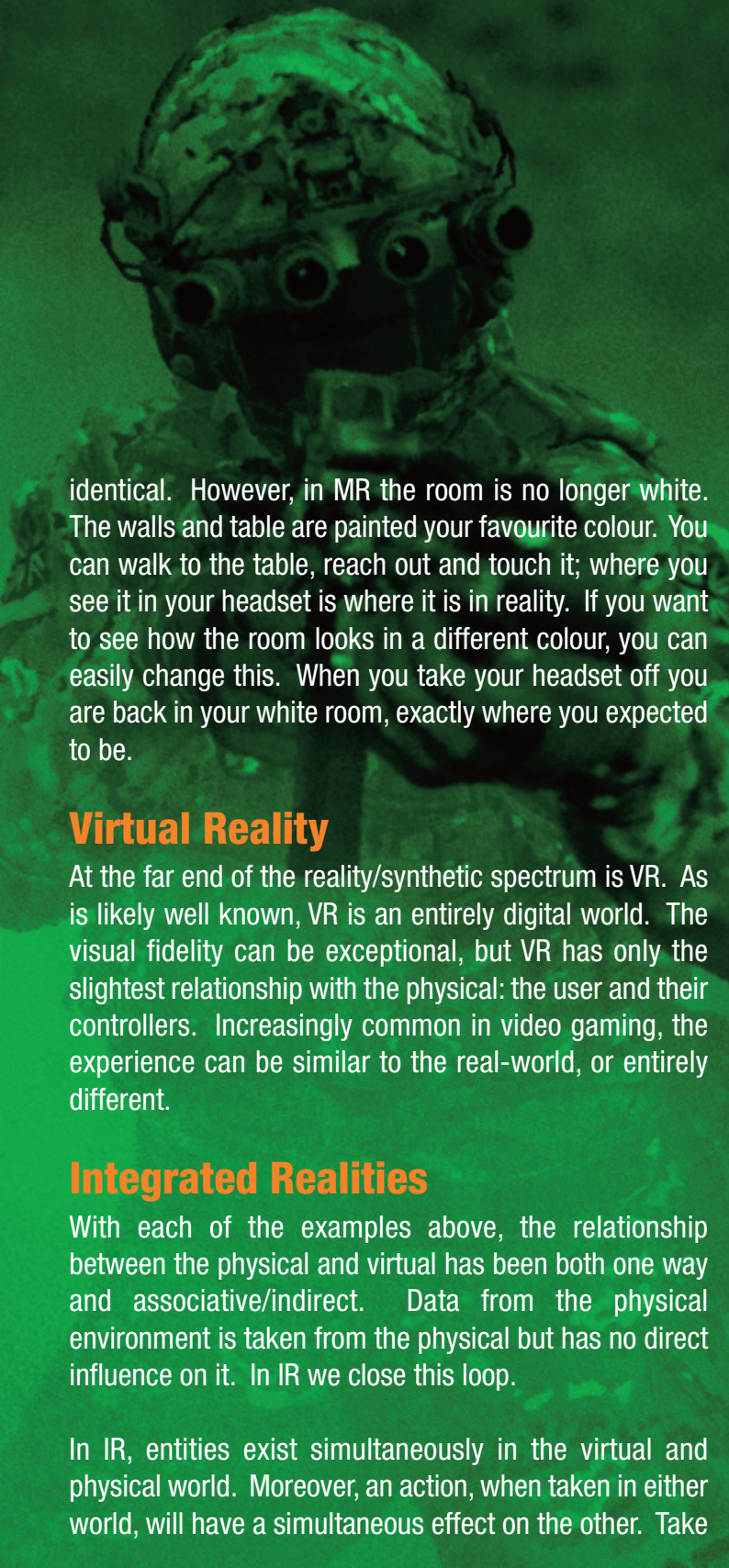
Reality (AR) and Mixed Reality (MR). Each with a different and diminishing reliance on the physical world.

Augmented Reality

The first step in the journey from physical to virtual is AR. Here digitally created images are overlayed over the physical world. Users of this capability will have a clear screen through which the whole of the physical world can be seen, onto which the AR system will then overlay images or data. This could be as simple as compass/grid references or, as seen with some early TRL projects, projections of battlefield assets. Imagine, if you will, a JTAC, being able to look at the sky and see images of the assets they have available. The screen used could be built into glasses, or it could be a smart phone. What is important is that in AR you see the real-world as it is before any digital information is introduced, and then have information added onto it.

Mixed Reality

The next point in the spectrum is MR. In essence, MR uses the structures of the physical worlds as a canvas and the digital world as the paint. In MR, the user is likely to be wearing a headset and the image they are seeing is a perfect replication of the physical space they are moving in. Bring to mind a white room with a table in the middle of it. When you put on your headset the dimensions of the room and the position and dimensions of the table are



identical. However, in MR the room is no longer white. The walls and table are painted your favourite colour. You can walk to the table, reach out and touch it; where you see it in your headset is where it is in reality. If you want to see how the room looks in a different colour, you can easily change this. When you take your headset off you are back in your white room, exactly where you expected to be.

Virtual Reality

At the far end of the reality/synthetic spectrum is VR. As is likely well known, VR is an entirely digital world. The visual fidelity can be exceptional, but VR has only the slightest relationship with the physical: the user and their controllers. Increasingly common in video gaming, the experience can be similar to the real-world, or entirely different.

Integrated Realities

With each of the examples above, the relationship between the physical and virtual has been both one way and associative/indirect. Data from the physical environment is taken from the physical but has no direct influence on it. In IR we close this loop.

In IR, entities exist simultaneously in the virtual and physical world. Moreover, an action, when taken in either world, will have a simultaneous effect on the other. Take



our SimStriker target as an example. Amongst other things, the SimStriker target can record hits from non-ballistic ammunition. When accurately engaged by a soldier in the physical, the target will drop. When linked to the SmartFacility's IR system, ACIES, the SimStriker target also appears as the avatar of an enemy combatant to anyone with a portal to the virtual world. Therefore, when the target is engaged in the real-world and drops, the avatar will also die and anyone viewing its virtual representation will see this. If, however, the target's virtual avatar was shot in the simulation, by a sniper for example, the avatar would drop and so would the SimStriker target. Critically an action taken against a virtual asset has a direct effect on its physical partner.

The above is a simple illustration of how the IR works, however there are numerous scenarios in which it can be used. The options and opportunities only grown when other training simulators, from Mortars to Fast Air, are linked to the SmartFacility. ACIES and the IR concept allows us to introduce complex combined arms training to our decentralised training facilities. Just imagine the opportunities for improvement when a team can train for complex urban operations, with high-cost virtual assets, in a high-quality facility, that allows for endless repetition and with the same accessibility as the gym.

www.4GD.co.uk



RunFlat International invests in increasing production capacity.

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

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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.

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HARRIER CBRN HAND PROTECT

‘A range of CBRN protective gloves, which achieve

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HARRIER LITE

A high quality, medium weight, close-fitting full fingered tactical firearms glove with leather palm. The Harrier Lite affords 24-hour protection against vaporous Chemical Warfare Agents and gives qualified liquid protection.

HARRIER

The original Harrier glove, utilising a highly protective yet comfortable NOMEX and leather combination, the Harrier affords 24-hour protection against vaporous Chemical Warfare

Agents and gives qualified liquid protection. The Harrier is the most robust and heavyweight option.

Who is OPEC CBRNe?

A British based design and manufacturer of level C CBRN and antiviral suit systems with a strong appetite to innovate.

The Harrier range is designed to integrate with the OPEC CBRNe range of level C garments.

If achieving dexterous CBRN hand protection is an issue you face, please get in touch.



ION

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HARRIER FLEX



HARRIER LITE



Contact us...

For more information on the Harrier range or any of our suit systems contact us at:

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DEALING WITH COURIERS, COVID AND BREXIT. A MONTH IN THE LIFE OF THE MAN ON THE GROUND

This is the story of one representative dealing with the vicissitudes of life during Brexit and Covid.

It was an interesting mix of characters, sub plots, villains and good guys. It shows what life is like as the man on the ground. It is a bit like a Victorian melodrama.

Lutra represents a number of overseas companies. One Survival Systems Limited (SSL) is based in Halifax Nova Scotia. A series of well spaced events seemingly separate but in fact linked came together to make early 2021 interesting, testing and satisfying.

SSL Make Helicopter Underwater Escape Training Systems (HUETS) which are used to train people to escape from helicopters ditched in the sea. SSL supply them under the brand name METS® (Modular Egress Training Simulators.) Simply, SSL are the best in the world at this providing all the additional items like lifting systems, pools, environmental simulation etc., associated with safety and realism in this challenging form of training.

They had never really had much success in the UK Military market. This was strange since in essence they were well known and had captured most of the civil market and were the market leaders elsewhere.

To bring the MoD in line with best practice and comply with modern safety requirements a new training facility was required. The contract for the new training facility had been awarded to a construction company to provide the new facility against a specification which named many items of equipment. The MoD had named the lifting equipment. In this context this is a very specialised item. It turned out the nominated company could not meet the requirement. The inevitable delays were occurring.

Lutra had only just joined SSL when we heard about this and offered to bring SSL over to see what could be done to bring the programme back on course. SSL had a crane available and were able to ship it from Canada and get it installed in 21 days. Michael Caine would have been proud of us because we had to take the roof off the newly built facility to achieve this (no explosive needed) but the installation was all done in a weekend.

In the course of this we noticed that the HUETs did not meet current safety requirements. SSL offered to lease the MoD 2 modern METS to allow mandatory training to continue whilst planned purchasing action was taken to acquire 2 new HUETs.

Enter: Villain 1. VAT.

SSL won the contract to supply the 2 new HUETs but events dictated that the MoD would be hit by VAT charges if action was not taken to get the leased units returned to Canada within a set time frame.

Most dramas have one villain. Two more entering simultaneously, joining with the first and a fourth entering later would not be believed if it were the plot of a novel. Its what happened.

Enter: Villain 2 BREXIT.

With all the issues to do with freight delays due to the docks filling up with unprocessed containers.

Enter: Villain 3 Covid.

With all the travel issues and lock downs, restrictions etc.

Bad enough dealing with one country's regulations but two made for an interesting plot twist or two. The hotel was outstanding as bookings for the team had to be moved and realigned due to changes to flights and equipment arrivals.

To get the lease units away the new units had to be installed and commissioned by mid-January to minimise disruption to training. Manufacturing issues meant some equipment could not be put on the ship so had to travel air freight by courier in 2 consignments. So much for the setting and End of Act 1.

Once the units got to UK Customs decided that a full documents and cargo inspection was required. This messed up the already delayed installation and postponed travel and accommodation plans of the installation team who were checked in at the airport on Friday when we were informed of the further delay. To avoid incurring charges the lorry would have to be cancelled by mid-day on Sunday. Negotiating with Customs over a weekend is a challenge but reason emerged triumphant and they helped as much as they could. The units were on the lorry at the port and duly arrived at RNAS Yeovilton on Monday morning. End of Act 2

Enter villain No 3.

The first courier shipment somehow got "miss handled" No consignment no installation. The courier company did not seem to care but one of their depot managers and her assistant who's details we discovered by accident were clearly embarrassed and worked like Trojans to make it happen. The only time the courier company displayed any customer care.



Next Plot Twist:

The return journey for the leased equipment was as frustrating. The night before the change over the shipping agent phoned to say the return shipments had been postponed because the ship had been replaced by a re-routed smaller ship. The booked lorry would not be able to enter the port. No entry to the port, i.e., no export, please go to jail as you need to pay VAT. Oh by the way find somewhere to store the units.

This also upset the swap and therefore the training at Yeovilton. More phone calls this time to the shipping agents and the ship owners. Again reason prevailed. People doing their best to help.

Enter Villain No 3 Again:

Just as we managed to recork the genies in the shipment bottle, the international courier managed to lose a further shipment containing essential items. The company customer care system was useless, absolutely hopeless, opaque and lacking any form of useful contact. Their system seemed to be designed to prevent it. For example there is only one customer care phone number which diverted to the on call customer care centre where things are viewed on a screen. The care centre was always in a faraway land where there was zero knowledge of the UK. They did not know where East Midlands Airport is and Leicester, Derby and Nottingham as reference points might as well have been craters on the moon. E mails were not responded to. Local offices had not got a clue what was happening. Story, counter story, "They should not have said that", confusion. Delay.

By sleight of hand we tracked down the senior management of the company to their home. He was secure in the knowledge that the company's system protected him from angry customers. Being in the Army teaches you that no defence is impregnable. Deliberately waiting until late on a Sunday evening to achieve maximum impact, and having a found a way in, we left him in no doubt of the consequences of not sorting their mess out straight away and certainly by the morning. However it cost us 18 days delay and a large phone bill.

In contrast the Royal Navy at Yeovilton and people at SSL were fantastic: flexible, helpful and endlessly patient. Along the way there was a need to find and engage: marine surveyors, because the ones booked had been cancelled when the freight was bumped, COVID Testing facilities for foreigners, as my Canadian colleagues needed a test to go home and freight wrapping companies, (mid Atlantic midwinter). Finding and reorganizing these on the Dorset Somerset border at short notice was interesting. They too were all excellent.

Reflecting on the whole saga we came to the conclusion that representative is the key word. You are the company, you represent their interests, and ethos, and fight the company's corner.

Telephone: +44 (0)1963204239

www.lutra-associates.com



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

Excelitas TechnologiesÆ Corp., a global technology leader delivering innovative, customized photonic solutions, today announced a significant launch order for the company's latest long range, High Definition (HD) MWIR Camera – OrclR.

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

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



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

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

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

Enabling the future through light

www.excelitas.com

High Performance Reference Sources for Mission Critical Apps.

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

The ultra-low phase noise YH1485 delivers phase noise performance below -170 dBc/Hz and excellent short and long term stability for reference requirements in high shock or vibration environments.

Our T1254, T1282, and T1276 Series TCXOs are designed for low orbit satellite applications and deep space exploration. They provide guaranteed performance under radiation exposure from 30krad to 300krad and stability under high shock/vibration conditions.

The T1241 TCXO offers ultra-low g-Sensitivity and low phase noise, and is ideal for mobile communications and airborne applications.

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

Testing & Processes per MIL-PRF-55310
IPC-A-610 and J-STD-001 Trained Operators
Certified to ISO-9001:2015 & AS9100D standards

In-House Qualification Testing

Reliability Calculations

Phase Noise vs. Vibration Testing

Award-winning Quality, On-Time Delivery & Customer Service



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

When The Going Gets Tough...

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

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

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

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

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

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

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

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



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



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



Available on any Heavy-Duty pneumatic mast system or larger
System includes locks and control system.
Available for mast tube sizes from 13.5 in. (343 mm) to 3 in. (76 mm).
Contact The Will-Burt Company for heights above 80 ft. (24m).



Available on any Heavy-Duty pneumatic mast system or larger



Unlocked Pneumatic Actuator



Locked Pneumatic Actuator



Control Box Included



Optional Handheld Controller



Delivering the Most Innovative Mobile Elevation Solutions to the World



Offering a full range of standard and customized towers, masts and mobile elevation platforms
Pneumatic and Mechanical / Man-portable / Lattice Towers / Pan and Tilt Positioners / Integrated Elevation Platforms

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Telephone: +1 202 820 2184
Email: HBeasey@willburt.com



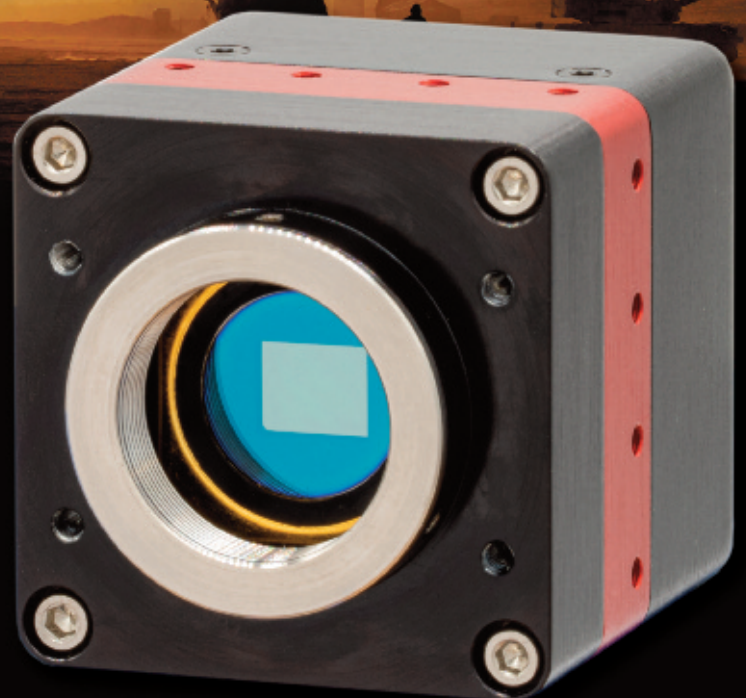
Raptor launches low noise Night OWL 640 camera

Raptor Photonics, a global leader in the design and manufacture of high-performance digital cameras, has added a new member to its growing family of VIS-SWIR cameras, the Night Owl 640.

With exceptionally low readout noise of 18 electrons (typical), the camera offers ultimate sensitivity for low light applications, “best in class” performance.

Using a 640 x 512 InGaAs sensor, stabilized at to 15°C, the Night Owl 640 features visible extension from 0.6µm to 1.7µm to enable high sensitivity imaging. Available with a 14-bit CameraLink output, the Night Owl 640 will run at up to 120Hz. The camera will feature On-board Automated Gain Control (AGC) which will enable the best contrast image from low light to bright as well as an on-board intelligent 3 point Non-Uniform Correction (NUC) algorithm providing the highest quality images. As with all Raptor cameras the Night Owl 640 is compact, rugged and low power (< 4W).

For further information visit www.raptorphotonics.com or contact Raptor at sales@raptorphotonics.com



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Optical interconnect for upgraded military aircraft sub-systems



Maintaining mission readiness

Because of budget constraints, defense administrations are focusing on upgrading and retrofitting the existing fleet of aircraft with advanced avionics, flight control, weapons, and other systems to make their aircraft more efficient and keep pace with the changing nature of modern warfare.

In addition, several surveillance systems are being installed in airplanes as emergency warning systems to enhance aircraft situational awareness of pilots and reduce their workload.

Special mission airplanes and UAVs are also being deployed for reconnaissance and surveillance missions across land and maritime borders, which necessitates the retrofitting of communication, navigation and surveillance (CNS) systems into existing military fleets.

Many of the world's military forces are renewing their military aircraft fleets to add or improve sub-systems.

- Infrared countermeasures
- Radar upgrades
- Situational awareness systems
- Cockpit data links
- Communication equipment
- Integrated flight deck systems
- Mission management computers
- Displays, including head-up displays
- Airborne intelligence gathering systems
- Precision guidance systems
- CNS systems

Description of the application

Military aircraft either consist of rotary-wing or fixed-wing aircraft that are used for combat or surveillance missions, or for the transportation of military personnel and supplies.

Many of the global military aircraft fleets are designed to be in service for decades.

Upgrading with commercial off-the-shelf (COTS) components and technology

As the industry is forced to become more cost effective in system designs for avionics retrofits, the use of COTS technology becomes more prevalent. COTS avionics components and systems have numerous advantages: they shorten the design cycle, are more affordable and can be used on multiple platforms.

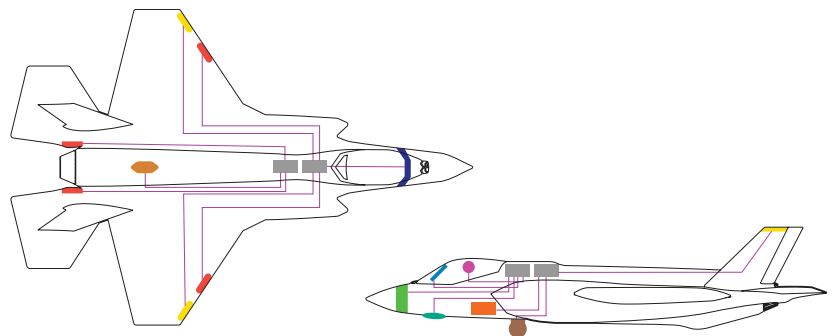
It is expected that the increased utilization of COTS systems in military aircraft will provide growing opportunities for suppliers to enter the military aircraft modernization, upgrade, and retrofit market.

Optical interconnect for modernization, upgrade, and retrofit of military aircraft sub-systems

As explained above, aircraft modernization is needed to maintain a relevant defense system. Optical interconnects deliver the high bandwidth to accommodate AESA (active electronics scanned arrays), high resolution cameras, and other advanced aircraft sub-systems. As well, optical interconnects with its inherent EMI immunity and small SWaP is the interconnect of choice for modern aircraft.

The Reflex Photonics rugged embedded optical modules with their small footprint, high I/O density, and low power consumption have enabled many aircraft sub-systems to achieve the high performance and reliability needed for aircraft modernization.

- Radar warning receiver (RWR)
- Missile launch detector (MLD)
- Active electronically scanned array (AESA) radar
- Mission computers
- Head-up display
- Multi-function display (PMFD)
- Data link
- Helmet mounted displays and sights
- Cockpit management systems
- Targeting systems
- Optronic payloads
- Optical bus



Optical transceivers upgrade for 100/140 μm aircraft optical cabling

The *LightABLE™* embedded optical module can also be used with 100 μm fiber optic cables commonly found in older aircraft, eliminating the need to re-cable the aircraft to achieve higher interconnect bandwidth.

The *LightABLE* optical transceiver delivers error-free operation at 10 Gbps with older 100 μm fiber thus, alleviating the need to replace the installed optical cables.

Benefits of using the Reflex Photonics *LightABLE*

- **Small:** Less than 5 mm high
- **Rugged:** MIL-STD 883 shock and vibration qualified
- **Sealed:** Moisture and thermal shock resistant
- **Storage temperature:** -57°C to 125°C
- **Performance:** 10.3125 Gbps/lane from -40°C to 100°C
- **BER:** As low as 10⁻¹⁵
- **Sensitivity:** -12 dBm
- **Proven:** Thousands used in aerospace and defense applications
- **Low power consumption:** 100 mW/lane



Real size for *LightABLE LM* 40G (full duplex) and 120G (SMT versions).

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Video Processing Distribution Unit (VPDU)

A COMPLETELY UNIQUE HARSH ENVIRONMENT PC FOR IMAGE AND VIDEO PROCESSING, INCLUDING TRACKING AND CLASSIFICATION OF OBJECTS USING ARTIFICIAL INTELLIGENCE.



AFV



- Rugged image processor for harsh environments
- Flexible design architecture
- Suitable for autonomous vehicle applications
- Wide range of software options
- DART software library for target detection and tracking
- FrameworkX for open software framework
- Comprehensive video management system functionality
- Artificial Intelligence based target classification
- Multiple and flexible video interfaces
- Military standard specifications (including gun shock)



For more information visit:

VISION4CE.COM/PRODUCTS/VIDEO-PROCESSING-AND-DISTRIBUTION-UNIT

Or speak to one of our engineers:

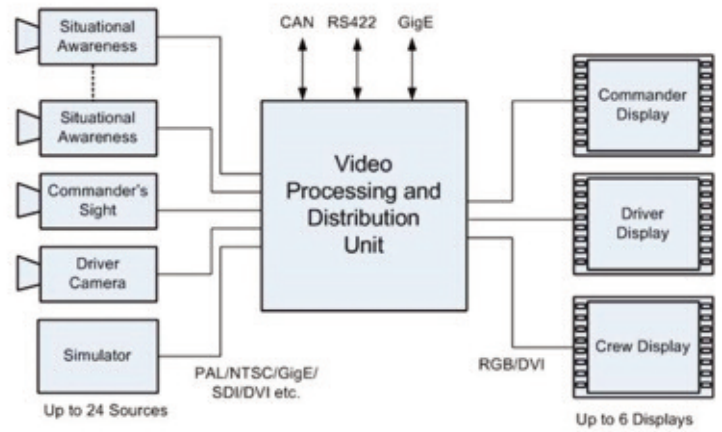
United Kingdom +44 (0)118 979 7904, **United States** +1 (866) 942 8804



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

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

The GRIP VPDUs incorporate unique video processing



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

For example, the VPDU can support Intel latest generation multi core i7 mobile processors, with an AMD GPU to drive up to 6 output displays. The VPDU has a flexible input architecture, which is modular and allows the VPDU to be tailored to support multiple video capture devices in digital and analogue formats as well as multiple communication interfaces such as Ethernet, serial & CAN Bus.

Video Processing and Distribution Options

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

SURVIVAL SYSTEMS LAUNCHES NEW PRODUCT METS® MODEL RHIB AT HMAS CERBERUS

Imagine trying to simulate an F1 Crash...

...Probably best not to because all the possible combinations add up to a very complex problem.

Operational experience tells you it cannot be done but aspects e.g. a fuel fire or front on shunt can be but the whole gut wrenching mishmash of imponderables, probably not.



but when they do the consequences are dramatic and frequently cause serious injury.

SSL was approached by RAN to tackle the problems highlighted by their operational experience of RHIB incidents which had convinced them that simulation would be difficult but necessary. By concentrating on the reproducible predictable issues, safety



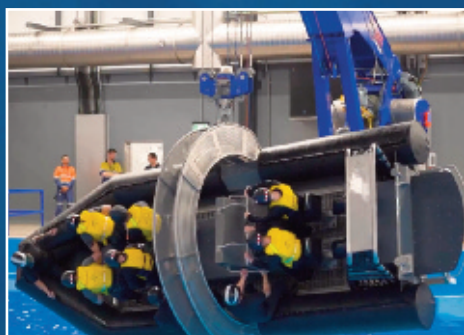
The best you can do is concentrate on the predictable and reproducible elements. That was the situation when Survival Systems Limited (SSL) was asked by the Royal Australian Navy (RAN) to simulate a mishap on launch or recovery from and to the mothership and possibly an overturn or other disaster in a Rigid Hull Inflatable Boat (RHIB). Luckily not many of these happen



drills would be evolved and practiced, lives saved and injuries reduced.

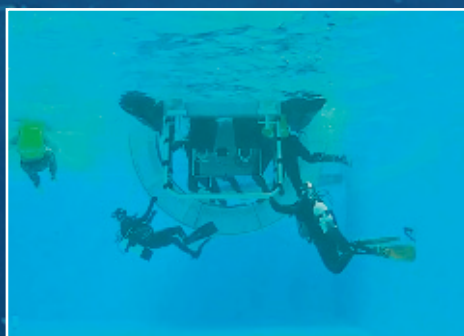
SSL is arguably the World's leading designer, developer and manufacturer of Helicopter Underwater Escape Training (HUET) systems using its brand name Modular Egress Training Simulator (METS®) to provide a range of training systems covering small to large helicopters, fixed-wing, jet, and fighter aircraft. SSL provides various METS® Models for small craft / work boats, amphibious vehicles and rig survival systems. METS® with integrated lifting systems allow training to occur safely. To add further realism to the student's experience they are supplemented with adverse environment training aids including simulators for -wind, waves, fog, lighting effects, rescue winches etc.

Nobody had wanted a high speed open topped boat like a RHIB until now.

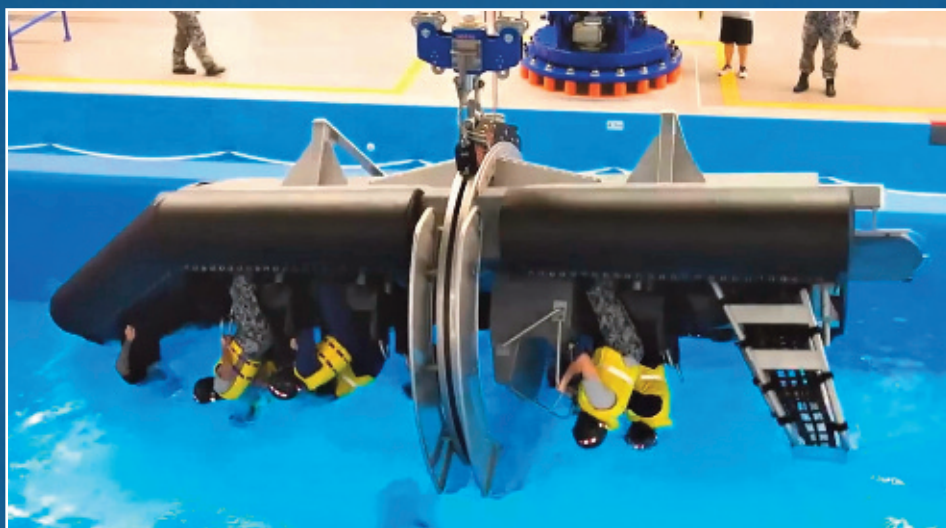


How to go about a challenge of this sort?

First work out if this is something that is



similar to previous METS® design challenges. Sufficient differences were apparent to necessitate a new concept. Then follow tried and tested processes designed to produce a safe training system. There is no point in producing something that is almost as dangerous as the situation you are training to avoid. In essence there are 5 steps:



- 1) *Research and then generate a hypothesis and criteria for success,*
- 2) *Plan and test the hypothesis using either analytical tools (CAD, motion simulations, FEA, or controls programming compiler), or bench scale or full scale apparatus,*
- 3) *Gather and analyse segment results against the performance criteria,*
- 4) *Assess whether successful as a whole against a pre-selected, challenging, set of criteria*
- 5) *Repeat if failure to meet criteria or proceed with implementation of the solution.*

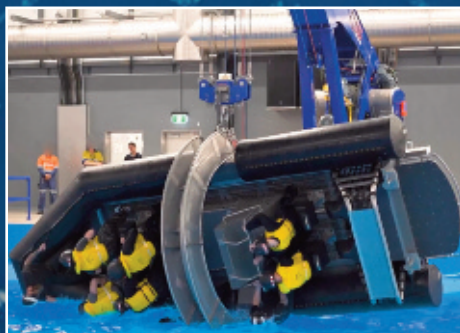
The result is a system that delights the client and does all that is expected of it. It makes operations safer for the crews of RHIBs. SSL's METS® Model RHIB helps provide a culture of safety. It provides a template of what to do when it all goes wrong. When dealing with the sea it frequently does all go wrong, usually through no fault of the operators. Mixed with working under pressure in dangerous situations it is even more likely to do so.

SSL's installation and training teams have been away from home for some months helping to prepare the RAN's training center at HMAS Cerberus for acceptance and operation of the METS® Model RHIB and the

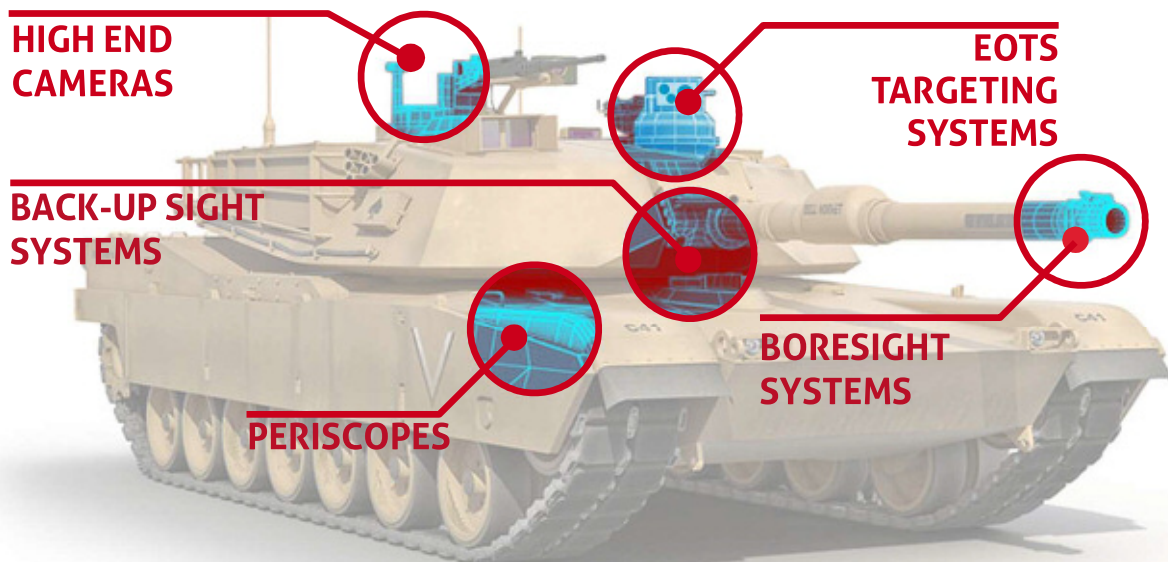
infrastructure within which it will operate. The whole system provides some of those daunting imponderables such as wind and waves, lightning and darkness in which RHIBs and their crews operate, keeping us safe in our beds. SSL feel they owe it to the crews to keep them safe too.



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WE ARE A WORLD LEADER IN HIGH PRECISION OPTRONICS.
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Quality | Innovation | Partnership | Reliability

Thinking Outside the Box:

Fiber Optic Technology Radically Improves the Design of Auxiliary Sights

Imagine you're the gunner of a tank that's buttoned up for a reconnaissance mission through hostile territory.

Boom! An RPG suddenly destroys your electronic Primary Sight, and then moments later another blast knocks out electrical power. When you are under attack, you are more vulnerable to losing your optical sensors and yet this is a situation when visibility is especially critical.

In degraded mode, when the (primary) electronic sights are down or electrical power fails, tank crews immediately move to backup sights, often referred to as auxiliary sights. These non-powered systems

maintain vitally-important visibility outside the vehicle for situational awareness and effective aiming, while the crew remains in the relative safety of the tank.

All types of armored vehicles utilize auxiliary sights. In a typical tank, three of the four crew members depend on various types of sights to perform their duties. Only the loader can perform his or her responsibility without a view to the outside.

For a century, auxiliary sights were periscopes—a rigid box containing mirrors, prisms, and lenses positioned to redirect light, allowing the viewer to see around an armored plate that protects the viewer and the vehicle.





These periscope auxiliary sights in tanks, armored personnel carriers, and infantry fighting vehicles are now being replaced by a fundamentally different design: extremely compact modular systems, connected by a flexible, non-powered fiber optic bundle. The fiber optic design provides a highly reliable and effective solution that significantly reduces size and weight and simplifies integration, thereby providing a common solution across platforms that reduces training and spare parts requirements.

The Old School Approach: Periscopes

The earliest armored vehicles simply employed direct vision for visibility of the outside. Originally, this was as simple as a slit cut in the armored hull. An obvious problem is the danger of incoming fire.

The line of sight from the tank can also be the path of an incoming bullet.

The solution was a periscope. As the etymology of the word describes, a periscope allows the viewer to “see around” an object, in this case a protective armor shield. Periscopes use mirrors, prisms and lenses to shift the line of sight, to a virtual viewpoint that is not obstructed by the armor plate. In effect, the protective armored plate becomes transparent.

Periscopes Limited by Basic Physics of Light

The basic physics of light—that it travels in a straight line and can be reflected at precise angles around objects—makes periscopes





possible, but it also creates significant design constraints that result in important disadvantages.

The problem is that the optical components of a periscope must remain in alignment (a word which means “arrangement in a line”). And this requires that the components share a sturdy structure—a tube or a box—to remain aligned.

Size is only one part of the problem. Because all of the components are housed in a single monolithic block, the placement of the periscope presents many design challenges. The location must be accessible and ergonomic for users, while also satisfying the requirements for positioning the parts that sit on the outside of the vehicle. This design constraint makes it difficult to simultaneously locate the periscope where you ideally want it on both the inside and outside of the vehicle. Relocating the periscope to accommodate vehicle upgrades and equipment changes can be difficult and expensive.

Thinking Outside the Box

For decades, it was assumed that periscopes were the only possible design for safe and reliable auxiliary sights. Without power, how can light—which travels in a straight line—go around a protective shield except by reflection off of mirrors and prisms rigidly aligned in a box? The answer is a radically different design utilizing a special kind fiber optics. Wound Fiber Bundles (WFB) is a cable composed of hundreds of thousands of tiny flexible strands of specially formulated glass that transmits light without any electrical power.

Similar to video and thermal camera sights, fiber optic auxiliary sights have modular, distributed architecture consisting of (1) a component placed on the exterior of the vehicle, (2) a component placed inside, and (3) a cable connecting the two. Unlike video and thermal camera sights, a WFB Auxiliary Sight operates completely without electrical power.

Modular Design with Three Components

The NEDINSCO Fiber Back-Up Sight Solution is a Military Off The Shelf (MOTS) system consisting of three core components that are individually replaceable, and upgradable LRUs (Line Replaceable Units):

Frontpiece – an optical objective assembly is attached to the vehicle’s exterior with mechanical interfacing designed for high boresight retention. The objective does not require any focus adjustment.

Eyepiece – The eyepiece has an adjustable diopter setting to provide a sharp image for each user. The operator can adjust the position of the reticle, independently in X and Y directions with adjustment screws; a frictionless design permits smooth adjustments that are securely locked into position.

Fiber Cable – The frontpiece is connected to the eyepiece by a high-quality optical fiber cable, with an extremely low rate of fiber failure. The flexible Wound Fiber Bundle cable is composed of hundreds of thousands of fibers, each measuring just 10 microns in diameter. The WFB transmits light in the visible and NIR bandwidth (allowing the operator to view the image during a night environment using a device or set of goggles for Image Intensification).

An optional fourth component, a flexible mechanical cable, extends, along with the fiber optic cable, from the eyepiece to the frontpiece in the dual field of view version of the NEDINSCO Auxiliary Sight. This patented system gives the operator a readily-accessible lever on the eyepiece to easily switch back and forth between a 2.2° Narrow FOV to the 22.2° Wide FOV to both support targeting and situational awareness.

The NEDINSCO Fiber Back-Up Sight Solution

Modular, Distributed Architecture Opens Up New Possibilities
Size. The space savings are dramatic and critically important in the cramped interior of a tank. Moreover, the flexible cables allow the eyepiece and cables to be stowed out of the way when not in use.
Weight. The individual components of a fiber optic auxiliary sight add up to only about 20% of the weight of a periscope sight.

Cost. The total cost of ownership is reduced by the efficiency of being able to transport, stock and replace small, lightweight individual components.

The modular, distributed architecture also affords fundamental design advantages such as optimal placement, customization and standardization for different applications, reduction in training in spare parts, and future proofing.

www.nedinsco.com



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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INTRODUCING THE NEW ERV3



For many years, customers have relied on our innovative ERacks for protection, transport and storage of valuable 19" rack-mount electronics. Our engineers are continually striving to further improve these lightweight ruggedised 19" transit cases, and we are now proud to fully launch ERV3. The worthy successor to our previous ERack design – now over 10 years old – with many thousands of them in use all around the world.

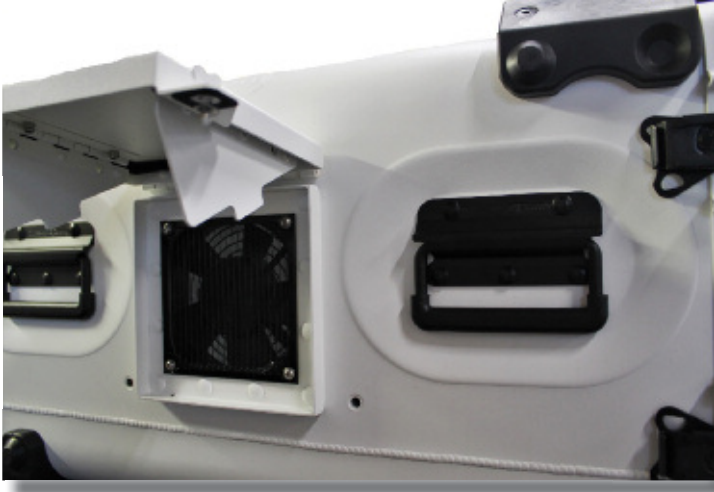
Why choose ERV3?

The innovative ERV3 design builds on the successes of previous E-Rack designs and offers the user a wide range of benefits. Designed for both commercial and military applications, this 19-inch ruggedised electronic transit rack offers protection against physical, climatic and electromagnetic hazards and is constructed from high-tensile aluminium alloy, making ERack ideal where weight, strength and portability are critical issues.

The folded-rim design eliminates edge extrusion, making the case stronger, lighter and more resistant to water and dust, resulting in an Ingress Protection rating of IP65. This innovative approach provides excellent EMC/EMI shielding characteristics and exceptional beam strength (>100kg centre point load).

Lids are press formed to give stiffness and enhanced rigidity as well as dimensional accuracy. CNC formed male / female extrusions which are bonded to the body and lids to ensure a perfect 'mate'.





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At CP Cases it's all about the quality and craftsmanship of the products. By keeping the process in-house we can maintain a close watch at every stage of the process to give the customer they expect and pay for.

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As with all CP Cases' products, ERack is fully customisable to suit individual client requirements; CP Cases has extensive experience in designing and manufacturing ruggedised OEM cases and containers, and are able to provide practical solutions for unique applications, when a case or an extremely tough container is required for deployment, transport or storage.

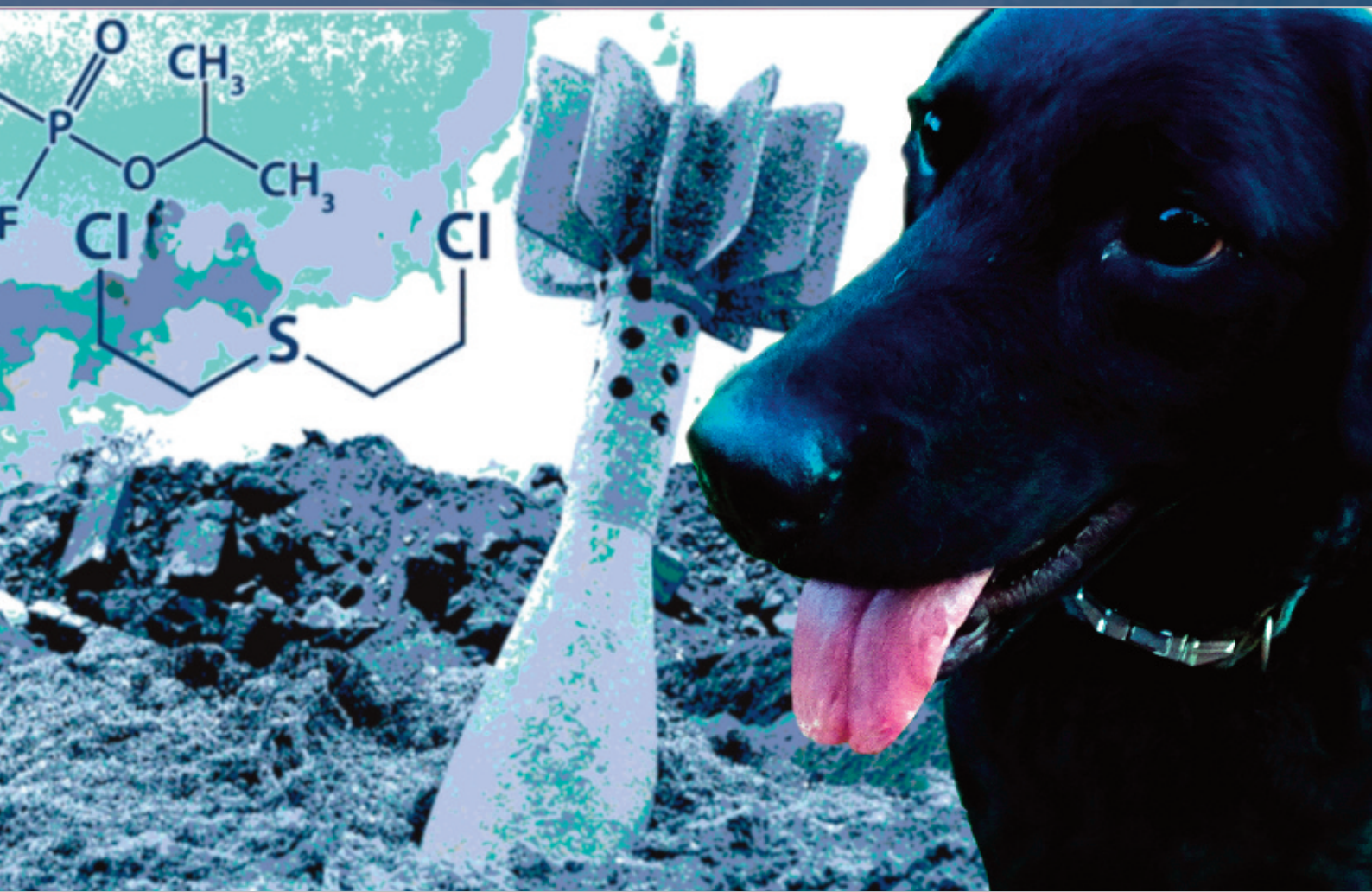
ERack can accommodate a payload of up to 50kg in its standard configuration. However, heavier payloads may be accommodated by double elastomeric or stainless steel wire rope mounts (further info available on request).



Fast-track delivery

We are able to meet promised short lead times of 6 week* delivery dates as the product is fully manufactured in house.





Greek Gods and Black Dogs

In 2019 the good folks at the UK Defence & Security Accelerator (DASA) program in conjunction with the equally good folks at UK MoD and US DoD announced a competition, called Don't Blow It.

The call sought to find innovative ideas for the safe elimination of chemical and biological weapons on the battlefield. After some intense head-scratching Valent partnered with a number of organisations to submit some superb, pioneering proposals attempting to solve the problem. In March of 2020 we were delighted to hear that two of them were selected

for funding. Our partners in this endeavour were Sandia National Laboratories (Sandia) from the US and Polycat UK.

Due to COVID (do I need to explain), Projects Perses and Blackdog officially kicked off a little late in June 2020. The aim; to develop a very lightweight system that would give operators the ability to



investigate and dispose of small quantities of munitions containing CWA or BWA discovered in the course of operations. Now we at Valent have been no slouches in this area, developing equipment to conduct sealed drilling into munitions and other sealed containers for over 20 years. Yet even for us, this was a challenge. We had to take all that experience and knowledge and pour it into a system that weighed less than 10kg, could easily fit into a standard rucksack and was simple to use. Not only that but it had to be teamed with a complimentary lightweight destruction technology that could also be carried by a 2 man team. For those who work in this area, you will know this is no easy task.

Both projects orbited around a central element that would provide the sealed access - the Viper Remote Access System. We are a tad proud of what we are developing with the Viper. It's a very lightweight, remote access gadget that can conduct a sealed drill into a wide range of munitions, tries to keep the operator safe at all stages, can sample, backflush and empty and deal with elevated internal pressures. It is also pretty smart. Not the kind of AI smart that everything from your watch to your fridge has built into it. This is more of a practical, take the load off kind of smart. CBRN operations are stressful enough without personnel having to fiddle and fret about setting up the equipment properly. We were keen that the system could continually monitor its performance, optimising the drilling and sorting out problems if they arose. All the operator had to do was push the button, stand back and accept the medals at the end of it.

As if this was not enough we also had to develop a portable vessel that would seamlessly attach to the Viper and allow for the destruction of the agent using the chemistry that the extremely clever boffins at Polycat and Sandia had formulated. This in itself was far from straightforward. We had to synthesise and test against various simulants and develop a system that could be utilised in a deployed setting. That was after building ourselves a small laboratory in which to do all the testing. It has been a busy year

So where are we on this journey? Well, Viper is looking extremely good and we are now completing the prototype systems that we will demonstrate in the next few months. It does everything we hoped and is a really, really nice bit of kit. On the destruction side, we have a portable container and the complimentary chemistry is showing some real promise. The projects have not been without their challenges and COVID has added another layer of complexity but I am looking forward to revealing the Viper system very soon.



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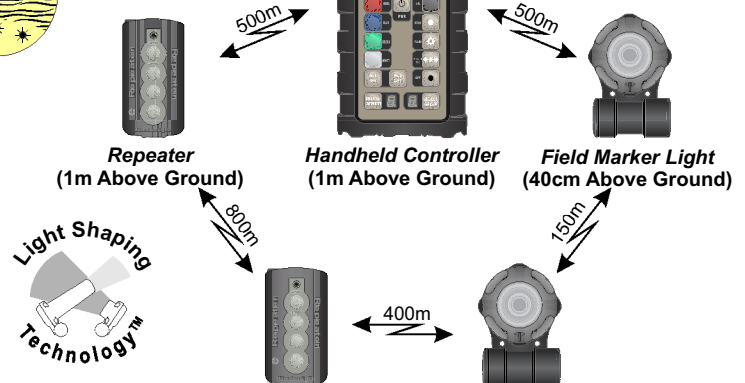
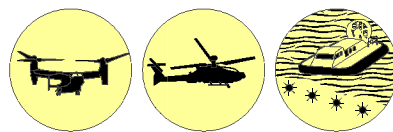
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TEXELIS

KEEPING MILITARY VEHICLES MOVING

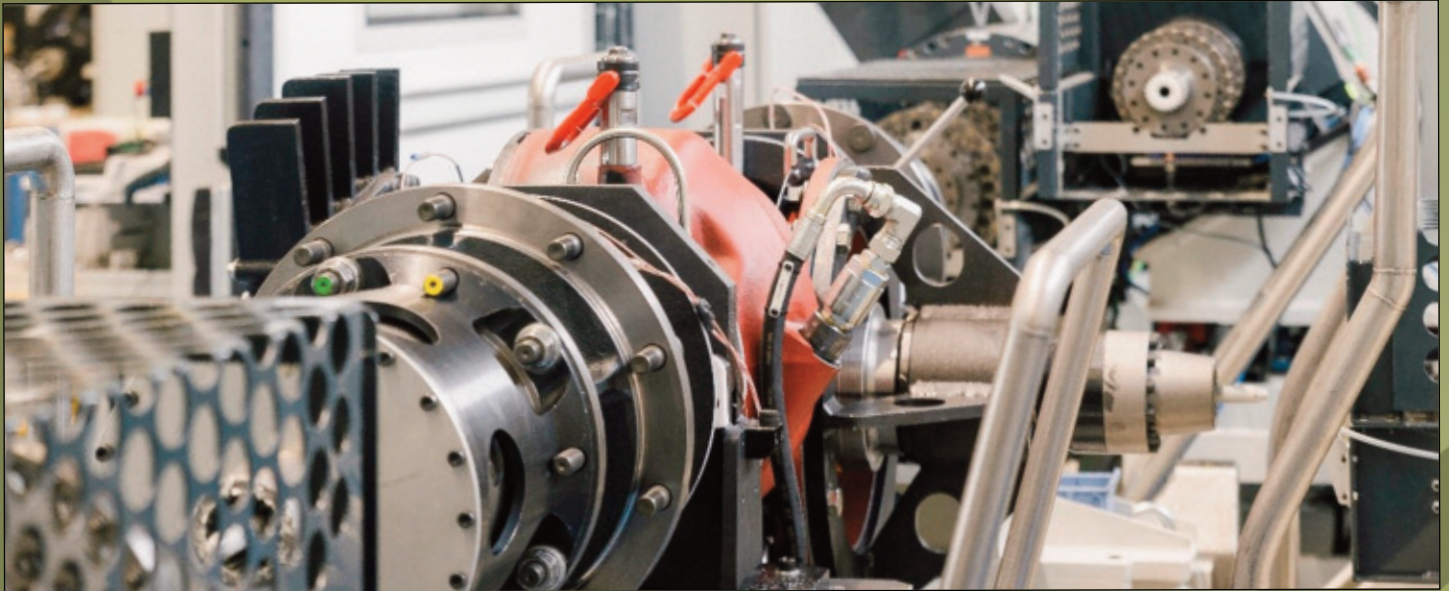
Best known for its vehicle mobility expertise, Texelis has a long history of designing and manufacturing mobility solutions for military vehicles deployed around the globe.

The company is dedicated to partnering with its customers for the long term, backed by an ongoing investment programme in its 1600 m² test facility at its site in Limoges, France.



“When a new driveline or mobility system is delivered to the customer it is not a full stop – far from it. Everything that happens from that point on is tailored to ensure that the equipment keeps delivering throughout its service life, and this is where the customer experiences the true value of selecting Texelis equipment to begin with,” Damien Delannoy, Sales Director Defense, Texelis, said.

Delivering on this goal is a challenge when today's operations see armoured vehicles deployed on operations that test them to the extreme. The company has invested deeply in its integrated test centre in order to ensure it is up to the task and able to provide the full spectrum of validation, characterisation, diagnostics and fine-tuning for its own and third-party products throughout their life cycle. The test centre's team of experts handles newly manufactured Texelis products and systems undergoing support, maintenance, repair, refurbishment and post-design modifications, to ensure



all systems are fully validated and tested prior to delivery to the customer.

The test centre is fully equipped with ten benches, a preparation, assembly and expertise workshop, as well as areas for the storage of prototype parts, test specimens, tools and offices; everything required to handle the full scope of testing required to keep its customers' vehicles operating in optimum condition – no matter their age or mileage.

The facility is equipped for main panels of testing. Four benches are equipped with tilting slabs to carry out thermal characterisation, lubrication and endurance tests on axles and gearboxes under controlled conditions.

A tilting slab bench is used to carry out lubrication



testing, in order to determine the oil flow rates at bearings and gears and to visualise oil flows.

Two automated benches capable of operating automatically 24 hours a day, carry out performance and endurance tests, equipped with speed multipliers in order to simulate the full life of a mechanism over a short period.

Two Mechanical Deformation and Breaking benches are used to measure deformations of mechanical components under torque and fracture angles. This data is used to optimise various housings, bearings and gears components.

Automatic benches are used to check the tightness, temperature resistance and speed of the joints, following cycles in both directions of rotation, with stop bearings.

“It gives our engineers insight into the current state of the equipment, the ability to simulate its behaviour in operational scenarios, visualise its expected deterioration over time, and pinpoint the work it needs today to keep it functional for tomorrow and beyond,” Damien Delannoy said. “And this is extremely valuable for our customers ensuring that their vehicle fleets remain in optimal condition throughout their service lives.”

www.texelis.com



DESIGN, PRINT & WEB SOLUTIONS

For more than a decade, the Defence Design Agency (DDA) has worked with defence and aerospace clients worldwide, bringing shared expertise and knowledge of the defence industry for the benefits of our clients.

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.

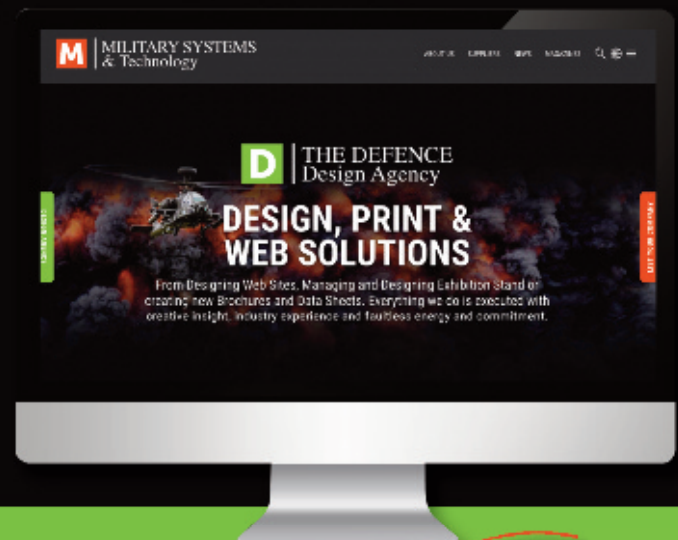
And websites shouldn't be stagnant – they need to be updated as your offering changes. So we can provide ongoing hosting, management and maintenance packages so that your site remains fresh and relevant.

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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Respiratory Protection

for the evolving threat landscape



The images and reports that followed the events of the January 2021 Capitol riots in the United States shocked audiences globally as an iconic democratic institution came under attack and threatened the safety of the lawmakers inside.

Few could foresee such an event taking place, however, it demonstrated the importance of being prepared for any eventuality. With rioters close to breaching the doors to the Senate, escape hoods were distributed and deployed to lawmakers and politicians housed inside to protect against any airborne threat such as tear gas or any unknown substance that may be released by rioters. These events showed the importance of preparation and having such a device on hand that could be quickly and easily donned.

Individuals who are routinely subjected to particulates, gases or vapours which are harmful to the respiratory tract due to their occupation will deploy suitable Respiratory Protective Equipment (RPE) and other Personal Protective Equipment (PPE) to ensure they are suitably protected from the threat at hand. The presence of harmful substances occurs in a range of workplace professions, often in these cases, the threat substance is known, and suitable protective equipment can be selected to allow work to be conducted safely.

However, in certain situations, the potential for a release of materials hazardous to health means organisations and agencies typically develop an Emergency Response Plan, consisting of a means to protect and safely evacuate all affected individuals, such as that which was followed in the Capitol riots.

Adapting protection to meet changing threat profile

Increasingly, respiratory protection is at the forefront of people's minds due to the ever-changing threat profile. In the last decade, there has been an increased concern about the potential for a terror attack or attack by a hostile state releasing a chemical or

radiological agent. However, these threats are not confined to only deliberate releases. Economic development has meant the presence and transportation of hazardous materials have become more widespread globally due to increasing numbers of industrial facilities and the associated waste being produced and subsequently transported cross-country. The increasing volumes and geographic spread of Toxic Industrial Chemicals and Materials (TICs/TIMs), leads to a greater potential for an accidental release of these materials in both rural and urban communities.

Large-scale incidents of a Chemical Biological Radiological and Nuclear (CBRN) nature can occur without warning or prior intelligence and the proliferation and use of chemical agents by both nation states and individual terror groups throughout the late twentieth and twenty-first century presents a real threat to frontline Military and First Responder personnel. Consequently, global Militaries and First Responders alike have expressed a desire to be prepared for any potential threat and investigate and action the procurement of CBRN protection to all individuals who may be located in potential target sites or high-risk geographies. For this kind of respiratory protection to be successful, it needs to be low-profile, simple to use with a quick don time as well as cause no interference with both the existing ensemble of equipment used by the operator or with their job role.

A respiratory escape device is designed to provide a period of protection to enable a safe escape from the threat at hand. A key differentiator of an escape device, such as an escape hood, is that it is designed and approved by certifying bodies only for escape. Whereas typical Air Purifying Respirators (APRs) are approved by certifying bodies to be used in the workplace for the completion of tasks and job roles, Air Purifying Escape Respirators (APERs) are approved only for the evacuation from a hazardous environment.





AVON PROTECTION

APERs, like the CH15 occupy a small footprint allowing them to be carried at all times, with no maintenance, minimal training and no annual fit testing meaning they offer a compact, potentially life-saving device which they can use to escape the incident area and subsequently regroup at a safe zone. Their ease of use also makes them well suited to tactical and civilian personnel.

There are a variety of respiratory escape devices available, which have a range of different potential applications, and fit into two major groups; Air Purifying Escape Respirators (APERs) including Escape mouth-bits and Escape Hoods as well as Supplied Air Escape Devices such as Self Contained Breathing Apparatus (SCBA). The use scenarios of these differing respiratory escape devices depend on the environment and user groups in question.

Air Purifying Escape Respirators

Air Purifying Escape Respirators (APERs) use a filtration system to filter and remove hazardous substances from the air to ensure that the user is afforded a minimum protection time to safely evacuate the area. There are two main types of APER, Escape Hoods such as the Avon Protection CH15 and escape mouth bits. Escape mouth bits cover only the mouth, with a nose clip to prevent inhalation through the nose and typically offer minimum protection durations of 5-15 minutes. Escape Hoods offer higher levels of protection, as they cover the entire head, typically sealing at the neck, and offer protection for 15-30 minutes. Key advantages of APERs are their compact size allowing them to be carried at all times. Furthermore, they typically require no servicing for the duration of their shelf life and have a lower purchase price than SCBA offerings, reducing the total cost of ownership.

Supplied Air Escape Devices

In contrast to APERs which filter atmospheric air to remove harmful contaminants, supplied air escape devices utilise a cylinder containing pressurised air to aid safe escape of the user. These systems are independent of ambient air, meaning they have the key advantage over APERs in that they can be deployed in an oxygen deficient environment. There are a range of supplied air escape devices varying in duration and size. The disadvantages of these devices compared to APERs is the elevated total cost of

ownership due to higher purchase price and the increased maintenance required. They are also generally larger and heavier, meaning they cannot easily be carried on a person at all times in the same way low profile APERs can be.

Portable Solutions

Avon Protection a world leader in respiratory protection recently announced the launch of the CH15, a revolutionary new, ultra-thin, single size portable APER that provides a minimum of 15 minutes of respiratory vision and facial protection against Chemical, Biological, Radiological and Nuclear threats.

The CH15 is a development driven after an emerging requirement from specialist users to provide instant protection from all CBRN materials when in a live threat scenario. Developed in conjunction with The Combating Terrorism Technical Support Office (CTTSO), the CH15 escape hood provides rapid deployment respiratory protection for military, first responders and protective detail.

The CH15 offers a different approach to carrying respiratory protection, this device offers what no other traditional respirator can, a low profile, lightweight, one size fits all solution that is always small and light enough to be carried. This unique portable solution means the CH15 can always be on hand for the unexpected.

This latest generation of CBRN protection is CE approved and compliments Avon Protection's leading respiratory protection portfolio, adapting proven technology to create their most compact CBRN protection device to date.

Capability and threats are always evolving, industry must continue to work with militaries and first responders worldwide to design, develop and deliver world leading solutions like the CH15 to ensure specialist users always have the right protection readily available no matter what the threat.

www.avon-protection.com

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MILITARY DIVING & TACTICAL



SURFACE, TACTICAL, WATER RESCUE, AND SAR SWIMMER EQUIPMENT

In addition to traditional diving equipment, Aqua Lung has a full line of equipment for the surface, tactical, water rescue, and SAR swimmer. This equipment includes specialized life vests, masks and fins, boots and gloves, and mission-conf and load bearing harnesses for rebreather usage. Obviously, the use and distribution of this equipment is very specific and only available to authorized users. figured emergency breathing systems.

CLOSED CIRCUIT DIVING EQUIPMENT FOR THE MILITARY USER

Aqua Lung has a full range of closed and semi-closed rebreathers for specific military mission requirements. In addition to this hardware, we also have a full line of lifejackets and weight integrated



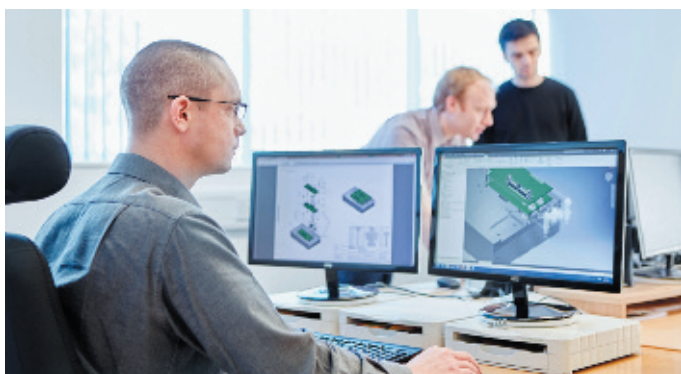
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LINCAD'S LIPS 16 BATTERY TECHNOLOGY TAKES PRODUCT PERFORMANCE TO NEW LIMITS

UK designer and manufacturer of bespoke battery and power management systems, Lincad, has an undisputed position at the forefront of lithium-ion battery technology, thanks to its latest model, the LIPS 16. The powerful lithium-ion battery system was launched last year specifically for use in demanding environments such as military and defence applications.

Lincad's newest version of its globally popular LIPS battery system represents the latest in lithium-ion battery technology and design. It has a fully metallic enclosure (sealed to IP55) that offers excellent physical protection and electromagnetic screening. The LIPS 16 has also been designed to be lighter, more energetic and more powerful than ever before, making it ideal for a range of applications requiring military grade performance, such as an acoustic weapon locating system.

The versatile battery system comes with an internal discharge feature that enables users to discharge the internal cell stack to less than 30%, which is both optimal for long-term storage and crucial for equipment needing to be transported by air, as the reduced charge levels allow the transferral to take place in accordance with IATA regulations. LIPS also offers improvements over lead acid batteries around weight, energy storage and design flexibility.



The step change in the electronic management systems employed by the LIPS 16 battery offers the crucial advantage of a two-year storage life when the battery is brought to a completely discharged state. This results in safer storage and a greatly reduced risk of the battery remaining in an over discharge condition, even when it is left on equipment. This helps to prolong not only the life of the battery, but of the equipment it powers as well.

Additional features found on the LIPS 16 battery include the capacity to update the associated operational software and to check battery memory using a mobile device, which is crucial when being used out in the field with minimal access to power supplies. The LIPS 16's internal battery management system can also store operational data to allow users to analyse performance and monitor

maintenance requirements on the move. Its interconnects operate via standard D38999 military circular connectors with its state of charge determined via a press-to-test membrane that comes with a five LED capacity status display. These functions enable highly accurate battery status information and diagnostic details.

Peter Slade, Lincad's Joint Managing Director is pleased with how the military and defence sectors have reacted to the launch of LIPS 16 in 2020:

“Lincad’s current range of LIPS batteries are the combined result of continued improvements through the integration of new cell technology and enhanced mechanical and electronic design by our talented engineering teams. We have been extremely pleased with the reaction to our newest innovation from our customers over the past 12 months, and look forward to supplying our reliable, next-generation battery system for many more demanding applications in the field and around the world.”

Lincad works predominately with military and defence customers who require high performance, reliable batteries for demanding applications, often in hostile or rapidly changing environments. The company also supplies its products to the medical and petrochemical sectors. While most of Lincad's products contain high-density lithium-ion technology, the company employs the most appropriate electrochemistry for each customer's individual requirement. This enables Lincad to offer a truly bespoke service that takes into account each customer's precise requirements, supply chain and performance specifications.

Lincad has been operating for more than 30- years and takes pride in pushing product performance to new limits, producing lighter, more powerful batteries and power management systems and faster, more flexible charging solutions. This autumn, the company will be exhibiting at DSEI, the 'Defence and Security Equipment International' trade show aimed at governments, armed forces, industry thought leaders and the global defence and security supply chain, which takes place at Excel in London from 14 to 17 September. Lincad will showcase its wide range of LIPS defence battery products from its stand (no. H2-580), which will be situated in the UK Pavilion.

Meet Lincad at DSEI

14 – 17 September 2021

UK Pavilion Stand H2-580



**The LIPS 16 represents
the latest in lithium-ion battery
technology and design**

A quart (2 pints) does not go into a pint pot (the only way to drink beer)

...but by redesigning the pot you can get more pots on the dray and waste less beer

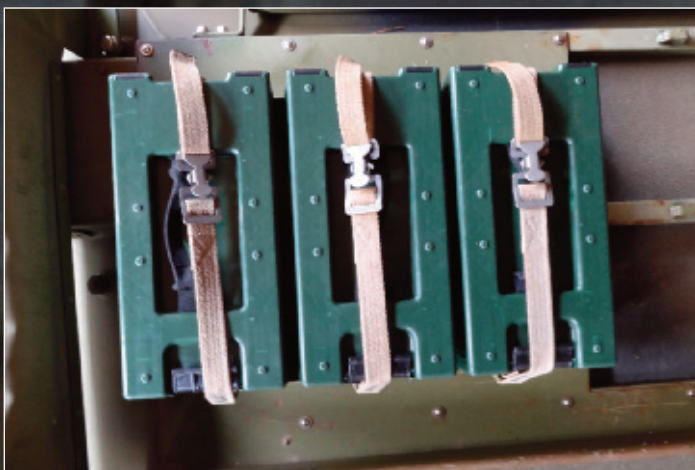
Ammunition weight dominates front line logistics and operations. It is a limiting factor for military operations.

For soldiers there is only so much weight their knees can cope with. For platforms it is a volume/weight/fuel/range equation. To carry enough ammunition for their mission land warfare platforms, be they land or air, are being bogged down by the volume and weight of ammunition needed to achieve operational effect and intention. The range, either time or distance, of platforms has to be reduced to carry the weight. Simplifying the equation more ammunition reduces the range of platforms, to achieve range more fuel is needed, platforms become bigger, heavier, yet more fuel, more logistic trucks to move fuel. More logistic targets

means greater vulnerability and less fighting power. A spiral of more soldiers needed to achieve the same effect, more vehicles/aircraft/ships required to move/deploy them, more ammunition and yet more trucks, bigger bridges, more fuel etc., and still not achieving operational intent.

How to break the spiral. Many countries, mainly to save knees, are moving towards caseless small arms ammunition, polymer links and case packaging, aka dunnage, to reduce weight per round. The aim is to reduce the load by 20%. This may be achievable but the enemy, inconveniently, are wearing body armour, using more vehicles, are better trained. The result is more powerful heavier ammunition is required than the first iterations achieved. Less range, more vehicles, more fuel etc.

Let's return to the other part of the equation, the pint pot. Small arms ammunition is packed in Second World War era metal boxes. The steel M2A1 ammunition case is a genuine WWII veteran. We don't expect them to go to war we look to younger fitter more suited people. Materials and designs have moved on since 1942. Polymers have replaced metal in many uses. Can't we do something here? By using polymer you reduce weight/case by something like 1.76kg (68%). When you pack the case with 12.7 machine gun ammunition (the worst case) the weight saving is 10% because more ammunition can be put into a case before exceeding UN Transport Safety specified upper weight limits. That is a saving of 1 pallet in every 10. The result less





weight: fewer trucks and more space inside armoured vehicles. More space for fuel or greater range for the same fuel. Same platforms and numbers, greater fighting power and you achieve your intent. The gains go on and on. The same is true of helicopters. More ammunition or more flying: the choice is yours. To add to the argument the US DoD has calculated that converting to polymer cases in Afghanistan would have reduced deaths in logistic convoys by 35 and reduced wounded numbers and fuel consumed by 10%.

The Danish company PPD have been living the design and use of their polymer Lightweight Ammunition Case LWAC) since 2012. Meeting every environmental and operational requirement through carefully researched design involving the best designers Denmark has. Then testing, testing, testing. Tests in hot or cold conditions, underwater, burning, being shot at, dropped, crushed, shaken rattled and rolled. LWAC passed them all. The latest being another round of bonfires. In addition the test have shown polymers cases are safer than steel, quieter during the "silent" resupplies in the dead of night oh and they are lighter. The pint pot has been redesigned.

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PlastPackDefence

Improved survivability thanks to under-vehicle blast mitigation

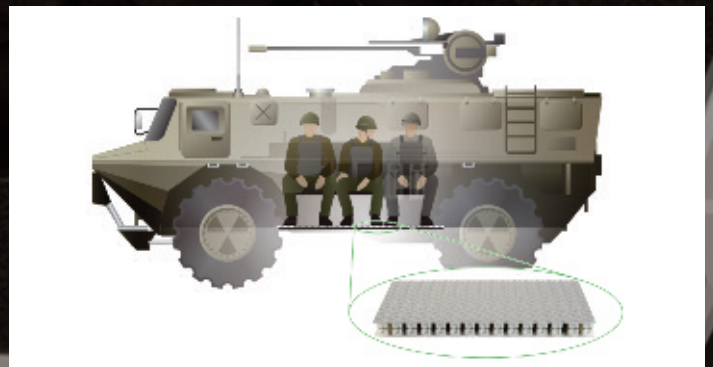
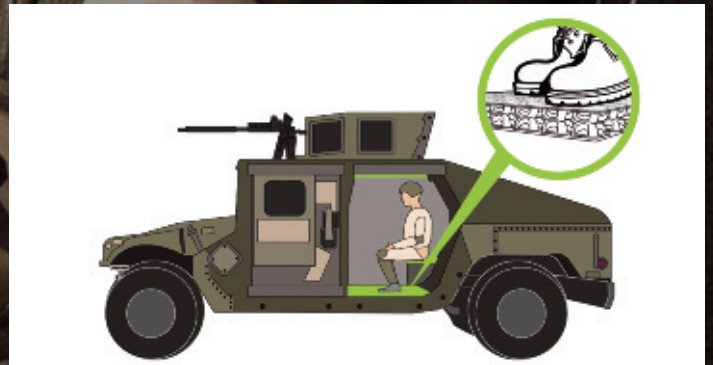
TSS International BV and SKYDEX Technologies, Inc. are proud to announce that TSS has been appointed official distributor for SKYDEX products.

As a stock-keeping distributor, TSS and SKYDEX aim to serve the European market for Civilian- and Military Armoured Vehicles, Boat Decking and Personnel Protection.

More than 24.000 MRAPs in the US Army have been equipped/retro-fitted with SKYDEX Convoy Deck, making it a combat-proven product. With already dozens of VR9 EU-armoured Toyota LandCruisers tested and certified with SKYDEX Convoy Deck, both parties are confident that the benefits of SKYDEX shock mitigation technology can greatly contribute to the survivability for many more armoured vehicles and their occupants worldwide.

"SKYDEX has a range of solutions that provide blast impact protection, and we're honoured to partner with TSS to take our designs to another level for the armoured vehicle community," says Alvaro Vaselli, President and CEO of SKYDEX. "With more than 20 years of experience protecting people and designing unique solutions for the military, SKYDEX understands that blast protection is critical for all vehicle platforms. Our advanced materials are engineered to reduce the risk of injury and in collaboration with a leader in vehicle protection solutions like TSS – we'll continue to save lives."

[Click here to read more...](#)



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Ensuring compliance in mission critical environments

Following a regular 12 monthly electrical inspection of a DSEAR area Zone 1 tanker servicing bay at an RAF site we discovered a number of non-compliant observations.

These included general wear and tear and damage, lack of maintenance, unauthorised modifications to ATEX equipment and faulty lighting causing reduced light levels.

We carried out a Lux level review and produced a lighting and emergency lighting design to make the area compliant, while ensuring adequate light level for working in the vehicle pit and workshop, as well as additional DSEAR area remedial works.

The work involved installing new cable containment throughout, re-wiring the entire tanker service bay, separating the non-hazardous and hazardous area circuits, as well as installing tanker earthing, ATEX heating, emergency lighting, fume extractions and outside lighting.

Our expertise and knowledge of defence electrical infrastructure meant we were able to bring the area up to compliance cost-efficiently while reducing downtime on a mission critical asset.



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Tyron Runflats head to Mali on British Army vehicles

Tyron Runflat has secured a new market win with its technology selected as part of an industry package to upgrade the British Army's Ridgback and Mastiff vehicles for deployment to Mali.



Crown copyright 2021

Tyron's All-Terrain Rubber Multi-Piece (ATR-MP) forms part of the upgrade carried out by NP Aerospace to re-engineer the vehicles under the UK Ministry of Defence's (MoD's) Protected Mobility Engineering & Technical Support (PMETS) contract.

This Urgent Capability Requirement contract, awarded to NP Aerospace in May 2020, includes an off-road mobility upgrade of Ridgback and Mastiff vehicles and associated spares.

The upgrade was carried out in order to enable the heavy armoured vehicles that make up the Army's protected mobility fleet to operate in challenging operational terrain and keep British Army soldiers safe on deployment. Key to Tyron's work was delivery under significantly reduced timescales, with the first wave of re-engineered vehicles delivered by NP Aerospace in just over 80 working days.

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

As part of the package of the new vehicle systems implemented – including new independent suspension systems, upgraded driveline, steering and braking systems, central tyre inflation systems (CTIS) and increased diameter tyres - Tyron's ATR-MPs will contribute to increased mobility and safety for the vehicle fleet, while also supporting simplified logistics in the field.

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

Tyron's ATR runflats are designed to maintain mobility and safety during and after tyre deflation, whether due to ballistic attack, blowout, or puncture, allowing the driver and crew to continue the mission safely and return to base. The runflat guarantees beadlock, which prevents the tyre spinning on the wheel when

deflated, enabling the vehicle to continue moving at speed in full compliance with on and off-road Finabel standards. The system is also fully compatible with CTIS and standard wheels, maximizing its flexibility for the military market.

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

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

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

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

"The wheeled vehicle is not going anywhere in the medium term, if anything their deployment will continue to grow as conflicts shift to more urban operations where wheeled vehicles offer the tactical advantage over tracked," he said. "So, we continue to innovate and look ahead at the coming challenges our customers will face and explore how we can help overcome them to keep their vehicles moving and their personnel protected in the field."

www.tyron.com

TYRON

Runflat

The D-Sub connector

Is this the most versatile low-cost connector of all time?

For many, the D-Sub connector reminds them of their childhood video games, for others it harks back to using big office PC screens with the signature blue VGA cable.

Here John Skinner, European Product Manager at electrical connector specialist PEI-Genesis, explores why the D-Sub is arguably the most versatile low-cost connector ever created and how it continues to be used in the most demanding engineering applications.

Today, we're used to seeing small connectors, with the likes of micro-USB and mini-HDMI catering for devices that continue to shrink in size. While the D-Sub connector may seem large in comparison by today's standards, when it was first created it was designed, as its name suggests, to be the Subminiature answer to the miniature connectors of the time.

The D-Sub was invented by Cannon engineers in 1952 for aircraft radio systems. According to the company, *"The D-Subminiature was designed as a smaller, lightweight, rectangular alternative to larger, heavier connectors at the time. At up to one inch wide by one quarter inch tall, the first D-Subs featured a 1500 V rating, a shell of cold rolled steel and an insert made of moulded nylon."*

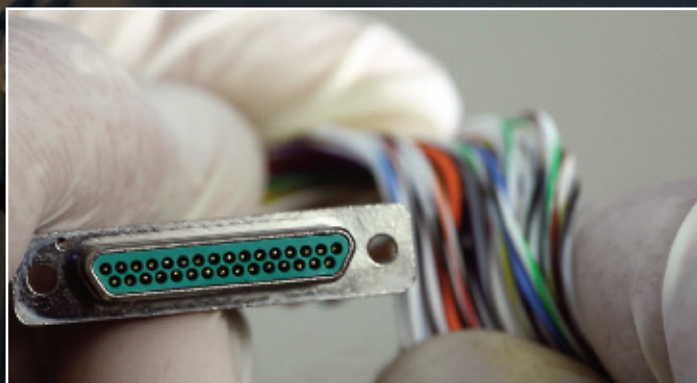
However, while it started life in a highly specialised environment, it quickly gained popularity in more everyday applications — gaining some commendable firsts. The D-Sub was used in the first colour television, the first mainframe computers, as well as early video game consoles and PCs and printers.

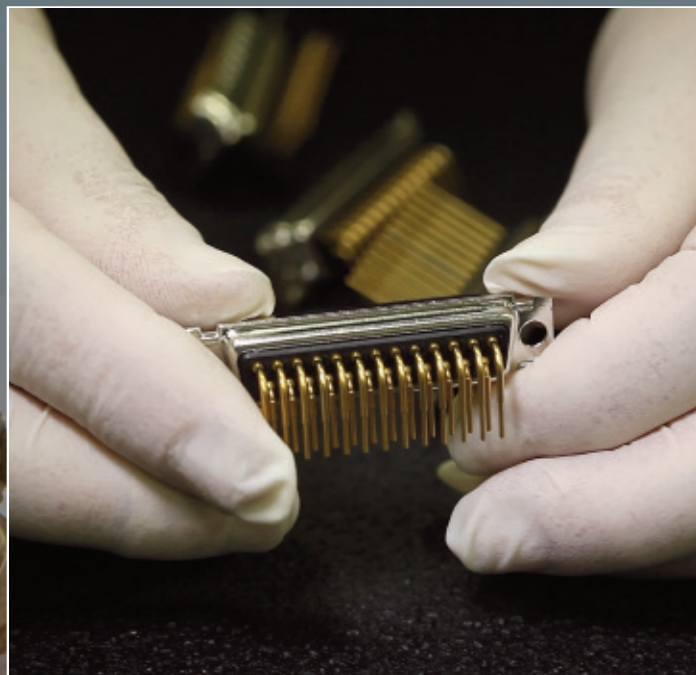
This versatility meant it was quickly adopted for use in a variety of consumer and industrial applications. After its introduction, Cannon rolled out the D-Sub with five shell sizes containing anywhere from 9-78 contacts in various layouts. The concept was eventually picked up and replicated by other manufacturers and the D-Sub took off.

Today it's used in everything from aerospace, communications and defence to industrial, transport, medical and consumer electronics. Its versatility means that it is equally at home on the International Space Station as it is on a high-speed train or in food manufacturing.

A versatile champion

So, what makes the D-Sub so appealing? At its heart, the connector can transmit data, power and radio frequency signals. On the outside, the D shape of the





shell means the connector can only be plugged in one way round — a useful design that, unlike other polarised connectors including USB-A, prevents the user from forcing the connector in upside down.

The metal shell also adds a robust housing for the rows of contacts inside and offers shielding against electromagnetic interference, which can be improved by adding a dedicated backshell.

For applications where the connector is subject to vibration that could cause accidental disconnect, mounting hardware options including jack screws, slide locks or spring latch systems, ensure a secure connection between D-Subs.

Stability

Stability is especially important in space applications where the cost of failure could bring a multi-billion-dollar project to a halt. While it's cheaper to transport lightweight plastics into space, the high-vacuum conditions of space can cause plastics and elastomers to outgas, releasing volatile compounds trapped within the material.

Outgassing can damage the connector and compromise electronics and connected equipment. D-Subs for space applications undergo a bake-out process to release the volatile compounds prior to assembly, or they can use specialised polymers that do not outgas.

However, stability doesn't just come from the connector material, it also comes from how those materials interact with their surroundings, in the form of magnetism. The permanent magnetic field present in ferromagnetic

metals like steel can cause sensors to lose calibration and produce erroneous measurements. As such, D-Sub connectors supplied for space and some medical applications use shells with a low level of residual magnetism.

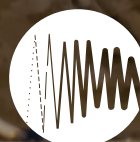
A versatile connector

Space isn't the only demanding application. Thanks to modern automated assembly techniques, D-Subs can now be sourced to suit almost any application, while staying low cost. PEI-Genesis can assemble connectors to order in as little as 48 hours and offers a variety of standard products including those with higher pin densities ranging from 15-78 pins in five shell sizes.

In a world where technological innovations come and go, the fact that the D-Sub has been in continuous production for nearly 70 years is testament to its versatility and popularity. Now, modern automation techniques have injected further life into the connector for years to come, making it perhaps the most versatile low-cost connector of all time.

To find out more about electrical connectors from PEI-Genesis, visit:

www.peigenesis.com



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

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



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

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

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

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



KEY FEATURES

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CUSTOM APPLICATIONS

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

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World-leading underwater capability

JFD conducts world-first simultaneous build of three submarine rescue vehicles

JFD, the world-leading underwater capability provider serving the commercial and defence diving markets and part of James Fisher and Sons plc, has been progressing the build of three submarine rescue vehicles (SRVs) simultaneously; a world-first in submarine rescue.

Due for delivery in 2021 and 2022, the SRVs are based on JFD's third generation submarine rescue vehicles; tailored to customer specification. These SRVs will join the fleet of five of JFD SRVs in operation worldwide.

This unique capability has been possible due to JFD's breadth and depth of expertise as world leaders in submarine rescue. This is the first time a build of multiple SRVs has occurred concurrently and despite the challenges presented by the COVID-19 pandemic, production remains on schedule. In parallel to these builds, JFD has continued to operate and maintain five of the world's submarine rescue systems, including conducting multiple global exercises.

Richard Devlin, JFD Commercial Director, commented: ***"Supporting our Submarine Rescue customers all over the world is part of JFD's core business. Internationally, we are relied upon to deliver market leading submarine rescue equipment on time and without compromise. Our global pedigree, together with our detailed knowledge, experience, and understanding of delivering such complex programmes has allowed us to successfully***





The SRVs will undergo factory acceptance tests before progressing to in-water harbour acceptance trials both locally in Glasgow and on location at JFD's test site at Fort William in the Scottish Highlands. Upon successful completion of the harbour acceptance trials the SRVs will be ready to enter service.

JFD's third generation submarine rescue SRVs are the most advanced in the world. An adaptable and reliable system, the technology has been developed over JFD's 40 years of experience and it allows for maintenance while offshore with a minimal spares package. Lightweight, quick to deploy and with incredible endurance, this proven class of SRV is in operation worldwide.

www.jfdglobal.com



Compression connectors, flexible circuitry cut a power supply footprint in half

You can't just fold a motherboard in half, can you?

When a mil-grade power supply engineer approached AirBorn's solution engineering team about his form-factor design challenge, he never expected the well-respected connector company's engineers to suggest using fewer interconnects as the problem's best solution.

The problem was simple: the power system needed to be folded in half to fit within the allotted space in the host application. The solution was theoretically possible, but it meant the system's motherboard had to be split in half and connected with some sort of cable harness and the associated connectors.

A quick look at the customer's proposed situation proved to be inadequate because the connector stack height would push the dimensions of the power system out of specification. No combination of vertical or right angle connectors and bulky cabling would meet the requirements.

The AirBorn Solutions Engineering team reviewed the mechanical models and quickly recommended a new solution: a flexible circuit assembly connecting the motherboard halves with AirBorn's Z Series solderless, compression connector. One half of the motherboard would be a traditional, rigid PCB while the other half would be a flexible PCA.

The Z Series connector is capable of mating directly with a PCB on one side and the flexible circuit on the other, eliminating the need for a mating connector. The compression, supplied by integrated hardware, ensures a highly-reliability electronic signal capable of withstanding high shock and extreme vibration.

The AirBorn team, following its signature Model-To-Market approach, quickly fabricated a prototype, choosing to selectively populate the contacts in the connector body to allow for the required electrical spacing. By eliminating two columns of contacts, the solution was capable of meeting the 100VDC requirement for the flexible circuit.

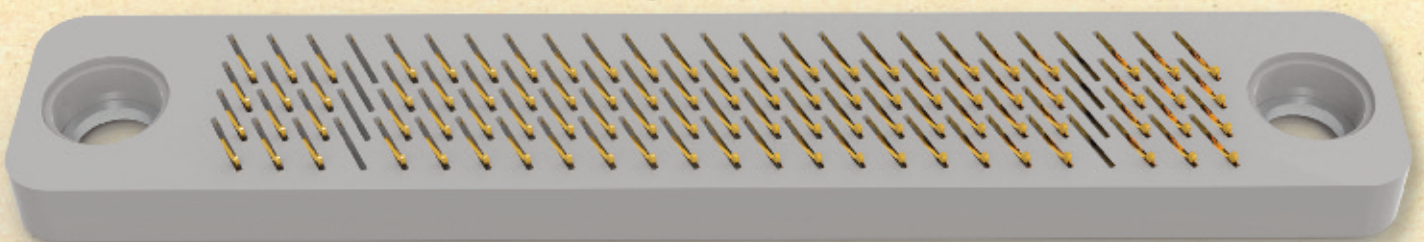


Figure 1 - Customized Z Series with 2 rows of contacts removed for application voltage.



Figure 2 – Fully assembled configuration. A stainless steel stiffening plate applied between the fasteners secures the flex cable and the flexible PCB to provide uniform compression along the interconnect.

An additional stainless steel stiffening washer was applied between the fasteners securing the flexible cable and the flexible PCB to provide uniform compression along the flexible boundary.

While examining the application, AirBorn engineers identified a potential cost savings for the customer, recommending Electroless Nickel Immersion Gold (ENIG) instead of solid gold for PCB pads. This measure would reduce the overall cost of PCB fabrication, and thus the power supply.

The final solution resulted in a high-altitude power system which could easily be removed from the host, unfolded for testing and maintenance, and reinstalled without disassembling the power supply.

In this application, the Z Series connector provided a robust and compact board-to-board interconnect solution, paired seamlessly with an AirBorn flexible circuit assembly and industry-standard ENIG electrical finishes, helped create an elegant and cost-effective solution the customer loved.

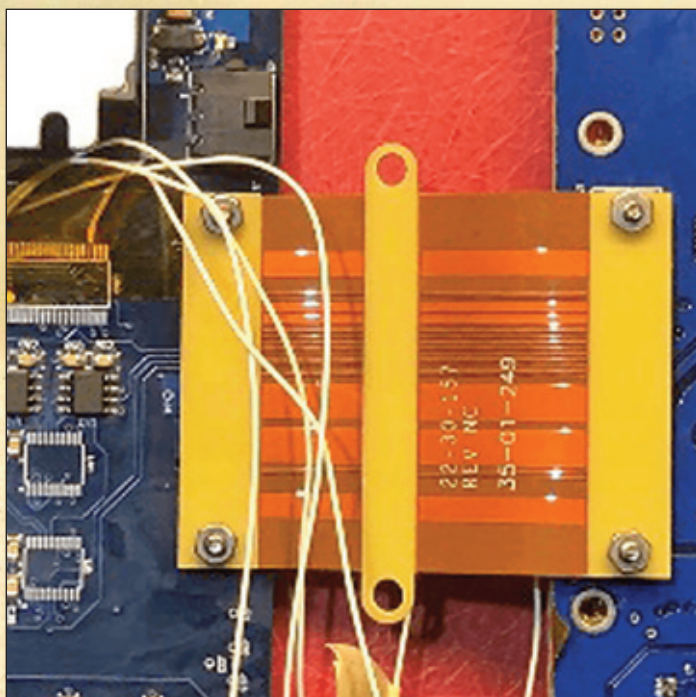


Figure 3 – Power Supply unfolded for additional testing while fully functional. Stiffeners (left and right) ensure consistent compression and signal while system is in maintenance configuration.

AirBorn International
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AirBorn



Z Series

Interposer Compression Connectors

- 1-piece, solderless contact system
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- Rigid body & guide pins assure contact stability & dependable targeting to pad
- A single Z Series connects two boards compared to traditional connectors
- Multiple contacts-per-cavity capability for redundancy and power modules

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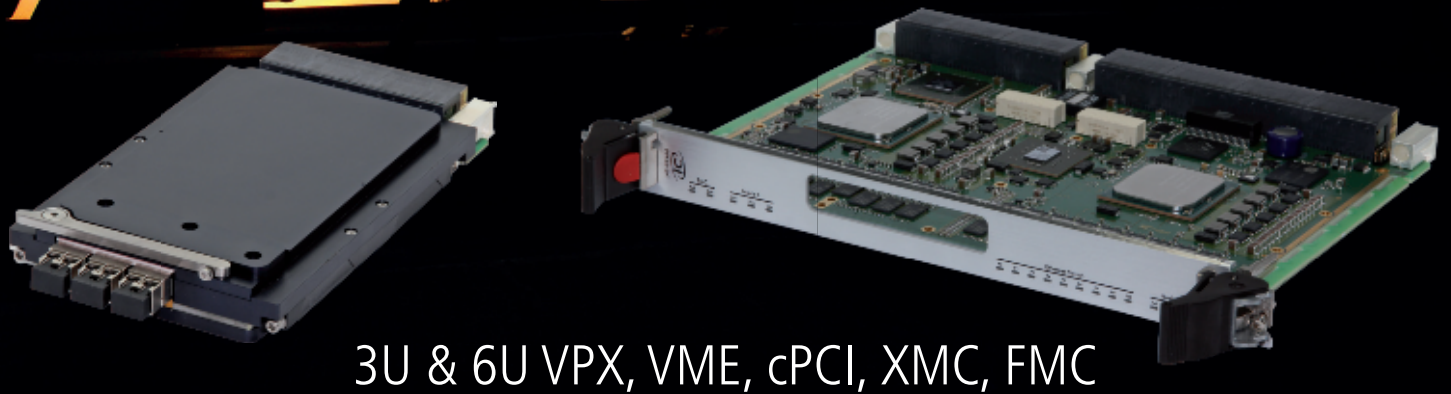
The Cummins Advanced Combat Engine (ACE) is ideal for new or repowered armored vehicles where available power is key but so is maximizing interior room. It features a compact and modular opposed-piston configuration with an advanced two-stroke technology. This eliminates the valvetrain and is a major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

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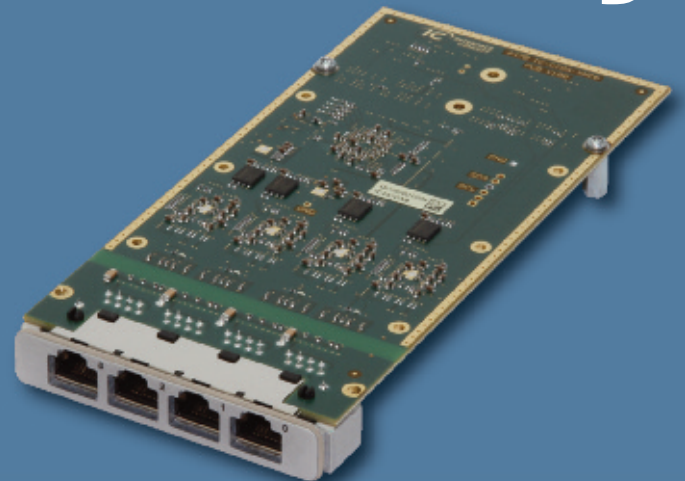
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High performance Ethernet redundancy solution

for the Industrial and Defense markets



Today's defense systems are highly sophisticated and based on high performance and mission computers, servers, workstations and signal processing nodes that need to exchange vast amounts of information. This information is exchanged via communication networks requiring high availability, reliability and robustness. In these systems, where Ethernet is ubiquitous, the network infrastructure and the communication protocols must guarantee that no data gets lost and that information gets reliably delivered. To meet these requirements in the most critical conditions, a solution to consider is the implementation of network redundancy.

In parallel with the rapid deployment and growing popularity of Gigabit Ethernet, Network redundancy protocols such as Parallel Redundancy Protocol (PRP) and High-availability Seamless Redundancy (HSR) were developed to circumvent network failures. This is in this context that Interface Concept capitalized on its extensive experience with Ethernet technology and FPGA board design to offer a high performance redundancy solution for the Industrial and Defense markets.

Interface Concept's IC-RBP-XMCA mezzanine card supports both

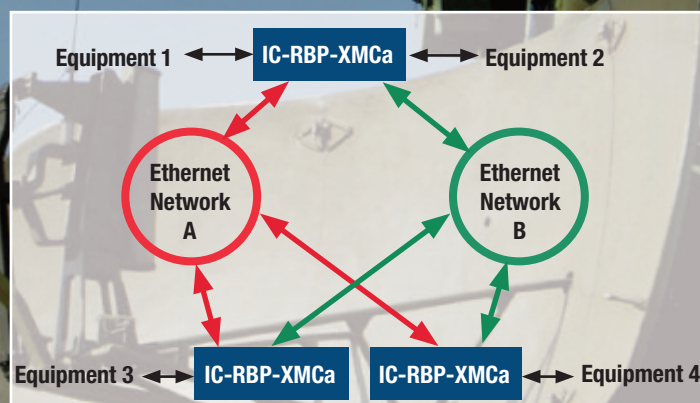
the PRP and HSR redundancy protocols. When operating in PRP mode, the IC-RBP-XMCA card is attached to 2 separate networks via 2 distinct Ethernet interfaces: one IC-RBP-XMCA is attached at the beginning of the redundant network (connection to 2 networks) and one IC-RBP-XMCA is attached at the end of the redundant network (connection to 2 networks).

Each IC-RBP-XMCA card is also connected to a Single Attach Node (SAN) or equipment which receives/transmits normal (non-duplicated) traffic. When transmitting toward the network, the IC-RBP-XMCA card replicates the transmitted frames coming from the SAN on each network. When receiving from the redundant network, the IC-RBP-XMCA keeps the frames arriving first and eliminates the duplicate frames before handing the traffic over to the SAN. In case of failure in one of the network links, the network redundancy allows the remaining operating network to continue to seamlessly provide traffic to the attached equipment.

When operating in HSR mode, the IC-RBP-XMCA card operates in a similar fashion but with a network using a ring topology. In this case, an IC-RBP-XMCA board stands at each node of the ring and is capable of duplicating traffic towards both directions of the ring on transmit, and eliminate duplicates on receive.

From a software standpoint, a monitoring application accessible via the IC-RBP-XMCA Ethernet ports provides the user with network statistics and status and can be used to generate real-time events such as the loss for of a network link.

The IC-RBP-XMCA can be plugged onto a cPCI, VME and VPX carrier or an SBC. At this time, it is available for air-cooled systems but a conduction-cooled version of this product will soon be available.



CONTACT US

For further information and friendly advice...

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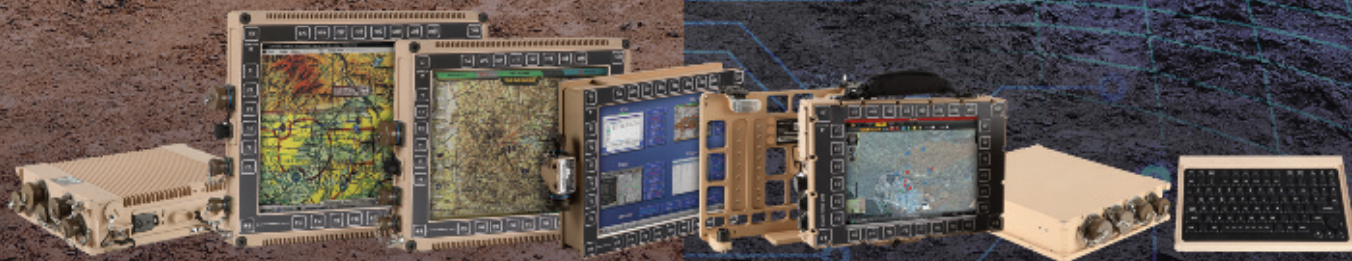
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