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Secure high-frequency and very high-frequency tactical communication

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Barrett Tactical Communications

Secure high-frequency (HF) and very high-frequency (VHF) tactical communication

Barrett Communications are designers and manufacturers of a comprehensive range of secure high-frequency (HF) and very high-frequency (VHF) tactical communication solutions. These systems are easily adaptable to different environments and are configurable from man-pack, to mobile, vehicle and base stations.

Barrett Communications supports customers around the world. A vast range of defence personnel, including border security, paramilitary police, coast guard and national defence forces rely on their specialised products and solutions.



Scalable and modular tactical networks

Being flexible and scalable, Barrett's tactical networks can include:-

- Hand Portable VHF transceiver
- Manpack, Mobile or Base packages in either HF or
- VHF configurations, by combining the core transceiver with modular accessories.

Accessories include:-

- dipole antennas
- whip antennas
- loop antennas
- rapidly deployable and air transportable masts
- power supply



Email, data, fax, telephone network interconnects and vehicle tracking systems can be added in a modular fashion. For example, manpack tactical data options include internal and external modems and the ability to connect to a rugged Ultra Mobile Personal Computer (UMPC).

Interoperable communication systems

For interoperability with other communication systems, Barrett networks can easily be extended. Dismounted users can be connected with portable line-of-sight radios to HF users with the Cross Gate. Linking commercial and tactical radios to all types of telephony, email and data connectivity can be achieved by adding an automatic telephone interconnect and email gateway.

Tactical HF radio system for military forces

The PRC-2090 Tactical HF radio system is a multi-role HF communications system that can be deployed as a 30W manpack, a 125W vehicle-mounted system or a 125W base station.

The lightweight transceiver includes:-

- integrated automatic antenna tuner
- battery management system integrated into each Li-ion battery cartridge
- automatic link establishment (ALE) to MIL-STD 188-141B 2G (JITC certified)
- optional internal MIL waveform modem with 5066 stack

Enabling the user to deploy full communication capability in many different environments, the PRC-2090 HF Tactical manpack transceiver is designed with a demountable display that allows it to be attached to webbing for use on-the-move, or remotely from the transceiver.

PRC-2090 features include:

- 1.6MHz to 30MHz continuous coverage
- All modes J3E (USB, LSB), H3E (AM) J2A (CW) J2B (AFSK)
- Fully immersible to 1m
- Detachable display for remote extended control operation
- Advanced tactical handset
- Enhanced DSP noise reduction
- Three year warranty

Options available include:

- internal / external high-speed data modems
- Digital voice and data encryption 56 bit DES and 256 bit AES (subject to export licence)
- Rapid docking system (RDS) vehicle and base docking system

Very high-frequency tactical radio system

The PRC-2080+ low band VHF transceiver is designed for multi-role tactical military and security applications. It is an extremely compact and lightweight unit which is simple to operate in demanding mission critical conditions. The PRC-2080+ is part of the family of Barrett transceivers that are field proven in over 150 countries, on every continent and in all environments.

In stand-alone configuration, the PRC-2080+ is ideal for squad level communication requirements. Using either the supplied advanced handset or optional tactical headset, the PRC-2080+ transceiver can communicate reliably up to 8 km in open space



(subject to terrain and topography), using the standard tape whip antenna.

The standard package comprises:-

- PRC-2080+ VHF transceiver
- Advanced tactical handset
- Tape whip antenna with gooseneck
- Rechargeable 6.5 Ah Li-Ion battery
- AC battery charger
- Optional multi battery charger available

When deployed in the docking station and combined with the 50W VHF amplifier the systems can be used for in-vehicle, re-broadcast and base station applications.

Configurations of the PRC-2080+ include:

- PRC-2080+ 5W Tactical VHF hand portable
- PRC-2081+ 25W Tactical VHF manpack
- PRC-2082+ 50W Tactical VHF mobile
- PRC-2083+ 50W Tactical VHF re-broadcast
- PRC-2084+ 50W Tactical VHF base

Features include:

- DSP voice and data signal processing
- Backward compatible with PRC-77 and other 30MHz - 88MHz communications equipment

Rapid field deployment systems (RFDS)

The Barrett RFDS (HF and VHF) is a turnkey communications system in a single case. It comprises of radios, various power options, cabling, lighting and external connections. It is designed for a simple set-up and can be operational in minutes.

The HF version is based on the PRC-2090 Tactical HF radio system, which provides a range of different transmission modes. It can be added with optional ALE, frequency hopping and encryption (subject to export licence) plus Barrett's 2023 internal HF modem, which in conjunction with the 2020 data system enables the transmission of email, fax and data over HF.

The VHF variant is based on the PRC-2080+ Tactical VHF radio system, which has more than 2,300 channels. It has 50W output power and a number of frequency hopping and encryption options (subject to export licence) are available.

Features of the HF or VHF RFDS include:

- Field operational in minutes
- AC Mains and/or DC power
- On board 12 V 33 Ah battery
- Battery charging onboard
- HF – VHF/UHF interoperability
- HF data transmission ready
- Multiple voice and data security options
- Stackable transportable base station and vehicle/field deployable
- Remote control tactical RGB LED lighting for night/dark area operations
- Amazon ruggedized Anti vibration 6U 19-inch rack complies with MIL-STD 810F and rated IP65
- Front mounted antenna connectors for HF & VHF transceivers to aid in rapid deployment

Secure tactical networks

Security options for Barrett tactical HF and VHF transceivers can be specified with Frequency Hopping (FH), Advanced Encryption Standard (AES), Data Encryption Standard (DES) or Fast Fourier Transform (FFT) voice security. FH and AES encryption options are subject to receiving an Australian Government Export Licence.

Barrett's HF and VHF Frequency Hopping options are unique and easy to use. They are available with variable hopping rates at 5 or 25 hops per seconds on HF and up to 125 hops per second on VHF. This provides excellent protection against electronic warfare (EW) attacks. Voice and Data security is further assured through a variety of scrambling and digital encryption options. These include Secure Call, an innovative, narrow band voice scrambler providing secure point to point, or point to multipoint communications and DES 56 and AES 256 digital encryption systems.

Intuitive operation, tailored training

We believe that system planning and efficient operation of any radio communications system is the key to the user or organisation receiving full benefit from their investment and we reinforce this belief with a range of training packages designed to support our systems around the globe.

Barrett offers training courses in radio system operation, planning and maintenance. Customised and specific training can also be designed to accommodate the user's needs and other HF related technologies.

Details of standard courses and sample syllabuses are available on request.



Courses are principally conducted in Barrett's custom designed training facility in Perth, Western Australia, and "field" courses can also be accommodated in a location convenient for your operation or mission.

Barrett Communications Overview

Barrett Communications was founded in 1976 to provide HF radio communications for remote communities in the Australian outback. They supported the Royal Flying Doctor Service and home schooling schemes before expanding into Australia's mining industry. Seizing overseas opportunities, Barrett then supplied HF radio systems to Non-Governmental Organisations (NGOs) delivering humanitarian aid. In 2000 Barrett Communications won a major contract supporting global humanitarian operations with base and mobile HF systems incorporating email, GPS vehicle tracking, telephone interconnect, logistics and training.

Barrett offers an extensive range of commercial and tactical HF and tactical VHF radio systems that can expand into complete, secure and independent communications networks that are intuitive to operate with minimal training. Barrett continues to grow organically and by acquisition, serving worldwide commercial, government, humanitarian and military customers and continues to experience strong demand for its products. Barrett's customers are both numerous and global.

www.barrettcommunications.com.au



Intuitive

Proven

Solutions

Border security, paramilitary police, coast guard and national security forces around the globe rely on the field proven expertise of Barrett Communications.

Tactical HF and VHF voice, data, interoperability and security communications solutions have been provided to over 150 countries.

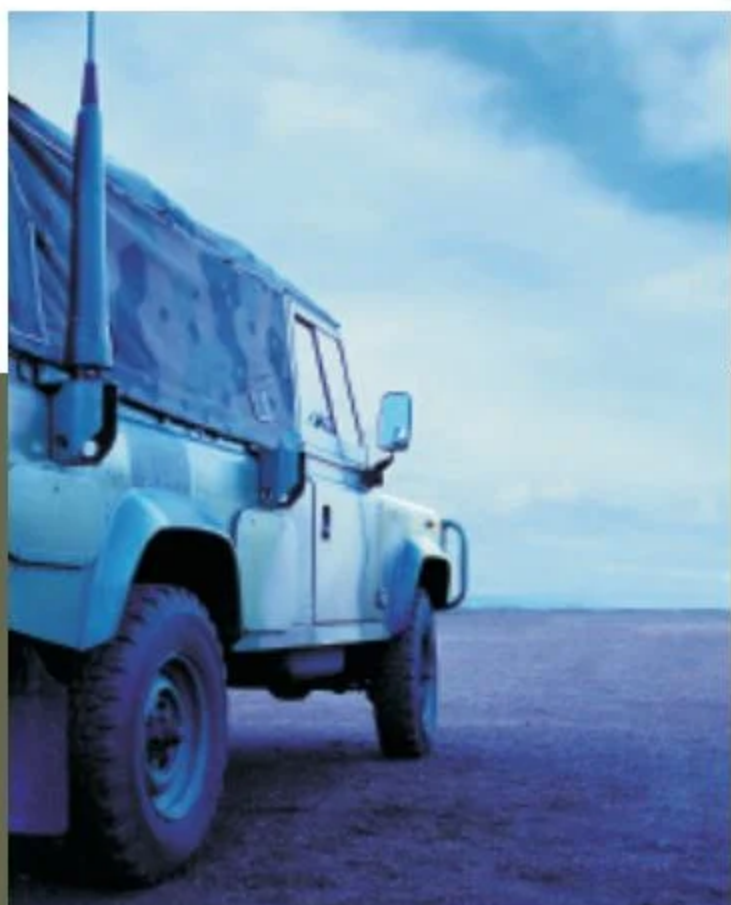
By understanding the unique challenges facing our clients, Barrett provides a complete communications solution including tailored operator training and technical support.



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- > Supreme stability
- > Highest braking force
- Progressive piston arrangement
- > Even heat transfer
- > Even pad wear
- Open pad setting
- > Optimized Cooling



Friction ring MOV'IT®

- Highly efficient cooling system
- > Superior ventilation
- Special steel compound
- > Superior thermal conductivity
- > Highest fading resistance



Braking pad MOV'IT®

- Enhanced friction surface
- Even heat transfer
- Lower system temperature
- Longer Lifetime
- Pad wear sensor



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Česká zbrojovka a

...the most important Czech manufacturer of firearms

Česká zbrojovka a.s. Uherský Brod has long been the most important Czech manufacturer of firearms, and at the same time, also one of the most significant arms factories in the world.



Founded in 1936

The company was founded in 1936 and became a joint-stock company in 1992. CZ ranks among the most successful Czech exporters and also plays the role of a key strategic partner of domestic armed and security forces. In 2016 the company celebrated its 80th anniversary from its foundation.

High precision engineering

The production programme of CZ consists of a balanced portfolio of weapons for the civilian market and service sector, complemented by supplies of high precision engineering products mostly for the automotive and aerospace industries. The company has an excellently equipped factory in Uherský Brod, where the quality control system according to ISO 9001: 2008 is implemented and certified. The company activities are also in line with similar NATO

a.s. Uherský Brod



requirements. CZ is represented on the domestic market by two company stores (in Uherský Brod and Prague) and a nationwide network of certified sales and service partners.

USA – prestigious market for Česká zbrojovka a.s.

The United States are a prestigious market for CZ, where her interests have been represented by the CZ-USA subsidiary since 1997. Through this subsidiary, the Uherský Brod company also owns the renowned US brand Dan Wesson. The subsidiary ZBROJOVKA BRNO s.r.o. operates in the division of break action hunting and sporting weapons, the direct successor of the famous traditional Brno arms manufacturer. In 2014, a new production and assembly plant CZ-Slovensko strengthened the capacity of CZ.



More than 100 countries worldwide

CZ is currently going through the most successful period of its existence. Thanks to the extensive modernization of the production facilities and the introduction of a new generation of weapons for the service and civilian markets, the current management headed by the CEO Ing. Lubomír Kovařík, MBA, has been successful in significantly increasing the volume of production and sales in the long term. After surpassing CZK 2 billion in 2012, there followed another sharp increase in sales, which reached a high of CZK 3.375 billion in 2014, CZK 3.41 billion in 2015 and record of CZK 3.929 billion in 2016. The Uherský Brod arms factory currently has over 1,800 employees and in 2016 produced almost 250,000 weapons. Over 80% of its arms production is exported, CZ has trade agencies in more than 100 countries worldwide.

CZ P-10 C

9x19

15 (17)

IMPROVING
ON PERFECTION



- › EXCELLENT SHOOTING COMFORT THANKS TO THE WELL-DESIGNED ERGONOMIC GRIP WITH DISTINCT CHECKERING
- › FLAT AMBIDEXTROUS SLIDE STOP AND MAGAZINE CATCH
- › NEW "DEGREE" OF RESISTANCE AGAINST CORROSION AND MECHANICAL DAMAGE
- › ENHANCED FRONT AND REAR SERRATIONS FOR FAST AND RELIABLE HANDLING

	FRAME	GRIPS	TRIGGER	SIGHTS	OVERALL LENGTH (MM)	BARREL LENGTH (MM)	HEIGHT (MM)	WIDTH (MM)	WEIGHT (G)	SAFETY FEATURES
CZ P-10 C	POLYMER	-	STRIKER FIRED DOUBLE ACTION	LUMINESCENT OR TRITIUM	187	102	132	32,2	760	TRIGGER SAFETY; DROP SAFETY # 1 STRIKER BLOCK; DROP SAFETY # 2 TRIGGER BAR SAFETY
CZ P-10 C FDE	POLYMER	-	STRIKER FIRED DOUBLE ACTION	TRITIUM	187	102	132	32,2	760	TRIGGER SAFETY; DROP SAFETY # 1 STRIKER BLOCK; DROP SAFETY # 2 TRIGGER BAR SAFETY



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cZ BREN 2

5,56x45 MM NATO 30

7,62x39 MM 30

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BY PROFESSIONALS

- › MULTI-CALIBRE CONCEPT
- › EXTREME RELIABILITY AND DURABILITY UNDER ALL CONDITIONS
- › HIGH ACCURACY AND SERVICE LIFE
- › LOW WEIGHT AND COMPACT DIMENSIONS FOR FAST AND COMFORTABLE HANDLING
- › AMBIDEXTROUS CONTROLS FOR OUTSTANDING ERGONOMICS
- › SHORT STROKE PISTON SYSTEM

		CALIBER	MAGAZINE CAPACITY	FRAME	BARREL LENGTH (MM)	LENGTH OF WEAPON WITH STOCK FOLDED/UNFOLDED, RETRACTED-EXTENDED (MM)	HEIGHT WITHOUT MAGAZINE (MM)	WIDTH OF WEAPON WITH STOCK FOLDED/UNFOLDED (MM)	WEIGHT WITHOUT MAGAZINE (G)
CZ BREN 2	8"	5.56x45 mm NATO	30	ALUMINIUM	207	505/684-733 ± 10	202 ± 5	80/104 ± 5	2891 ± 50
CZ BREN 2	11"	5.56x45 mm NATO	30	ALUMINIUM	280	577/762-807 ± 10	202 ± 5	80/104 ± 5	2986 ± 50
CZ BREN 2	14"	5.56x45 mm NATO	30	ALUMINIUM	357	657/840-884 ± 10	202 ± 5	80/104 ± 5	3103 ± 50
CZ BREN 2	9"	7.62x39 mm	30	ALUMINIUM	227	525/706-753 ± 10	202 ± 5	80/104 ± 5	2847 ± 50
CZ BREN 2	11"	7.62x39 mm	30	ALUMINIUM	280	573/755-802 ± 10	202 ± 5	80/104 ± 5	2896 ± 50
CZ BREN 2	14"	7.62x39 mm	30	ALUMINIUM	357	650/833-880 ± 10	202 ± 5	80/104 ± 5	3009 ± 50

Stated dimensions may be different in particular design and configuration.

STÄUBLI



Your Connection Solutions for Defence and Aerospace

As one of the leading manufacturers of quick connector systems, Stäubli is active on all 5 continents and covers connection needs for all types of fluids, gases and electrical power.



Since the early 1970s, Stäubli has been supplying the defense and aerospace industry with couplings and developing specific ones for military applications. The experience we have gained over this time in active partnership with manufacturers and users has increased our technical expertise and enabled us to meet the demanding technical and precision requirements for these sectors. The extensive range of solutions available can satisfy many of your specific needs.

Military Connectors and Quick Release Couplings

Our expertise and global presence allow us to participate in all major international projects to provide highly effective and high performance technical solutions for targeted applications.



Military Refueling Couplings for Aircraft, Trucks and Armored Vehicles

For helicopters, aircraft, armored vehicles, light vehicles. Quick release couplings for UAV (Unmanned Aerial Vehicle) and UWV (Unmanned Water Vehicle), truck and ground equipment.

Military Air Conditioning Couplings

Crew bays, restricted areas integrating electronics, connection between the air conditioning system components (compressor, evaporator, condenser accumulator) for unit removal and maintenance.

Military Hydraulic and Fluid Couplings for Vehicle Maintenance

Connection of hydraulic circuits on armored vehicles, flight simulators. Power pack and engine change out, fuel and coolant connections. Oil connection for main and emergency steering. Oil change for gearbox and engine.

Quick Release Couplings for Military Cooling Systems

Connection of cooling fluids or refrigerants to high power electronic circuit. Aircraft, drones, submarines, ground mobile systems, etc. Water cooling for marine and ground mobile radar systems.

Couplings for Military Oxygen Equipment

Mobile hospitals, interconnection of supply modules to medical shelters. Filling of oxygen bottles.

Military Breathing Air Couplings For Oxygen Masks

Staubli Defense Military Breathing Air Quick Release Coupling AQR Breathing air supply to protective masks and suits for accessing dangerous or contaminated areas cleaning fuel tanks, submarines, etc.

Military Break-away Couplings For Air Cooling

Quick Release Military Air Cooling Coupling CBW Personal cooling system. Connections for air cooled pilot vest with integrated break-away function for unimpeded emergency ejection.



Defense and Aerospace Couplings For High Pressure Gas Cooling

Quick Release Space Couplings SCM Connection in extreme conditions: weightlessness, high-pressure gas, low temperatures.

Military Couplings For Manufacturing Processes

Connections on compressed air and other fluid circuits. Connection of energy circuits on test benches of motors and reactors.

Stäubli Solutions Adapted to New or Existing Equipment

With our vast experience of working closely with partners in these sectors, your Stäubli contacts are always at your service.

Ready to analyze your specific needs and offer you tried and tested solutions to match your applications, and able to develop new solutions to meet your future requirements.

The integration of quick couplings into your project at conception simplifies the subsequent assembly, commissioning, operation and maintenance of your systems.

To learn more about Stäubli military and defense connector solutions, please visit our website at www.staubli.com/defense



Safety through technology

SCHROTH Safety Products provides customized solutions for occupant protection in military ground vehicles, airplanes and helicopters of all varieties as well as motorsport and OEM automotive applications. With over 60 years' experience in occupant protection, SCHROTH is one of the recognized leaders in seatbelt and seating products for military applications.

Modern safety systems require integration across complex platforms, which often call for customized solutions. Throughout the product lifecycle, from R&D through to prototype construction right up to series production, we control all processes according to state-of-the-art technology and carry out intensive testing and crash simulations for quality assurance purposes in coordination with the customer's requirements.

SCHROTH Specializes in:

Seat Belt and Harness Systems

SCHROTH Military Harness Systems have been designed to meet or exceed the user requirements of the UK, US and European Militaries. SCHROTH Military Harness Systems are designed to be easy to use, with consistent configurations and features that provides maximum protection, rapid entry and egress, adjustability and comfort for a wide range of occupants while seated in forward, rearward or side facing seated positions.

SCHROTH has accumulated a wide range of hardware and restraint solutions for countless applications meeting world-wide standards and regulations. Regardless of your requirement, SCHROTH can most likely supply your solution.



- **Water Activated Buckles (WAB)**
- **Multi Point Harness Systems for Field Stretchers**
- **Production and Program Management capabilities for Prototypes to Mass Production**

Seating Systems for Military Ground Vehicles (Mine Blast and Static Utility Systems)

SCHROTH's lightweight utility troop seat systems offer an ITAR-Free, COTS (commercial off the shelf), low-profile, space-saving solution for a wide variety of vehicle installations. The mine blast and utility seating comes complete with an integrated ECE/FMVSS compliant lightweight 4-point harness restraint.

Performance Levels

- Tested according to AEP 55 Vol. 2 (Level 4b)
- Forward crash tested at 24g (50km/h with 95% dummy)
- Side facing crash tested to 13.5g (32km/h with 95% dummy)

Specifications

- Provides 5% to 95% occupant protection with full body armor
- Flame resistant to DIN 75200/FMVSS 302
- Environmental qualification
 - 120 hours – ASTM B 117-90 for salt spray testing
 - STANAG 2895 – cold, heat, damp heat testing

Standard Features

- Forward-, rear- and side-facing installation (wall or frame mounted)
- Comfortable and durable seat surfaces (tear and flame resistant fabric, color – black)
- SCHROTH ABTS (All Belts to Seat) 4-point shock resistant, lightweight ECE R16 and FMVSS 209 compliant harness
- Seat and asm® (Anti-SubMarining) harness designed to prevent submarining
- Spring loaded self-folding, storable seat pan
- ITAR free product – designed and manufactured in Germany

Optional Features

- Integrated self-folding foot rest
- Upgradable SCHROTH 4 or 5 point RFR™ ECE/FMVSS/FIA compliant harness
- Additional seat cushion padding
- Seating fabric available in black, dark blue, olive green and tan
- Storage pocket under the seat
- Optional narrow seating width (380 mm)

The Resettable Mine Blast Utility Troop Seat design may be adapted to many ground vehicle applications and SCHROTH can meet interface, integration, and ergonomic requirements as necessary.

Gunner Restraints / Top Cover Harnesses / Standing Positions

SCRHOTH has multiple designs to meet various vehicle applications.

SCRHOTH's Gunner Restraint Systems (GRS) have been fitted to over 160,000 vehicles for operations in Iraq, Afghanistan and other trouble spots world-wide.

SCHROTH has developed and delivered four-point restraints with integrated airbag systems for 125 German Boxer Armored Personnel Carrier (APC) vehicles.

The SCHROTH inflatable restraint system offers numerous innovative features including shoulder harnesses fitted with belt-integrated airbags.

In the event of a crash, sensors measure the resulting acceleration and trigger the gas generators that produce micro pyrotechnical charges allowing the airbags to be deployed within a fraction of a second.

Although airbags have been in commercial vehicles for years, there are very few applications of airbag technology for a production ground vehicle developed specifically for military applications.

This inflatable restraint brings state-of-the-art protection by integrating the airbag into the shoulder harness and providing protection for side-facing occupants.



SCHROTH®
Safety through Technology

Driving Forward to Engage, Enable and Excel

*By Craig Taylor, Head of MarComms,
Excelitas Qioptiq D&A*

Today's advanced defence and aerospace applications demand a partner who can deliver mission-critical performance, reliability and support.

We are that partner, with over 50 years of experience in getting the job done right the first time. We work closely with our customers throughout the product lifecycle, while providing expert technical input at every step along the way. Our expertise in energetic safety systems, electro-optical modules and equipment, high-reliability power systems, sensors, defence lighting, frequency standards, and high-energy switching enables us to meet exacting application needs.

Dismounted Vision Solutions

We are the world's principal designer and manufacturer of infra-red, image intensified and fused night vision equipment. More than 100,000 individual night sights have been supplied to over 56 different countries for a wide range of defence, police, border security, coastguard, and search and rescue applications. We deliver a range of world leading weapon sights for a wide variety of platforms including individual assault weapons, light support weapons, crew-served weapons, anti-tank/anti-materiel weapons, and specialised sniper

applications, using image intensifying, thermal and Fused imaging technology.

Cameras for Ground Based Surveillance, Vehicle and Naval Platforms

We have a proud heritage of designing and manufacturing optical modules for defence and aerospace applications. We strive to create cameras that offer end users the opportunity to select the performance and sensor origin to match their application and its challenges. By being sensor agnostic we are able to address procurement issues that are related to restricted content. Our next generation product family of thermal cameras offer ruggedised, high performing solutions for tough, long range requirements. The portfolio of products includes systems utilising the latest optical and detector technologies in the medium wave infrared (MWIR), long wave infrared (LWIR) and the visible wavebands.

Optronic Defence Modules

We offer state of the art design and manufacturing to provide precision solutions optimised for low cost, high volume production. We provide a complete in-house capability for the design, simulation, manufacture, test and qualification of advanced optronic modules for Soldier & vehicle systems and equipment, Tactical missiles, Missile warning and targeting, Surveillance systems and Ground Vehicle Systems.

Defence Sensors, Power & Energetics

From Arming and Fusing, Rocket Motor Ignition and Laser initiated ordnance systems to laser range finding, warning, terminal guidance and command and control modules. We provide the capability that enables critical mission winning systems and equipment.

Avionic Displays

A respected international reputation for the design and manufacture of optical modules for Head-Up, Head-Level, Head-Down and Helmet-Mounted displays. We have been designing and manufacturing optical modules for Head-Up Displays (HUDs) for more than 30 years, fulfilling over 50% of the world's demand for HUD optical modules.

Space Technology

The only provider for OSRs and Coverglass to all the Wests satellites. Coverglass is micro sheet glass processed to be incredibly tough and designed to protect the photovoltaic solar panels from the harsh environment of space. OSRs or Optical Solar Reflectors are small mirrors that assist with the crafts internal thermal management. The space vehicle lighting systems we supply are widely used. Our high reliability RAFS (Rubidium Atomic (time) Frequency Standard) technology was developed specifically for mission critical space applications,

providing 20 Years of Continuous, Failure-Free Operations.

We understand what it takes to get even the most complex project off the ground. From initial design to deployment, we consistently deliver innovative solutions. Our products are backed with exceptional design, production, and test capabilities and decades of systems integration experience. Every product, whether customized to exact customer specifications, ruggedized commercial off-the shelf (COTS), or build-to-print, is engineered to meet stringent performance requirements and operate in extreme environments.

Because of our proven heritage of leadership supporting critical defence and aerospace applications we are a preferred supplier for World Wide aerospace and defence contractors, with solutions in Air, Land, Sea and Space - keeping our troops safe is our only mission.

QIOPTIQ
Photonics for Innovation

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Kite In-Line Image Intensified Weapon Sight selected by the Commonwealth of Australia Department of Defence in support of the Australia Defence Forces (ADF) LAND125 3C project.



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Integrated Communications



Intercoms

Cobham has built a reputation second to none on the reliability and quality of its Vehicle Intercom Systems with over 150,000 systems in service around the world.

- Enabling vehicle mounted troops to communicate in the most demanding of missions and environments
- Advanced TDMA & Ring architecture
- Distributed processing and conferencing
- No master controller & no single point of failure
- Backwards compatible with ROVIS systems with same form factor, cable assemblies and mounting points



TacG2 Vehicle Intercom Systems modules

Mast Systems

Cobham offers a full range of composite and aluminium Communication and Tactical Masts, from vehicle mount up to stand alone units.

- Telescopic masts – Options available from 4m up to 50m extended height
- Telescopic lifting poles – Winch and belt operates designed to be used at land and at sea
- Tripods – Options available from 2kg up to 50kg top loads
- Wide range of mast accessories, ancillaries and antenna pointing devices
- Complements Cobham's wide offering of antennas



Deployment of lightweight telescopic EXL-mast

Interference Cancellation

Cobham's Integrated Communications Environment (ICE) products enable multi-radio and force protection system integration.

- Optimises the performance of multiple on-board systems
- Restores the sensitivity of on-board communications
- Cancellation frequency range of 30 – 512 MHz
- Cancellation performance 60dB (typical)
- Complements Cobham's Vehicle Intercom Systems (VIS)



ICE 7201 Multi-Radio Interference Cancellation System

Counter Threat Technologies



Anti-Jam GPS Solutions

Cobham's latest Anti-Jam GPS system is a highly effective solution specifically designed to meet the demands of military platforms.

- Allows operation 100 times closer to the jammer
- > 85 dB J/S performance
- Uses a combination of space-time adaptive processing (STAP) and excision filtering
- Software defined core for low through-life costs and superior upgradability
- Dual frequency (L1/L2) capability



20-7009 CRPA



7-6005 DACU

Counter-IED Solutions

Cobham offers a wide range of Ground Penetrating Radar (GPR) C-IED solutions for handheld, vehicle, UGV, UAS and training applications.

- Handheld – Military and humanitarian mine, IED and wire detection
- Vehicle – Multi-Channel GPR for IED and mine clearance operations
- UGV – Fast and simple deployment onto UGVs removing operators from harm's way
- UAS – Modular GPR system mounted to UAS for clearance of large areas remotely
- Training – Fully-immersive virtual-reality C-IED training systems



AMULET Vehicle-Mounted Mine Detection System

Counter-UAS Antennas

Cobham has drawn on its vast range of resources to provide antenna solutions for systems designed to compromise the unlawful use of drones.

- Wideband Omni-Directional – High power 360 degree jamming
- Directional Helix – High gain and directional for long range jamming
- Directional Flat Panel – High gain and compact for higher frequencies
- High Power Ultra-Wideband Directional – Multiple frequencies covered with a single unit
- Complements Cobham's wide range of masts



MINEHOUND VMR3G



Counter-UAS antenna array

COBHAM

Cobham Antenna Systems
The Cobham Centre, Marlow, SL7 1TF, UK

Tel: 01628 472072 | Email: antennasystems.marlow.marketing@cobham.com
www.cobham.com/antenna-systems

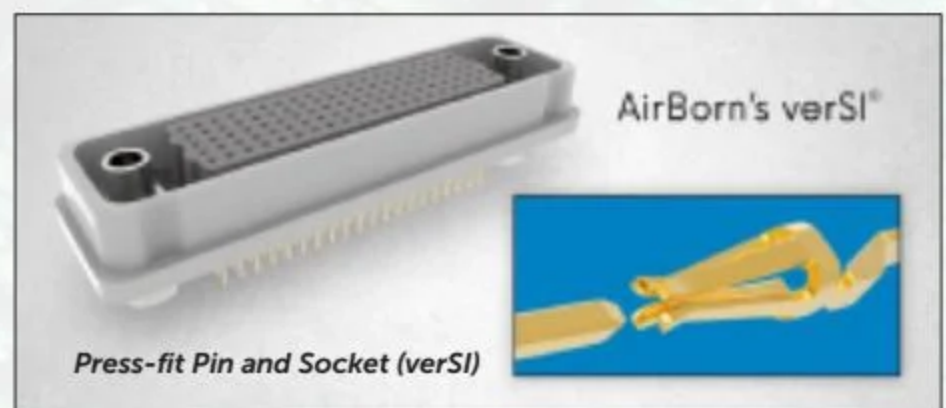
Selecting a High-Speed Interconnect & Key Successful Implementation

When designing applications utilizing high-speed interconnects, it's vital to navigate around all potential "speed bumps" along the signal's path.

Factors such as stack ups, tolerances, via design, trace widths, plating, and copper etching will have to be understood and mastered to achieve an optimal signal path. Any design check list should also include the connector, which can often be overlooked. Connectors must be scrutinized or they may wreak havoc on the system's signal integrity. A proper connector should provide a few key elements:

- **Matched impedance over the bandwidth of interest**
- **Low insertion loss over the bandwidth of interest**
- **Reliable connectivity to the PCB**
- **Reliable connectivity to the cable system**

In order to ensure that the connector provides low loss and matched impedance to your signal, we need to look at scattering parameters or s-parameters, which specify the nature of linear electrical networks and will identify the bandwidth and the loss of the circuit, providing peak performance potential. S-parameters data are provided by manufacturers as a way of characterizing their



connectors and should be the first criteria when considering a high-speed one. Designers should also transform and observe s-parameters in the time domain, as a TDR (Time Domain Reflectometry) plot, and see what the impedance profile looks like internally.

It is important to note too that connectors have a good many "flavors" (termination style, internal signal length, materials, etc.) and the designer needs to understand how the s-parameter files were created.

Here at AirBorn, we provide simulated and measurement-correlated data for each customer's intended use. This provides customers a more accurate assessment of connector impact to the design and bolsters confidence levels in the simulated data.

Another important criterion in selecting the connector is PCB termination options. Connectors typically come in several termination styles including, PTH, surface mount,



Speed Keys to a Presentation



press-fit, and PIH (paste in hole); each having distinct strengths and weaknesses.

Press-fit terminations are rugged and provide maximum retention and connectivity to the circuit board, but also present a tough challenge for high-speed applications. Routing a signal out of a high-density press-fit connector may require a high layer count PCB, presenting the longest path up through the plated holes to get to the connector. This fairly basic system relies on the female side to have a socket and the male to have a spring pin that inserts into the socket. This mating category has two or more points-of-contact and can offer several advantages over the single point-of-contact offered in the edge mount mating system. The multiple contact points in Figure 1 below present a lower contact resistance and inductance to the signal. It is also a very reliable and rugged mate that is sure to maintain contact under extreme vibrations. AirBorn uses this pin and socket design in high-reliability, high-speed products for this exact reason.

A surface mount termination is more amenable to high speed design and allows for maximum flexibility when matching impedances at the connector launch point. This method of termination offers the most benefits toward high-frequency design but is not necessarily robust. Surface mount connectors normally require some additional reinforcement to ensure a strong connection to the PCB, such as mounting hardware.

The paste-in-hole (PIH) style of termination is somewhat of a hybrid between the previous two styles. Similar to press-fit, PIH termination has a shorter, non-press-fit pin that is inserted into a plated through-hole footprint and soldered in place. AirBorn offers these pins as short as 10mils which provide improved high-frequency response as well as a rugged connection to the PCB. Each termination style will have some discontinuity in impedance to the signal as it transitions from the PCB into the connector, all while allowing the designer varying degrees of freedom to deal with this discontinuity and minimize the impact to signal integrity.

Another criteria when selecting a connector for your

high-speed design is how it contacts to the mating connector. There are several methods of mating contact, all with their unique set of benefits and limitations to the designer. Each must be judged how they will affect the signal integrity of the overall design. One very popular mating contact is the edge connector. This method relies on the edge of the PCB, or a mechanical component attached to the PCB, to slide into the connector. The connector has spring loaded fingers that will slide along the PCB pad to make electrical contact at a single point. This allows for minimal discontinuity in the signal but it also provides only a single point of contact and may prove to be detrimental for designs exposed to high-vibration or shock (requiring additional retention methods).

This pin and socket contact can also be physically longer than the edge contact, presenting a larger discontinuity if not designed properly. Therefore it's crucial to study the s-parameters and impedance plots provided by the manufacturer.

At the end of the day, designers need to get a strong, undisturbed signal from point A to B and a proper connector is a critical element along that journey. After all, even if you design in the highest-speed connector, if you experience intermittent opens, what good is the speed? At AirBorn, we work closely with every customer to assess their needs and get them into the correct interconnect solution to ensure that their links work optimally with minimal signal degradation. As a designer, you have a number of connector options from which to choose, so pay close attention to the associative data and choose wisely as the uninterrupted flow of information is critical.



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Technologies Ltd

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wire detection
equipment

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

Key Counter IED and Search Products

Buried/Underground Cable Detectors - WD100

The WD100, buried/underground Cable Detector is the only commercially available detector specifically designed to detect surface laid and buried command wires used to initiate Command Wire Improvised Explosive Devices (CWIED).

Military Metal Detecting Probes - MD4

The military metal detecting probe MD4 is used by many NATO countries, it is rugged and simple to use. The detection capabilities allow the operator to locate small



targets and to gauge the depth and size of objects such as victim operated switches. MD4 is self calibrating with operator zeroing function.

Military Mine and Metal Detectors - MD8+

Ergonomic, simple to use high sensitivity military metal/mine detector, the MD8+ employs the latest digital technology and high speed pulse induction which allow the detection of the smallest metallic targets.

Rugged Hand Held Metal Detectors - HD7

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

New Products – MD3000 Multi Role Metal Detection Kit, designed for use by police search teams and other investigative agencies, the MD3000 is a state of the art easy to use detector. The MD3000 has two inter-changeable search heads, a halo for

general area search and a probe for use in undergrowth and narrow cavities.

Command Wire Detector - WD10

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

www.guartel.com



The UK's premier manufacturer of metal & cable detectors for military and law enforcement operations.

Guartel Technologies Ltd is a world leading company specialising in the design and manufacture of high quality, metal, mine, wire detectors and Counter IED products.

Our products are in-service with police forces, security services, NGOs, NATO and other military forces world-wide.

We supply a range of products for use in Counter IED, EOD, Search and Demining operations.

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Military Wheeled Vehicle Tyre Protection

Tyron has developed a range of solutions to keep wheeled vehicles moving safely in the event of a sudden tyre deflation.

Created following extensive consultation with both users and tyre fitters, Tyron's solutions have been extensively tested and proven in the harshest conditions.

The company's two product families are the Tyron All Terrain Rubber Runflat or ATR and the Tyron Multiband. In both cases these have been designed to allow for the changing of tyres without the need for specialist equipment.

Tyron has developed and patented a multipart rubber runflat, suitable for fitting to a wide range of military and security force off road vehicles.

Made out of rubber, the Tyron ATR absorbs the shocks from bumps more effectively than a hard composite solution and reduces the damage to the wheel and the tyre, so that both have the potential of being re-used when repairs have been carried out.

Using rubber also gives the passengers inside the vehicle a more comfortable ride in the case of a tyre burst, which enables them to be in better shape to carry out their task.

The patented multi part design allows the fitter to change a tyre at the side of the road without special tools.

Tyron's rubber runflats are designed with beadlock, which prevents the wheel slipping inside the tyre, this allows the vehicle to continue on its mission and get back to base. The use of rubber is far more effective than other materials.



Wheel & Protection

Stand No N9-300

Weight Reducing Runflat Introduced

Tyron has introduced a lightweight carbon fibre rubber runflat, the Tyron Carbon-ATR, which achieves up to 50% weight reduction.

Tyron runflats have a patented steel core to give it strength and a frame to maximise the performance of the rubber, the Carbon-ATR replaces this with a carbon fibre core, which reduces the weight while maintaining its strength.

"Reducing the weight on an armoured vehicle is the goal of all vehicle designer's as lower weight means increased mobility and better fuel economy" said Richard Glazebrook, Chief Executive of Tyron Runflat.

The new Carbon-ATR are available for both the 1400R20 and 1600R20 tyres where the greatest weight saving can be achieved.



TYRON

Flat Tyre Protection

DESIGNED TO DEFEND

Span sizes

Multiple hangar spans: 11.1m (36ft), 20.4m (67ft) and 25m (82ft)

Strong durable rapid construct aircraft hangars

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

Packing

Complete EFASS range of military buildings packs into 20ft ISO shipping containers.

Construction

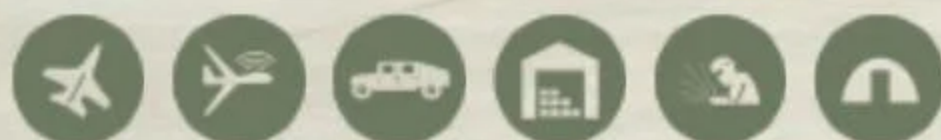
Structures can be quickly built without additional mechanical plant

Strength

Withstands wind and snow loads to UK Defence Standards

Usage

Fully demountable for future storage, relocation and construction cycles



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Fabric

Double skin insulated PVC fabric cladding is fire retardant and can be easily repaired.



Handling

Components can be unpacked, constructed, dismantled and repacked by military personnel



Access

State-of-the-art hangar doors available including Heli-Door, Trident and Roller Shutter options



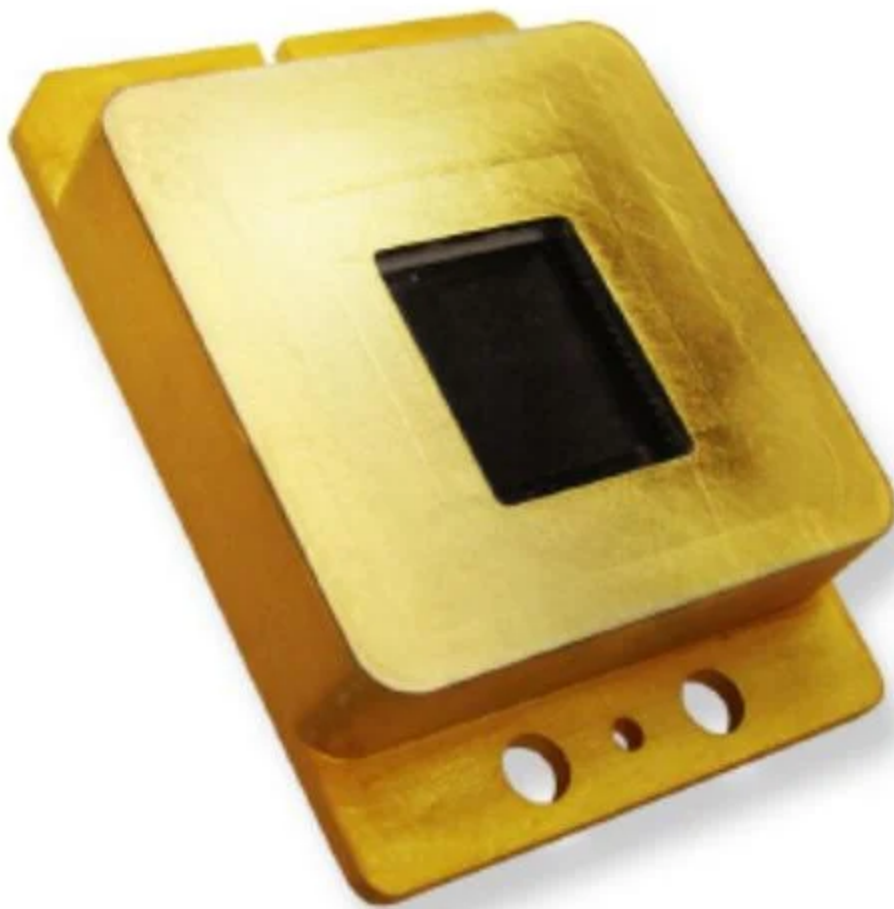
Framework

The EFASS hangar aluminium framework has been designed to maximise strength, minimise weight and still be robust enough to withstand multiple construction procedures in challenging environments.



Military Buildings

excellence in engineering



Sensing

Sofradir

is the leading developer and manufacturer of key classes of advanced infrared (IR) detectors for military, space and industrial applications. Its vast IR product portfolio covers the entire spectrum from the visible and near infrared to very far infrared. Sofradir pioneers developments in cooled IR detectors based on a sophisticated high performance technology: Mercury Cadmium Telluride (MCT) to which Sofradir has added Indium Antimonide (InSb), Indium Gallium Arsenide (InGaAs) and Quantum Well Infrared Photodetector (QWIP) technologies. Many of the world's missile seekers use Sofradir's military-grade, battlefield proven IR detectors; targeting pods, armored vehicle sights, Handheld Thermal Imagers and other airborne, naval and ground vehicle applications. Sofradir is the only European IR manufacturer to have its IR detectors deployed in space.

Founded in 1986, Sofradir is headquartered in Palaiseau, near Paris. It carries out high volume manufacturing at its facilities in Veurey-Voroize, near Grenoble. Sofradir owns two subsidiaries: ULIS,

a high volume manufacturer of microbolometers based in Veurey-Voroize and US-based Sofradir-EC, a provider of uncooled and cooled IR imaging cores and engines, located in Fairfield, New Jersey. Together Sofradir, ULIS and Sofradir-EC employ about 750 staff.

SWIR Detectors - Snake SW

The Snake SW is the new generation VGA InGaAs FPA sensor: a high-sensitivity and high-resolution FPA assembly designed for most demanding low flux imaging applications from 0.9 μm to 1.7 μm .

Sofradir InGaAs technology exhibits outstanding performances in terms of dark current, uniformity and operability. Snake SW is well adapted to a large range of applications such as night vision, surveillance, airborne gimbals and various industrial and scientific applications. This high-performance FPA assembly takes full advantage of Sofradir's state of the art technologies.

Other products include:

Neptune SW, Neptune VISIR, Saturn SW, Saturn VISIR, Snake SW, Snake SW OEM, Cactus 320, Cactus 640

MWIR Detectors SWAP-C Leo MW

The LEO MW is a compact detector specially designed for SWAP



g Your Future

(optimised size, weight and power) MWIR (3 – 5 μm) applications.

Thanks to its digital output, this product simplifies your interfaces and speeds up the development of your systems. This high-performance IDCA takes full advantage of Sofradir's state of the art technologies.

Other products include:

Galatea MW, Inspir MW, Daphnis HD, Daphnis XGA, Uranus MW, SWap-C Leo MW, Leo MW, Mars MW, Jupiter MW, Scorpio MW

LWIR Detectors - Scorpio LW

The Scorpio LW is a compact high-resolution LWIR IDCA with low power consumption.

This IDCA offers high speed operation for detecting fast moving targets or improving the sensitivity. Thus, it is well-suited to high-performance and long-range applications.

Sofradir's MCT technology allows operations in LWIR waveband, the preferred solution for ground-based applications.

This high-performance IDCA takes full advantage of Sofradir's state of the art technologies.

Other products include:

Venus LW, Vega LW, Pluton LW, Scorpio LW, Mars LW, Mars VLW, Mercury LW, Sirius LW



Command and Control Electronic (C&CE) Megalink Proximity Board

The Megalink is a Command and Control Electronic (C&CE) that drives Sofradir detectors and provides a digital video output.

This proximity board enables you to easily interface your camera electronics with the detector through Camlink interface.



Pelican Presents its New Certified Lighting Innovation

The Leading Manufacturer Showcases the New 9455Z0 RALS for Global Use with their newest ATEX certified flashlights

Pelican™ Products, the global leader in the design and manufacture of advanced portable lighting, offers advanced tools that are innovative, tough, and trusted since 1976 by professionals working in the oil and gas, fire and rescue, mining and other high-risk industries. The company offers over 60 lights with European ATEX Certification and USA Safety approvals. A selection of these solutions will be showcased at Intersec Show (Hall 3 • Stand 3-D30).

9455Z0 RALS, the First and Only RALS with Safety Certifications for Global Use

With the new 9455Z0 RALS the company provides the safest product in its category thanks to its three global safety certifications: The European ATEX Zone 0 (Cat. 1), IECEx ia and North American CI, D1. All of them make it the perfect choice for working in high-risk industries, regardless of the location in the World.

The 9455Z0 is a compact 7,3 kg portable area lighting system, easy to hand carry and to set up. Its powerful LEDs radiate up to 1.600 lumens in high with a run time up to 10 hours. Powered by a maintenance-free rechargeable battery, the system offers a wide beam spread of 125° of clean energy that illuminates the entire area preventing workplace injuries. It features a telescoping mast that extends to 80 cm, a 360° articulating light array and a wide handle for easy gloved grip and transport.

3315RZ0-RA ATEX Rechargeable Torch

The unique 3315RZ0-RA (Right Angle) LED torch is powered by a special designed lithium rechargeable battery that provides a life expectancy of over 2,000

New ATEX and US Safety Innovations at Intersec

cycles, 4 times more than the 500 cycles that batteries usually last. With three lighting modes (high/low/flashing), it shines up to 132 lumens of brilliant light and delivers a run time up to 34 hours in a small compact design. Equipped with a right angle adapter with clip that provides hands free lighting, it allows the torch head to articulate, directing the light exactly where you need it.

3715Z0 ATEX Right Angle Torch

Certified to ATEX Zone 0 (Category 1), this right angle torch features downcast LEDs for illuminating your path, with 189 lumens (high) and 90 lumens (low), and a flashing mode. Its built-in battery life indicator shows the lights battery level at every moment. Compact, rugged, and lightweight, the 3715Z0 LED light contains the latest technology available.

3415MZ0 Right Angle, The Intrinsically Safe Work Light Packed with Features and a Magnet

The 3415MZ0 is the ultimate ATEX safety-certified compact work light. The Zone 0 (Category 1) certification provides the security needed for almost all hazardous locations. Driven by only 3AA batteries, the 3415MZ0 is equipped with both a spot and flood LED. This allows for close up as well as distant lighting needs. It is engineered to run on either or both LEDs. The articulating head and built in clip provide hands free and handheld options so you can direct the light wherever it is

needed. The 3415MZ0 includes an integrated magnet expanding its hands-free applications, truly a multi-task torch designed to bring great value to your lighting needs.

2765Z0 ATEX Headlamp

This safety approved headlamp is designed for use in hazardous environments. Apart from being certified to highest ATEX Category, Zone 0 (Cat. 1) is ultra-compact and lightweight, weighting only 96 gr with batteries. Equipped with three uniquely positioned LEDs, it produces up to 105 lumens and provides up to 9 hours of run time. Moreover, it offers multiple modes: high, low, downcast and flashing. The downcast LEDs provides illumination for pathway for safe walking, reading space for added convenience, and most appreciated by your counterparts in face to face interaction because you will not blind them anymore. Additionally, the 2765Z0 offers a full time battery level indicator, which will help you monitor your battery time left.

It is available in two colours - yellow or black - and includes both a rubber strap for helmets and a cloth strap for bare heads. It's engineered with an extremely durable IPX4 water/weather resistant polymer construction, and pivots to a 45 degree angle to direct clean, brilliant light where it's needed.

All the torches models are backed by Pelican's Legendary Lifetime Guarantee. For more information on full Pelican and Peli ranges, you can visit: www.pelican.com and www.peli.com



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PHOBOS – Threat Warning System

Enhanced Situational Awareness for the Maritime Environment

The Phobos® Threat Warner/RESM is an extremely compact, affordable, end-to-end integrated EW sensor system. The design employs a high degree of RF & digital signal processing integration, (based on established Teledyne wideband receiver and signal processing products), enabling the full 2-18GHz frequency coverage and 360° azimuth coverage to be achieved in a very small and light-weight unit.

Key Features

- No external RF cables
- Simple to deploy & operate
- Built in auto-positioning (compass/GPS)
- Minimal Operator Workload
- Network enabled connectivity

Applications

- Fast Patrol Boats – Littoral / EEZ Operations
- Unmanned Surface Vessels

PHOBOS – 2-18GHz Threat Warner/RESM System – QR020-M1



CP Cases Airship™ receives certificate of grant for AirShip patent

CP Cases, the designer and manufacturer of high-performance protective cases and 19 inch racks, has announced the approval of its patent application for the Airship product range launched at the DSEI in September of this year.



Airship is 50% lighter than the current market leader offering significant cost benefits for the handling and secure transport of delicate and sensitive equipment

cpcases



The Airship product range was developed in response to the continued market need to come up with better protective solutions, whilst offering significant improvements in lightweight cases for the safe and secure transportation of delicate equipment. 50% lighter than the current market leader, Airship provides a more cost-effective solution for the transportation of military communications or other sensitive equipment.

Lightest weight, drop shock and vibration protective cases

Originally designed to meet the demands of the French Armed Forces – the combination of bonded layers of honeycomb polypropylene

and rigid closed cell foam provide a featherweight block which is machined to exactly match the equipment to be protected. Once the pockets and weatherproof seal have been precisely machined, the lightweight block is securely anchored in a military specified, abrasion resistant rugged textile waterproof outer – which incorporates handles, webbing strap pull downs and weatherproof industrial zips. Hard shell cases were the hitherto traditional method of protecting valuable /sensitive equipment – where a heavy, hard outer container (ie; injection moulded case or flight case) with the additional internal sculptured foam pack had been used. Airship has

turned conventional rugged case design thinking “inside out” – where the foam pack no longer requires a heavy, hard outer shell.

Fully accredited IP66 climatic protection

A unique feature of Airship is the weatherproof seal between base and lid, which is accomplished by routing the mating seal from the substrate closed cell foam. This novel engineered weatherproof seal provides Airship with a fully accredited climatic seal to IP66 – ensuring equipment is protected against gale force winds and extreme rain, as well as being totally sand and dust proof. Airship is also scheduled for MIL STD 810G testing.





ROG

SOLID OXYGEN

EMERGENCY MEDICAL OXYGEN

WHEN you need it... **WHERE** you need it

The ROG™ is manufactured by Molecular Products; a global leader in chemical based technologies for the purification of air to preserve life and protect the environment.

The ROG™ is an innovative medical oxygen generator designed for medevac via air, sea and ground-based medical support teams.



- **Delivers medical grade O2**
- **Unpressurised and non-explosive**
- **Portable and lightweight**
- **Resistant to extremes of temperature**
- **No maintenance, electricity, mixing or filling**
- **Live fire, shock and drop tested**
- **Rugged in design to withstand demanding operational rescue environments**
- **Cool Touch technology**



Rugged Oxygen Generator: Minutes To Save A Life

The ROG™ is a rugged oxygen generator that gives immediate access to a life saving oxygen supply. Designed for pre-hospital casualty care in demanding environments, the ROG™ is an innovative development in medical technology that will help increase survivability of defence and security forces.

ROG™ technology has succeeded the demands of extreme environment testing including live fire, drop, shock and vibration.

In austere environments, the ROG™ enables patients to be oxygenated at the point of injury via a safe, reliable and non-explosive source. Small and light enough to be carried in a medical bag, the ROG™ does not require any maintenance, electricity, mixing or filling. Rugged in design, the ROG™ is portable, strong, durable and able to withstand robust use in rough terrain or confined spaces.

Unlike compressed medical oxygen cylinders, the ROG™ can be exposed to extremes of temperatures, operated in any orientation and has an extensive shelf life.

Unique to the ROG™ is its Cool Touch thermal management system. Unlike any other product of its kind, the technology inside the ROG™ keeps the heat inside, ensuring that the unit stays at a safe temperature during use.

TECHNICAL SPECIFICATION

Duration	15 minutes
Flow rate	6 litres per min (average)
Weight	2.0kg (4.4lb)
Oxygen purity	99.9% (USP)
Dimensions	270mm (h) x 115mm (w)
Heat insulation	Cool Touch technology
Usage	Single use
Certification	FDA 510k cleared



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e: **sales@molprod.com**
w: **www.molecularproducts.com**

The Queen commissions HMS Queen Elizabeth, fitted with Oxley LED Navigation Lights



The Queen will be guest of honour at the commissioning of the UK's new aircraft carrier - HMS Queen Elizabeth today in Portsmouth.

The HMS Queen Elizabeth is the biggest engineering project ever undertaken by the UK military and Oxley is very proud to have supplied a full suite of LED navigation and signal lights for both this carrier and the second planned vessel for the Royal Navy.

The suite of lights was designed and manufactured at the Oxley facility in Ulverston Cumbria. The LED lights utilise the latest technology; they are rugged and sealed to IP67, they incorporate a built in health check system to enable the bridge team on the vessel to identify if a light is non-operational.

The suite is composed of a full set of wheel marked navigation lights, meeting COLREGs and suitable for any vessels over 50 metres in length. All variants are NVG friendly and therefore suitable for use with aircraft flying on night vision goggles.

Ten thousand workers at six different shipyards have been involved in the carrier's construction. The vessel boasts 33-ton propellers twice the size of a double decker bus and a four acre deck.



For CBRN protective textiles, trust the leaders in the field

Chemviron Carbon is the world's leading manufacturer of superior 100% activated carbon cloth (ACC) - the vital CBRN protective layer in clothing for defence and security personnel worldwide.

Key advantages and applications of Chemviron Carbon ACC include:

- Lightweight and breathable for very low physiological burden
- Very rapid adsorption of a wide range of CBRN molecules
- Suitable for protective clothing, first responder masks and escape masks
- Used in CBRN filtration and decontamination wipes



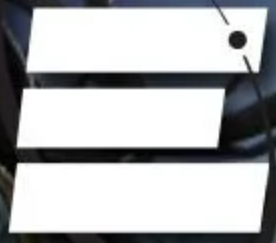
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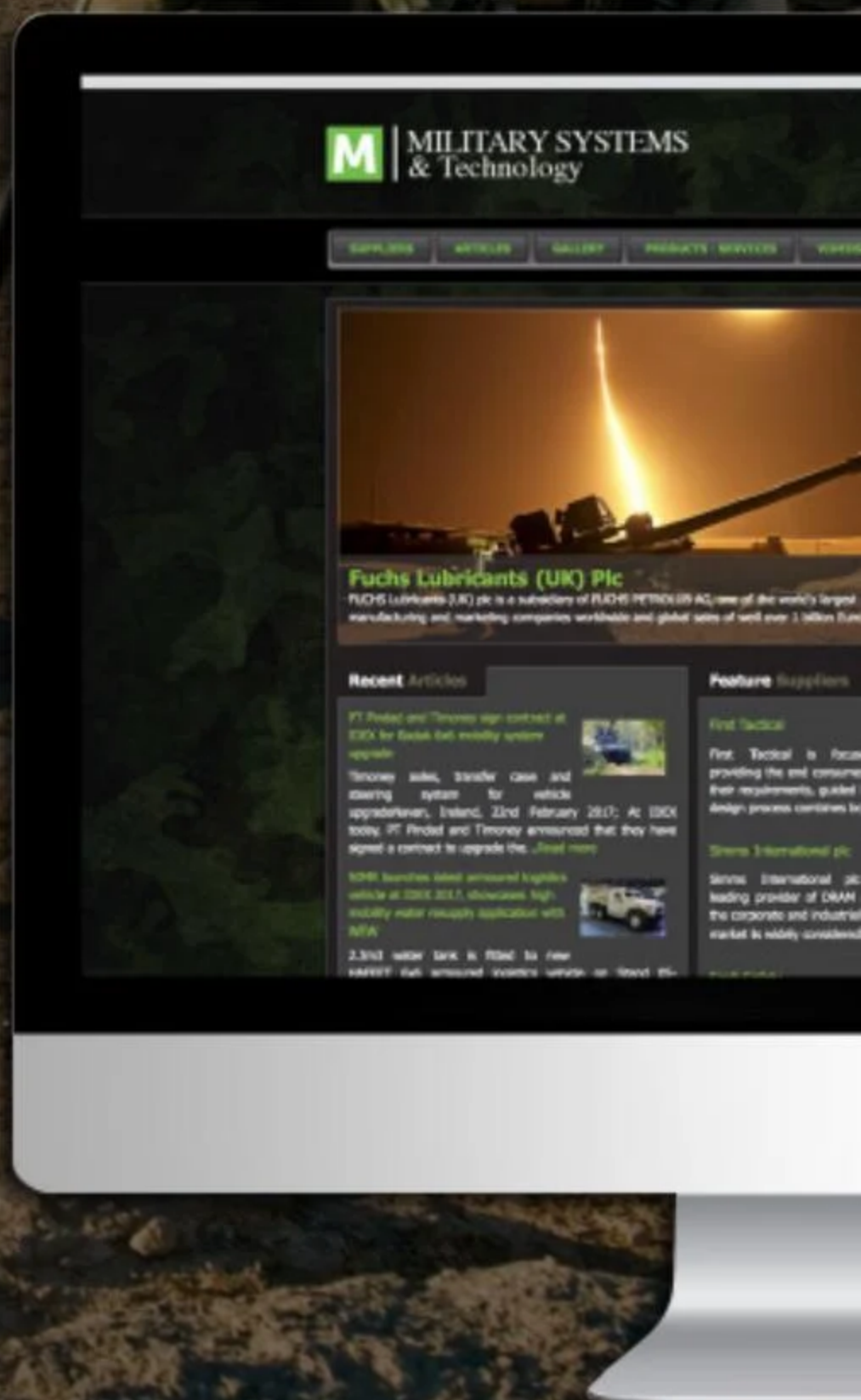
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Worth Cottage, Hele, Exeter, Devon,
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