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Photo courtesy PEO C3T

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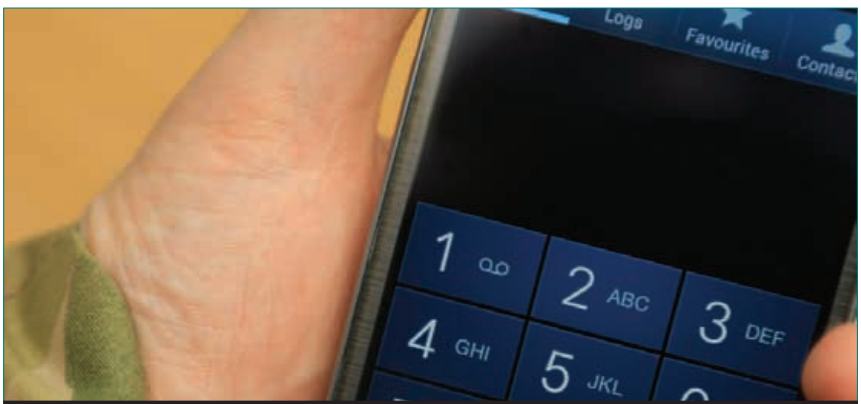

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Photo courtesy of MoD

Kratos receives US$49 million contract award to support US Government satellite communications

Kratos Defense & Security Solutions has announced that its RT Logic subsidiary has received a US$49 million firm fixed price, IDIQ, single contract award from a US Government Agency for satellite and communication system hardware, equipment and products. The period of performance on the contract is five years with funding to be determined with each respective hardware order under the contract vehicle. The first delivery orders under the contract, totalling more than $8 million, have been received by the company.

The dual-use technology being deployed in support of this contract has also been sold to major commercial Satellite Communications (SATCOM) operators to support their new multi-billion dollar investments in High Throughput Satellite (HTS) SATCOM fleets.

"This technology supports the new, next-generation wideband digital SATCOM payloads that are now coming on line and will dominate the growth of SATCOM for years to come. Kratos' overarching strategy and related R&D investments in next-generation SATCOM payload monitoring is already paying dividends," said John Monahan, President of RT Logic.

RT Logic is part of Kratos' Technology & Training Solutions Division (KTTS) which specializes in providing systems products, solutions, and services for satellite communications command and control, signal monitoring and communications network management, as well as intelligence, cyber security and training products, solutions and services.

Phil Carrai, President of KTTS Division, said: "KTTS's satellite and communications products and services have supported more than 85 percent of US government space missions and are used by more than 75 percent of commercial satellite operators around the globe, making Kratos a leading provider of end-to-end ground segment solutions including satellite systems command and control, monitoring, signal processing and intelligence products and technologies, We are proud to support this important national security customer in its mission."

Due to customer related and other considerations, no additional information will be provided related to this contract award. **GMC**

Second Australian company to provide parts for Triton UAS

Northrop Grumman Corporation has awarded a second Australian supplier contract to Mincham Aviation for the US Navy's MQ-4C Triton unmanned aircraft system (UAS) initial production lot.

South Australia-based Mincham Aviation will manufacture aircraft structure components for the first low-rate production lot of four Triton air vehicles. This second supplier contract follows one awarded in July to Ferra Engineering for mechanical sub-assemblies.

"We are pleased to be able to further demonstrate our ongoing commitment to developing and fostering capabilities in local supply chains," said Ian Irving, Chief Executive, Northrop Grumman Australia. "We will continue to look to offer opportunities to quality-focused Australian companies to be involved in the production and sustainment of Triton, which will be one of the US Navy's and Royal Australian Air Force's key capabilities for many years to come."

Northrop Grumman's engagement with Mincham Aviation and Ferra Engineering were facilitated through the Australian Department of Defence's Global Supply Chain program. Under the Global Supply Chain initiative, international companies such as Northrop Grumman can assess Australian industry and provide them with the opportunity to compete for business around the world on a value-for-money basis.

Australian companies have also received requests from Northrop Grumman for quotations to provide components for follow-on low rate production lots. These industry opportunities include cables, complex machined and composite assemblies, as well as special tooling and test equipment.

Australian Prime Minister Tony Abbott announced his government's intent to purchase the Triton UAS for high-altitude, long-endurance surveillance missions in March 2014. **GMC**

Photo courtesy Northrop Grumman

US Navy demonstrates endurance on the MQ-8C Fire Scout

Northrop Grumman Corporation and the US Navy successfully demonstrated endurance capabilities with the MQ-8C Fire Scout unmanned helicopter. On a planned 10+ hour flight and range out to 150 nautical miles flight from Naval Base Ventura County, Point Mugu; the MQ-8C Fire Scout achieved 11 hours with over an hour of fuel in reserve.

The long range, long endurance flight was part of a series of capability based tests used by the Navy to validate their concept of operations and previously tested performance parameters. The Navy conducted the demonstration with support of Northrop Grumman engineers.

"Endurance flights provide a full evaluation of the MQ-8C Fire Scout systems," said Capt. Jeff Dodge, Program Manager, Fire Scout, Naval Air Systems Command. "We can better understand the capability of the system and look at crew tasks and interactions in a controlled environment. This will allow us to adjust operational procedures to maximize the system's effectiveness."

The MQ-8C Fire Scout completed its developmental flight test program earlier this year and has operational assessment planned for later this year. The MQ-8C Fire Scout has accumulated over 513 flight hours and flown 353 sorties. **GMC**

Saab receives UK orders for Giraffe

Defence and security company Saab has received orders from the UK Ministry of Defence for additional Giraffe AMB radar systems plus upgrades of the existing systems and associated equipment. The order value is approximately US$70 million. Deliveries will start during the second half of 2015 and continue until 2018.

The Giraffe AMB radar provides a full 360° update of the air situation out to 120km every second. It can operate in challenging environments such as mountains, complex coastal regions and wind farm areas.

The upgrade will take the UK's existing systems to the same production-build standard as the new Giraffe AMB, enhancing the primary radar's performance and capacity.

It also keeps the UK's radars in line with the Giraffe product roadmap. This, in turn, will enable the addition of a unique capability to spot small UAS vehicles and the capacity to screen out difficult radar 'clutter', such as birds.

"We are delighted to have agreed this significant expansion and upgrade of the Giraffe AMB fleet with the UK MoD. We are looking forward to supporting both potential mission deployments and further system evolutions based on our spiral development plan for Giraffe," says Micael Johansson, Head of Saab Business Area Electronic Defence Systems.

Development and production will take place in Gothenburg, Sweden.

The multi-mission Giraffe AMB surveillance radar system was first acquired by the United Kingdom in 2008 as part of the Land Environment Air Picture Provision (LEAPP) programme. Since deliveries started in 2010 it has been used to provide the real-time air picture in support of airspace management on deployed operations and at major events in the UK. It has also made a vital contribution to force protection through the detection and prediction of impact of incoming rockets, artillery shells and mortars.

The Giraffe AMB is part of Saab's Giraffe product family that includes high-performance air and sea surveillance and target indication radars, covering very short to long ranges. The Giraffe also has essential command and control for ground based air defence and sense-and-warn applications. **GMC**

Photo courtesy Saab

Photo Scott Ferguson UK MoD

ASTi upgrades communications for GR4 simulators

Advanced Simulation Technology, inc. (ASTi) has announced the delivery of significant communications upgrades for Tornado GR4 simulators in Northern Italy. The Tornado GR4 is an all-weather, day or night attack and reconnaissance aircraft capable of supersonic flight that was developed in the 1960s, and is a popular aircraft to simulate for training purposes throughout Germany, Italy, and the UK. The latest ASTi upgrade was sought out as other, non-ASTi related, upgrades were being made; it encompasses both hardware and software components.

The software upgrade includes the replacement of a 1st generation Digital Audio Communications System (DACS) model, built and integrated in 2002, with the 4th generation ASTi-built Telestra 4 (T4) model. Although the DACS model was built 13 years ago, it was still in excellent working order, allowing for ASTi engineers to quickly convert it directly to the latest-generation ACE Studio software. Additionally, an updated communications package incorporated new SATCOM and high-frequency radios to an existing ASTi radio library.

The hardware update boasts the replacement of DACS hardware with the latest T4 servers. This update proved to be cost and energy efficient, as each simulator required two DACS servers, but only requires one T4 server for premium comms and aural cues capabilities.

This update is currently ongoing as ASTi provides online support throughout the integration process. The Tornado GR4 simulator is just one of 11 installations that ASTi has fielded in Italy. ASTi also supports GR4 simulators in the UK that are still running 1st generation DACS systems. **GMC**

SDR and Cognitive Radios

The armed forces are constantly looking for ways in which they can communicate in a smarter way. The lack of available spectrum has been a constant headache for the military but the development of intelligent radios that can actually seek out empty spectrum to exploit is pushing the envelope further. GMC discovers the benefits of Software Defined Radio and Cognitive Radio.

Software Defined Radio (SDR) and its successor, Cognitive Radio, are taking radio to places that we would never have expected. Radio, for many decades, has played a crucial role in the communications capabilities of militaries the world over, but the future of radio holds some truly incredible capabilities. SDR and Cognitive Radio offer an impressive level of flexibility which is so vital on the battlefields of today, allowing troops to communicate at a high level.

SDR is a radio communications system where the components have been actually been implemented into the radio by means of software in an embedded system meaning that they are very easy to upgrade and allow the radio to use a variety of different waveforms offering true flexibility in the field. The concept of SDR was that a common platform could be used across a number of different areas and the software within the radio could be used to change the configuration to different functions at any given time. SDR also may be re-configured to allow upgrades and to meet another role if necessary.

Cognitive Radio takes this concept even further. These radios can autonomously detect and exploit empty spectrum. It is an intelligent radio that can be programmed and configured dynamically. Once the radio has detected an available channel, it can then change its transmission or reception parameters to its spectrum band, thus allowing a form of dynamic spectrum management. Cognitive Radios are able to monitor their own performance on a constant basis so that they are able to deliver a high quality of service. It recognises its operational environment and adjusts itself accordingly so that it delivers a consistent high quality of transmission, essential to military radio communications. So really, what you have is a radio that is situationally aware and that can use its intelligent processing to deliver the best standard of service available to it. Cognitive Radios can acquire, classify and organise information, can retain information, can apply logic and analysis to information and can make and implement choices. They can also hide and avoid interference.

The development and use of Cognitive Radios will help to address the challenge of lack of spectrum available to the military as they are able to seek out and use available spectrum that would otherwise be going unused. It is now the task of the military to better understand the cognitive radio and to make clear to manufacturers their needs and requirements so that the equipment that is developed is tailored to their specific needs.

The development and eventual fielding of Cognitive Radios has the potential to transform military radio communications. It has the potential to access new frequency bands, to protect high priority users from harmful interference and can enable mobile troops to communicate and share critical information more effectively. By enabling cost-effective use of bandwidth and being very easy to upgrade through its software, the cognitive radio is also much more cost effective and flexible. There are huge possibilities for Cognitive Radio, some of which we have not yet even come to realise. Communications technology enables the military to be more situationally aware, but imagine how much this can be improved if the technology itself becomes situationally aware.

The military has very exact requirements when it comes to radio, especially in terms of hardware being able to withstand harsh conditions and also to cope with the mission critical needs of the military. Radios also have to be highly resistant to jamming and interference and the whole radio network must be resilient and robust. It is for these reasons that Cognitive Radio is being tested and explored by militaries across the world. They meet the stringent requirements of the military and the technology is available today.

Per Vices' Crimson SDR

In 2014, Per Vices launched its robust wideband RF front end and powerful digital back end of Crimson, the company's latest Software Defined Radio.

Crimson features a high stability internal reference clock with stability of ± 5ppb. "The successful incorporation of our ultra-low phase noise and low-jitter performance oscillators in the Per Vices Crimson software defined radio means that the Crimson software defined radio is capable of supporting the most demanding radio applications," said Anthony Mastropole, President of Crystek Corporation.

Crimson's accuracy and stability rival specifications found in other test equipment in a single device featuring lower cost and greater flexibility. Crimson can perform the duties of a 100KHz to 6GHz radio receiver/transmitter, spectrum analyser, data recorder, and internet communications hub. Crimson is equipped with four independent receivers and transmitters, allowing it to perform multiple duties simultaneously. Its functions are software defined and can be controlled and reconfigured in real time from anywhere in the world.

xG demonstrates cognitive SDR jamming resistance capabilities

xG Technology successfully demonstrated its interference mitigation capabilities against sustained jamming at the US Special Operations Command's (USSOCOM) Technical Experimentation Event, conducted June 14-18 at the Muscatatuck Urban Training Centre in Indiana.

"In 2014, Per Vices launched its robust wideband RF front end and powerful digital back end of Crimson, the company's latest Software Defined Radio."

Photo courtesy of Per Vices

During a three day exercise, a tactical xMax network was deployed to provide real-time video, position location and integrated tactical radio communications from vehicles operating in diverse terrain throughout the MUTC. Sustained electronic attacks from military-grade jammers were introduced but were unable to disrupt the performance of the xMax network.

xG was selected to participate as a technology developer at the event because of the unique capabilities that the xMax cognitive software-defined radio platform brings to tactical and expeditionary operations. xMax was the only communication system on display at the event that met the USSOCOM requirement for innovative and advanced software-defined radio technologies that will enable secure and interference-resistant communications for Special Operations Forces.

USSOCOM provides command, control and training for all Special Operations Forces in the US. It conducts Technical

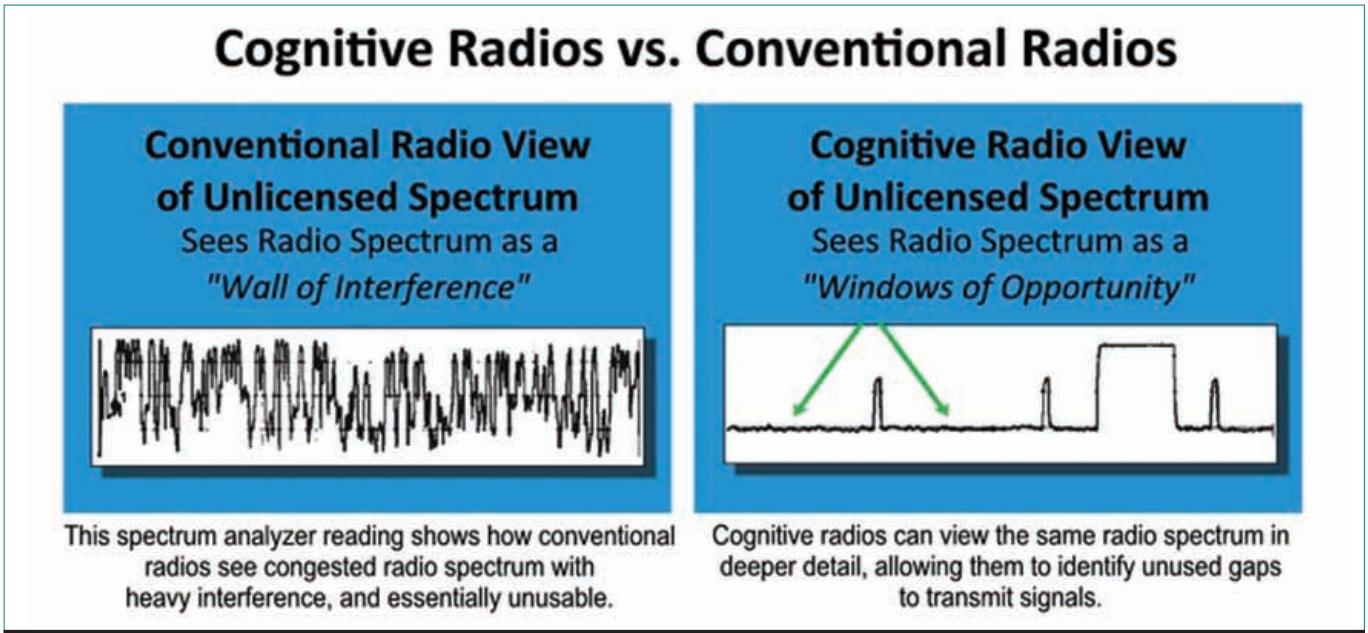

Image courtesy of Xg

Experimentation events throughout the US with participation from government, academia, and private industry. The events provide a unique opportunity for technology developers to interact with the Special Operations Forces community in a collaborative environment.

Brian Lasagna, Vice President of Business Development at xG Technology, said, "This represented an excellent opportunity to display how the advanced interference mitigation capabilities of the xMax system meet current USSOCOM requirements. We had significant engagement at the event with USSOCOM program planners and officials, and we look forward to working closely with them to tailor xMax form factor, frequency support and other features to suit specific SOF missions. Our success at this event reflects the increasing interest in the ability of our technology to assure high-capacity, high-availability wireless services, regardless of external conditions."

ASELSAN SDR for land, sea and naval platforms

Turkish company, ASELSAN, provides a family of multi-service HF SDRs that offer secure and reliable radio communication solutions for land, air and naval platforms. These radios enable beyond line of sight communications by employing the latest HF technology and conform to various NATO STANAG's and military standards. Software configurable architecture provides reliable secure voice and data communications by supporting various HF radio waveforms and EPM techniques. The versatility of waveforms and modes enable communication even in the most challenging HF channel conditions. With the use of modern technologies such as 3rd Generation Automatic Link Establishment (ALE) and Automatic Channel Selection (ACS), these radios provide ease of use, reducing the need for well-trained and experienced HF radio operators.

The family operates within ground, naval and airborne configurations and operates in within the 1.6-29.999MHz band and to STANAG 4203.

The family features:

- CW ,USB, LSB, ISB, AM and AME Modulations;
- Supports 10 Hz Channel Spacing;
- Digital voice (S4591 MELPe) and Data (Synch/Asynch/IP);
- Built-In Digital Modem - STANAG 4539;
- Automatic Channel Selection (ACS);
- Automatic Link Establishment (ALE) - STANAG 4538;
- Built in Encryption for both Voice and Data Services;
- Frequency Hopping Capability;
- Easy to Use Man Machine Interface;
- Built-in-Test (BITE);
- Built-in GPS;
- Remote Control Capability; and
- Complete Line of System Accessories.

Rockwell Collins' FlexNet-Four

The FlexNet™- Four H/V/UHF vehicular multichannel Software Defined Radio (SDR) offers enhanced capacities to significantly improve the connectivity, mobility, versatility, interoperability and exchange of information on the battlefield. The FlexNet products are joint developments of Rockwell Collins and Thales.

With connectivity and mobility at the top of the list of military customers, integrating FlexNet-Waveform, FlexNet-Four V/UHF SDR equipment offers transverse communications, high data rate transmission on the move, and mobility management that greatly improve the connection between the users from HQ to small action units. FlexNet-Four brings to the users an increased level of service such as voice (digital or VoIP), data (short messages, formatted messages, file transfer), image and video transmission.

With a scalable capacity of four simultaneous channels and embedded routing capability, FlexNet-Four acts as a communication node making it highly versatile. Each channel can be configured and programmed independently according to a majority of missions dedicated to mobile battlefield platforms. In addition to the services provided by each channel, FlexNet-Four provides networking and cross-banding functions that enable connecting users on the field even if they are not on the same frequency range radio networks.

Based on an open architecture, compliant with Software Communications Architecture (SCA 2.2) international standard, and a powerful programmable hardware platform, FlexNet-Four ensures enhanced functionality, expandability and waveform portability accommodating future technology or requirement upgrades with ease. This flexibility is improved due to the modular hardware architecture of FlexNet-Four.

In terms of interoperability, the radio can be immediately reconfigured to provide interoperability with the PR4G standard and is open to host other standard waveforms (MIL-STD, STANAG) and national waveforms with their national specific requirements.

SDR and Cognitive Radios are the future

Building on the solid foundation laid down by developments in Software Defined Radio, Cognitive Radio is where the future lies in terms of military radio communications. SDR is fielded and proven and has already proved its worth in theatre. Though still in the demonstration phase, Cognitive Radio is set to change the game in terms of radio capability. We have seen here how forces such as USSOCOM, have been won over by its capabilities.

For the military, especially, Cognitive Radio and its resistance to jamming and ability to solve bandwidth challenges, provides an excellent fit for battlefield communications. Both SDR and Cognitive Radio enable the military to overcome communications on the battlefield.

The communications are only going to be as effective as the equipment used, and SDR and later, Cognitive Radio can provide flexibility, interoperability, versatility and anti-jamming capability that will offer tactical and strategic advantage over adversaries and enable the fighting forces to carry on communicating regardless of the situation they are in. **GMC**

Image courtesy of Rockwell Collins

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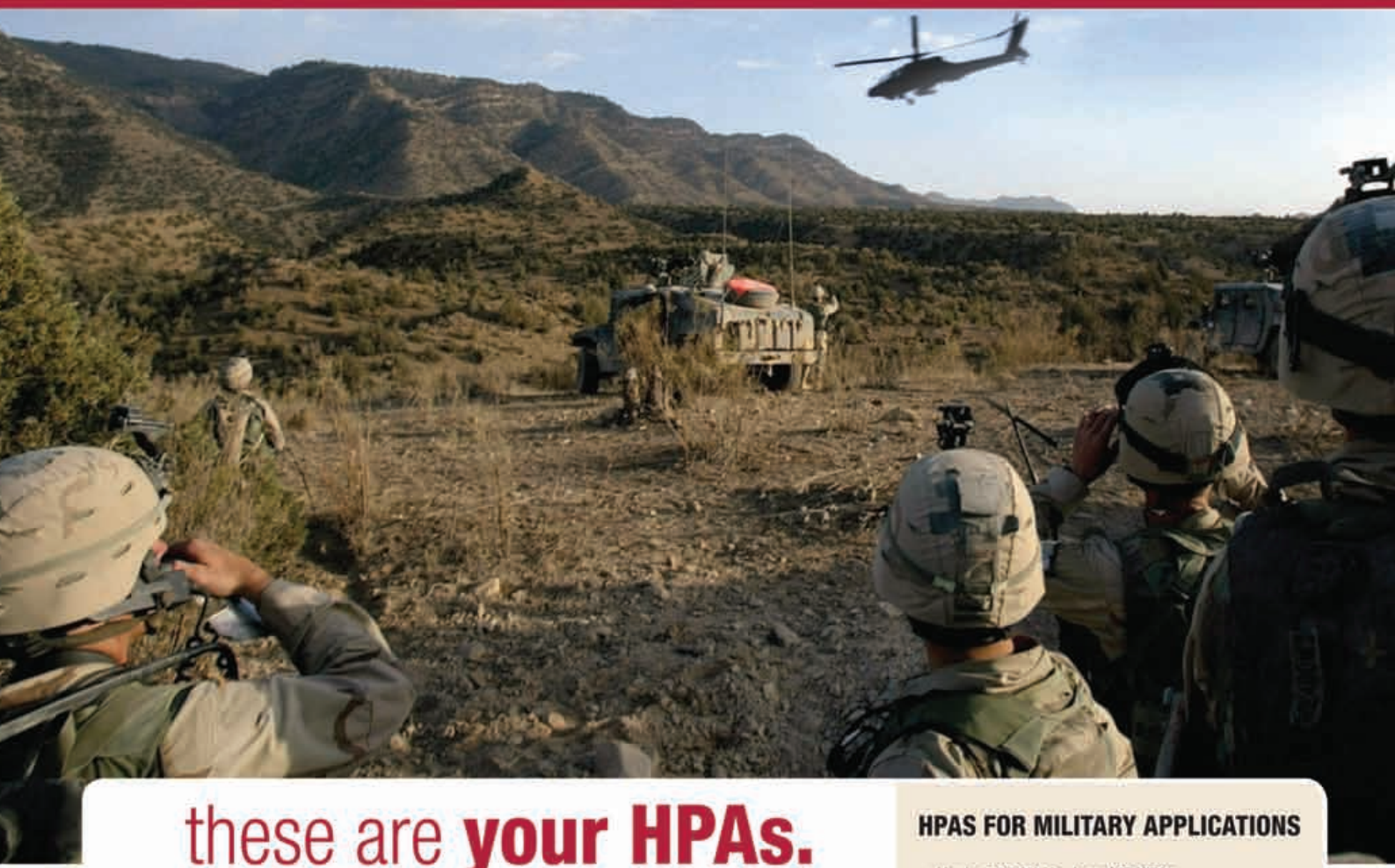

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Innovation in the DNA

EM Solutions' CEO, Rowan Gilmore proudly states: "Constant innovation through better design is in our DNA". With their highly experienced workforce and 'can do' attitude, it becomes obvious that EM Solutions is a leading communications technology manufacturer for good reason. GMC poses the questions to Gilmore to dig deeper into the Australian company's background and current work.

EM Solutions' CEO, Rowan Gilmore

GMC: Can you give us some background on EM Solutions as a company and how it came to be established?
Rowan Gilmore: The founders of EM Solutions first spun out a company called MITEC from a microwave technology development centre at the University of Queensland in Brisbane, Australia in 1984. When that was sold in 1998, they went on to create EM Solutions as a specialist RF and microwave products company, and subsequently to grow the company into the systems company serving satellite markets that it is today. Even today, EM Solutions provides services to products developed by MITEC over thirty years ago!

GMC: The defence communications sector has evolved greatly over the last 30 years, and you have witnessed these changes. From your perspective, what are the most important and notable changes that have happened during your career so far?
Rowan Gilmore: The first was the switch from analogue to digital coding and modulation in the late 1980s, and then the emergence of the Internet in the late 1990s. The expectation that high speed multimedia should be available on demand anywhere in the world has subsequently forced satellite providers to respond with higher bandwidth and spot beam solutions. That's why our solutions are focused on enabling high data throughputs across multiple satellite bands, especially at Ka-band.

GMC: Can we talk about your heritage and capabilities in the amplifier field and the developments that you are currently evolving?
Rowan Gilmore: EM Solutions has always developed bespoke and customized solutions for its customers, which initially were the Australian Defence Force (ADF) and local telcos.

From our roots as a developer of solid-state power amplifiers, filters, and oscillators we have progressed up the value chain to develop high speed receivers and transmitters for radios, and now on-the-move terminals, to become the partner of choice for several European systems integrators. For example, our 50W Ka-band linearized BUC is the only airborne qualified BUC on the market, and was first developed specifically for a customer in Europe.

Photo courtesy EM Solutions

EM Solutions is recognised by customers globally for designing and manufacturing differentiated microwave and RF products and systems for satellite and broadband communications. Renowned for technologically superior design, manufacture, and support of microwave technology, EM Solutions are leaders in supplying next generation high speed communications products that assist in the delivery of real-time voice, data and multimedia anywhere in the world.

Committed to innovation and delivering quality solutions, EM Solutions consists of an agile team of people able to provide superior communication technology quickly and accurately with full design, manufacture, testing and support services available in-house and governed by strict IS9001 quality practices.

Emerging from its predecessor company MITEC in 1998, EM Solutions produces integrated RF modules such as low noise receivers and solid state high power transmitters for defence and commercial customers, as well as the complex systems in which they are used. These sophisticated systems are used primarily in microwave terrestrial and satellite links, or in other applications such as radar, radio-astronomy, and remote sensing.

With a customer base of more than 200 of the world's largest systems integrators and telecommunications companies, the company delivers nothing but high-quality products and services.

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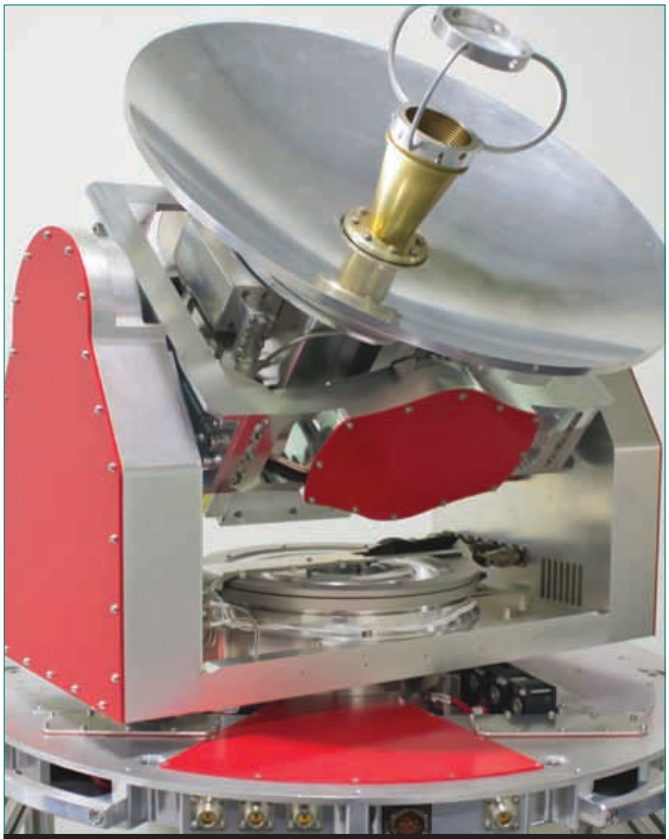

Photo courtesy EM Solutions

GMC: At what point did the EM Solutions team move into satcom on-the-move terminals and where has this journey taken you?

Rowan Gilmore: It was in 2008 that EM Solutions won its initial sponsorship from the ADF to develop a land-mobile Ka-band terminal. We were fortunate that we were able to test multiple prototypes over the Optus C1 satellite and to perfect our "monopulse" pointing technology before progressing to WGS testing. The development of this unique pointing technology has taken us on other fruitful journeys; for instance, we have production E-band radios that now link the New York financial markets, offering double the speed, double the range, and an order of magnitude faster latency than our closest competitor.

GMC: Can you tell us more about the contract that you are currently involved with for the ADF for wideband COTM terminals?

Rowan Gilmore: Terminals should be able to roam between satellites in the same way as a mobile phone. For the Royal Australian Navy we will be in ship trials early next year, with a one metre maritime terminal that operates simultaneously at X and Ka-bands with the WGS satellite and can fall back to commercial Ka-band when needed. Our goal is to offer more robust and assured communications than can be achieved with just one satellite, by switching between bands and satellites all on the one platform automatically.

GMC: Which products will you be showcasing at the DSEI event?

Rowan Gilmore: We will be showcasing our land-mobile 48cm Ka-band on-the-move terminal that is WGS capable. In addition, we will have our Ka multiband Diamond series BUCs on exhibit. These use GaN devices, cover an entire 3GHz of RF bandwidth, and are fully linearized, still providing the smallest form factor on the market. Our new nano BUC HUB is also now shipping, it provides the 3GHz linearized upconversion functionality on its own and can be used as a split system with a separate power amplifier.

GMC: EMS does a lot of work with the ADF, but are you working with other defence forces - are you looking to expand your operations in the future?

Rowan Gilmore: Absolutely! We are a highly collaborative company, and through partners in Italy and Spain for example we are developing products to meet the emerging needs of defence forces in those and other countries around the world. Our new 1m X/Ka- maritime terminal is of interest to several WGS signatories who want to reduce their reliance on a single band and increase their on-air availability. Of course, we are also serving civil defence forces as well, for instance in Japan where the Fukushima disaster caused a re-evaluation of the country's communications infrastructure.

GMC: What kind of support do you offer your customers, and what would you say are your unique attributes as a company?

Rowan Gilmore: EM Solutions best supports its customers by rapidly responding to their needs, for instance by customizing products to their specific requirements. For example, we have been asked to add Ku-band capability to our X/Ka- maritime terminal, and we are looking at the quickest way to bring this to market. We also work with partners in Australia to help design and build other RF and microwave products for their defence customers, such as for radar and EW.

GMC: What are your ambitions for EM Solutions five years down the line?

Rowan Gilmore: We want to remain globally recognized for the level of our innovation, and we want to be the partner of choice for more multinational defence system integrators. With so many customized products, we hope that we can scale many of those into much larger production volumes. And finally, we intend to carve an even deeper niche for ourselves in high end satcom on-the-move terminals and high speed telecommunications products.

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Photo courtesy EM Solutions

• GVF serves as the unified voice of the international satellite industry •

www.gvf.org

Photo courtesy PEO C3T

Focus on PEO C3T

The United States Army's Program Executive Office Command, Control, Communications Tactical (C3T) performs a critical role in the modernization of the US Army's communications infrastructure and is also a critical enabler for an agile, expeditionary Force 2025 where innovation will pave the way for a fighting force that will have information superiority no matter where in the world they are deployed. The US Army is taking its information network to the next level.

The US Army's Program Executive Office manages more than 40 key acquisition efforts and develops, acquires, fields and supports the Army's tactical network - a top modernization priority and critical enabler for an agile, expeditionary Force 2025. The mobile tactical network delivered by PEO C3T provides secure and reliable communications that allow commanders and soldiers to stay connected and informed at all times, even in the most austere and hostile environments.

As Paul D. Mehney, Director of Public Communications at PEO-C3T explains: "The organization's goal is to deliver a pervasive, integrated network that provides soldiers with the information they need from garrison to the foxhole, while simplifying the network so it is easier to use, train, maintain and sustain."

When it comes to priorities, PEO C3T is first and foremost dedicated to supporting deployed forces. In fiscal year 2015 alone the organization has and continues to plan network capability fieldings to more than 73 Army, Army Reserve and National Guard units. "We have seen the power of the network in all theatres of operation where soldiers have relied on advanced satellite communications and tactical data radios to stay connected while exchanging voice, data and video through their mission command applications," continues Mehney, "but we still have work to do."

Despite resourcing challenges, network enhancements will not end. PEO C3T has listened carefully to soldier feedback, which has stated overwhelmingly that they must strive toward an integrated, scalable network to provide commanders a 'tool box' of connectivity with applications for all missions. More importantly, PEO C3T recognizes that it must make the network less complex to use, maintain and sustain.

"Now, we are preparing for the future by executing mission command modernization to help build a secure seamless information sharing environment across the tactical battlefield, supporting Force 2025 and beyond with operational priorities for versatility, mobility and interoperability with joint and coalition partners," Mehney said.

Modernization and Force 2025

To achieve a more expeditionary network, PEO C3T is in the process of enhancing current program efforts to:

- Enable expeditionary mission command with agile command posts that readily scale, adapt and move with changing conditions;
- Achieve uninterrupted mission command from home station to deployment with scalable connectivity that is available upon immediate entry and then matures within a theatre;
- Provide users with a common, intuitive experience across locations, formations and operational phases; and
- Protect the network against cyber threats.

Main challenges to delivering capabilities

As always there are challenges involved in delivering these capabilities to the Army and a main area of focus lies in the simplification of operation of the network and improvement in the integration of the various network components.

Mehney stresses: "To start with, we are simplifying the tasks that soldiers must undertake in order to operate and maintain the tactical network, which consists of mission command systems, mobile computing platforms, mobile and fixed satellite communications and line-of sight radio communications systems. We will continue to seek user and soldier feedback as they exercise the mission command and network systems at

Photo courtesy PEO C3T

combined training centres, during home station training and while deployed in support of operations around the world."

Near term efforts are focused on automating the process of initializing the various network components, with specific emphasis on the many networking radios that are currently being produced and fielded to support digital communications from mobile command platforms to dismounted soldiers. Solutions for over the air reprogramming and rekeying are top efforts that will mitigate the most complex efforts associated with deployment of tactical radio networks.

Enhancing protection against cyber vulnerability and being able to proactively detect cyber threats is also a key effort. PEO C3T is working with key stakeholders in the requirements, research and development, and sustainment communities, as well as industry, to ensure that cyber protection and detection is addressed in current and future systems. Although the cyber challenge is constantly evolving, getting processes in place early in programme management and sustainment will enable cost efficiencies, integration and cyber resilient system architecture. Finally, across the PEO C3T portfolio, project managers are working to improve efforts to converge the data, transport and operations of the tactical network.

Range of technology

PEO C3T's portfolio can be broken down into several major categories, all which must be integrated to form the army's network. These broad categories include: Transport capability (SATCOM and radios), Mission Command (applications and hardware), Waveforms (to exchange voice and data), and Communications Security (COMSEC)/Cyber (COMSEC, key management and cyber detection/defense).

Commercial technologies

A key challenge will be to create an environment where the program office can more quickly adapt commercial hardware and software technologies into its warfighting systems. Establishing a set of open standards, as the army is doing through the Corps of Engineers, will reduce the complexity that is currently faced in the modernization of the family of systems. Platform integration has also been a constraint in the ability to rapidly adapt new technologies, especially in combat platforms. PEO C3T is working closely with the broader community on a Modular Open System Architecture (MOSA) and open standards for the Vehicular Integration of C4ISR/EW Interoperability (commonly referred to as VICTORY). VICTORY will reduce the unique interfaces that are commonly associated with individual combat platforms and standardize the interfaces required for our industry partners as they build future C4ISR solutions.

Industry also plays a major role in the development of solutions to reduce network complexity, achieve common

computing standards, reduce the size of network systems and help solve existing and future cyber issues. Technology evolution continues to advance at a significant pace. The program office's fundamental challenge is the system of systems integration of these technologies into complex network architectures.

Creating an environment where PEO C3T can more quickly adapt commercial hardware and software technologies into its warfighting systems will be key.

Network interoperability

The growing expectation for coalition operations is to ensure the tactical network has the ability to support coalition information sharing at multiple echelons, not just at joint headquarters. Establishing each coalition network has a unique set of challenges, both technical and doctrinally, and there is no single answer to this challenge.

"The Army has established the Army Warfighting Assessments (AWA) to help inform requirements and allow our program managers and industry partners to insert technical capability to help make establishment of coalition networks less complex" states Paul. D. Mehney. "PEO C3T is a part of that construct, actively working with coalition partners to provide technical solutions to allow for network bridging and to seek integration operational lessons learned. To put it simply, we must first reduce the complexity of our own network and right size our Signal force, while also working to achieve the Joint Information Environment and support unique requirements associated with individual Combatant Commands. Achieving network interoperability is more than just material solution it is working the integration of policy and technology."

Objectives for the coming year

A fundamental challenge is the system of systems integration of these technologies into complex network architectures providing ruggedized military utility and often requiring integration into complex warfighting platforms. PEO C3T has a number of ongoing efforts to leverage computing capability and advanced software solutions to simplify the initialization, integration, programmability, and usability of the systems with a focus on reducing the training required by soldiers.

PEO C3T is leveraging secure Wi-Fi and 4G LTE technologies to significantly reduce the time required to deploy and set up tactical operations centres. Efforts to develop and deploy the common operating environment based mounted and command post computing environment will greatly simplify command post operations, converge hardware and software solutions, and enable an environment more suitable for the incorporation of new applications and capabilities.

"The program office is also driving the Command Post Computing Environment, to bring a common user experience across hardware, very similar to what soldiers have on their home devices whether they're using a computer, tablet or smartphone. This will begin to eliminate separate, stove piped systems and transition to mobile and readily available, user-friendly web apps mitigating the commander's requirement to mentally fuse digital information displayed," concludes Mehney. **GMC**

Photo courtesy PEO C3T

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What is the Sisfron program?

Brazil's Integrated Border Monitoring System or Sisfron aims to help the government strengthen its presence along the country's borders. Through its network of sensors and presence on land, in the air and on water, Sisfron will enable security and defence forces to pinpoint illegal activity that occurs on Brazil's borders. Helen Jameson finds out more.

Sisfron has been launched. The first pilot of the system got underway with the 4th Mechanized Cavalry Brigade, Dourados last year. The pilot was initiated to test and verify the system and to allow any tweaks and changes to be made before implementation across the Brazilian border, which is expected by 2022. The pilot covers 600km in Mato Grosso do Sul, one of Brazil's Central-Western states. The pilot phase is expected to come to an end in 2016.

Sisfron is an integrated border monitoring system. The sensor equipment, that will eventually line 17,000km of Brazil's borders, will enable fast decision making by those in command in order to react quickly to threats and illegal activities that take place on Brazil's borders such as drug trafficking, smuggling of weapons and illegal immigration.

To understand why the Sisfron programme is so important to the Brazilian government it would help to use some context and look at the situation along the Brazilian border. To put things into perspective, the Brazilian border is vast. It covers around 10,000 miles and is five times larger than the US-Mexico border. This border is notoriously difficult to patrol. A large part of the border stretches through dense Amazon jungle and across ten different countries. There is a huge problem with narcotics. Brazil borders the world's three primary producers of cocaine – Colombia, Bolivia and Peru. There has been a surge in the use of cocaine in Brazil and traffickers are constantly attempting to smuggle cocaine and other drugs such as marijuana, across the border into the country. Illegal immigration is also a problem for the Brazilian authorities. So how does the government start to solve these ingrained issues? Building a wall would not be an option as the border is so vast. There is not enough manpower available to constantly patrol such a huge area.

It has been acknowledged that Brazil needs to adopt a combination of technology and intelligence and surveillance techniques to overcome the problems that are facing its borders. This is where Sisfron makes its entrance.

The total cost of Sisfron is estimated at US$4.6 billion but the system will transform border security for Brazil and will considerably improve public safety in general within the country. Sisfron will enable forces to detect illegal activity up to 20km away. The system will enable them to gather intelligence and conduct surveillance. The system will also feature an electronic

Photo courtesy of Savis

Helen Jameson - Editor, Global Military Communications - email: helen@dsairpublications.com

warfare element that will observe background electromagnetic radiation in certain areas and will be able to identify any changes in said areas that could indicate suspicious activity.

The Mato Grosso do Sul pilot comprises 68 antennas, radar, IT, electromagnetic sensors, tactical and satellite communication components and command and control centres. All installation has been carried out by Savis. Savis (controlled by Embraer Defense and Security) and OrbiSat were selected by the Brazilian Army to deliver Sisfron.

Savis selected Harris to supply an end-to-end tactical communications system for Sisfron. The solution is based on Harris' wideband radios with tactical voice, situational awareness and surveillance capabilities.

Savis is part of the Tepro consortium which is carrying out Phase 1 (pilot phase) of the Sisfron programme on behalf of the Brazilian Army under a $404 million contract awarded in November 2012. Harris is supplying tactical communications subsystems, accessories, software, services and support for this phase. These radios deliver live video, tactical chat and situational awareness across all echelons and provide border security forces with unprecedented command and control capability. This important programme significantly expands the company's presence with the Brazilian Army in support of their communications modernization requirements.

In April, Elbit Systems' Brazilian subsidiary, AEL International, was selected to supply electro-optic (EO) observation systems to Savis as part of the first phase of the programme. Awarded in 2013, the electro-optic systems were supplied in 2014 as part of the initial pilot phase taking place in Mato Grosso do Sul. Elbit Systems has made investments in Brazil in terms of assets, infrastructure and know-how in optronics.

Also selected for the pilot phase was Saab subsidiary MEDAV GmbH. The company received the order for the electromagnetic signal-sensor part of Sisfron and deliveries have been taking place since 2013 and are expected to continue until 2016.

Stationary as well as mobile remote controlled sensor-stations with monitoring and direction-finding capabilities in the frequency ranges HF, VHF and UHF will be delivered and a regional centre for monitoring (ISTAR) and a training centre are included in the contract. Together with this project, technology transfer is provided, increasing the autonomy in the supply chain and creating jobs in high technology sectors in Brazil.

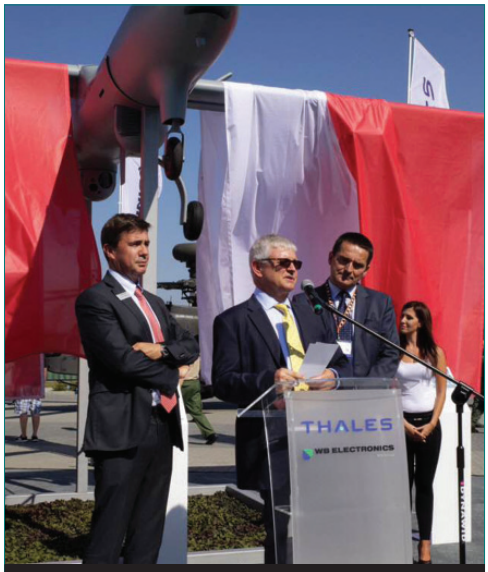
"Brazil is one of Saab's most important markets and this order reinforces our presence and relationship with the country", says Micael Johansson, Head of Saab's business area Electronic Defence Systems.

"This order is further testimony to MEDAV's proven capability to provide leading solutions for threat detection and localization. Sisfron is a big project for border security and its success will be highly reliant on the capabilities of technical sensors", says Dr. Hans-Joachim Kolb, Managing Director of MEDAV GmbH.

Wider benefits

The wider benefits of the Sisfron programme are sure to be felt throughout the rest of Brazil as trafficking and smuggling will be stopped at the borders, before reaching population centres further inside the country. It will improve public safety where violence has been on the increase. It is also hoped that Sisfron will promote greater interaction and co-operation with the Brazilian Armed Forces and law enforcement and intelligence agencies. Training will be given to all involved, bringing the agencies together, and will also help in terms of employment as recruitment will also be an important part of Sisfron. The authorities estimate that 1,000 jobs could be generated directly from Sisfron itself, and up to 4,000 as an indirect result. The effect of Sisfron could also be felt in neighbouring countries as Brazil co-operates with other armed forces and authorities. **GMC**

"There has been a surge in the use of cocaine in Brazil and traffickers are constantly attempting to smuggle cocaine and other drugs such as marijuana, across the border into the country. Illegal immigration is also a problem for the Brazilian authorities. So how does the government start to solve these ingrained issues? Building a wall would not be an option as the border is so vast. There is not enough manpower available to constantly patrol such a huge area."



MSPO - Copyright Thales

WB Electronics and Thales unveil their UAS for Polish Gryf programme

WB Electronics and Thales unveiled at Poland's MSPO exhibition, their exclusive tactical unmanned aircraft system for the Polish Gryf requirement. The WB Electronics/Thales solution offers a capability that fully meets the Gryf requirements for an armed unmanned aircraft system, and delivers the capability through full Polish industrial collaboration.

Based on the combat-proven unarmed Watchkeeper system delivered to the British Army, the WB Electronics/Thales solution will integrate its surveillance capability with a strike capability of the Thales FreeFall Lightweight Multi-role Missile (FFLMM) together on a single platform.

Commanders can fully understand and exploit their environment using the high-performance Intelligence, Surveillance, Target Acquisition and Reconnaissance (ISTAR) capability. In a fast changing environment, the solution can dynamically re-task to an effects-based capability allowing them to make faster, better informed decisions during critical target engagement.

Building on the partnership announced in July, the system will not only deliver the right capability, but will deliver the system through full partnership with the wider Polish industry. Polish industry has extensive expertise in building unmanned aircraft. Many Polish solutions, such as the FlyEye offered by the WB Group, are currently being used by the Polish Armed Forces.

Through this unique partnership, WB Electronics and Thales will be able to establish a sovereign capability for the Polish Armed forces. Critical technologies developed by Polish engineers could also be exported to other countries in the future. **GMC**

Photo - Triton - courtesy of Northrop Grumman

UAV market continues to soar

The demand for military UAVs continues to see sustained growth, despite cut-backs in defence budgets. It is clear that these unmanned aircraft are regarded as hugely important by the military, as force multipliers and invaluable in terms of ISR applications. GMC looks at the latest in UAV technology and the future market.

The meteoric rise of the UAV has probably been the biggest success story in the military aerospace sector. Teal Group backs this up by confirming that it is the 'most dynamic growth sector of the world aerospace industry this decade'. Their 2015 market survey estimates that UAV production will soar from current worldwide UAV production of US$4 billion annually to $14 billion, totalling $93 billion in the next ten years. Military UAV research spending would add another $30 billion over the decade. "The market for UAVs looks very strong, increasingly driven by new technologies such as the next generation of unmanned combat systems, and the development of new markets such as civil and consumer drones," said Philip Finnegan, Teal Group's Director of Corporate Analysis and an author of the study.

The demand is a global phenomenon, but there has been significant growth of UAV companies in Europe, South Africa and Israel with these companies catching up with the more 'traditional' markets such as the US that have dominated the UAV scene in the past.

In terms of payloads, Electro-optic/Infrared Sensors (EO/IR), Synthetic Aperture Radar (SAR), SIGINT and EW systems and C4I are forecast to double in value from $3.1 billion in financial Year 2015 to $6.4 billion in Financial Year 2024.

EO/IR remains the most popular type of sensor, but this is set to change with funding for use of innovative new UAV sensors emerging. Radio Frequency (RF) systems are set to become more popular and sensor systems are set to become much more expensive and sophisticated overall. "Rapidly increasing capabilities for RF sensors will be funded, as potential conflicts shift from clear-skies Central Asia to the more restrictive geographies of Eastern Europe and the Pacific," according to Dr. David Rockwell, author of the electronics portion of the new study. "And out-years UCAV and nano-UAV procurements will see much more expensive and capable sensors."

Teal Group also predicts that UAVs will continue to provide the world's fastest growing aerospace payload market but the 'usual suspects' will not figure as heavily. Dr. Rockwell continues: "Instead, new sensor programs for current and future air vehicles will result in more unexpected growth spurts and losses. We now forecast a number of speculative new programs in the out-years, including estimates of classified programs. Wise companies will plan today for growth tomorrow."

Northrop Grumman Triton HALE UAV

The MQ-4C Triton by Northrop Grumman is an unmanned aerial vehicle that is currently under development for the US Navy. The Australian Defence Force has also shown a level of interest in the UAV and a contract for initial production has recently been awarded to Brisbane-based Ferra Engineering.

The MQ-4C Triton provides real-time ISR over vast ocean and coastal regions. Supporting missions up to 24 hours, the high-altitude UAS is equipped with a sensor suite that provides

a 360-degree view of its surroundings at a radius of over 2,000 nautical miles.

Triton builds on elements of the Global Hawk UAS while incorporating reinforcements to the airframe and wing, along with de-icing and lightning protection systems. These capabilities allow the aircraft to descend through cloud layers to gain a closer view of ships and other targets at sea when needed. The current sensor suite allows ships to be tracked over time by gathering information on their speed, location and classification.

Built to support the US Navy's Broad Area Maritime Surveillance (BAMS) program, Triton will support a wide range of intelligence-gathering and reconnaissance missions, maritime patrol and search and rescue. The Navy's program of record calls for 68 aircraft to be built.

The aircraft's capabilities are impressive, including covering a mission radius of 2,000 nautical miles, 24 hours a day/7 days a week with 80 percent Effective Time on Station (ETOS). MQ-4C also boasts a 51,000 hour airframe life, a communications bandwidth management system, COTS open architecture mission control system, and a net-ready interoperability solution.

The payload features a multi-function Active Sensor Active Electronically Steered Array (MFAS AESA) radar and maritime air to ground modes. It also features long-range detection and classification of targets and an MTS multi-spectral targeting system with EO/IR, auto target tracking and full motion video.

General Atomics complete CDR on new Predator B

General Atomics Aeronautical Systems has reached a significant milestone in its Independent Research and Development (IRAD) program to design, develop, and produce a variant of the Predator B Remotely Piloted Aircraft (RPA) to be certified for flight according to the NATO Airworthiness Standard for unmanned aircraft.

Certifiable Predator B (CPB) has completed a successful internal Phase 1 Critical Design Review, along with reviews by two prospective European customers. Development of the system follows international airworthiness standards that include STANAG 4671, UK DEFSTAN 00970, SAE ARP4754A, MIL HDBK-516C, DO-178, and DO-254, as well as others. Certification of delivered systems will be granted by the responsible agencies within each country. The company is on schedule to conduct flight tests of a test aircraft in 2016, leading to the first flight of a certifiable production aircraft in 2017.

"Completion of this first CDR is the culmination of several years of review of requirements and design compliance with the certification agencies," said Linden Blue, CEO, GA-ASI. "The company also has made a significant investment to solve issues associated with flying RPA within civilian airspace. Certifiable Predator B will represent the first RPA system in its class to achieve this breakthrough."

Certification-compliant wings and redesigned tails will complete flight-testing on a company-owned Predator B aircraft in late 2015. This flight-testing represents a key milestone for the CPB RPA. The wings span 79 feet and enable over 40 hours of flight time for the aircraft. The company also has applied for FAA Type Certification and is working with the FAA to develop Unmanned Aircraft Systems (UAS) airworthiness standards.

GA-ASI is focused on the development and testing of Detect and Avoid (DAA) capabilities for RPA, combining Traffic and Collision Avoidance System (TCAS) II with the company's Due Regard Radar (DRR) to enable both automatic collision avoidance and the ability to remain well clear of other airspace users. The integrated DAA system will continue to fly aboard NASA's Ikhana (Predator B) in 2015 in support of a series of NASA flight tests. These tests will measure the performance of the entire system in a variety of situations to support the ongoing standards development within the RTCA Special Committee 228. Additionally, the CPB aircraft integration testing has confirmed the capability to handle multiple configurations of certified electronics, such as Technical Standard Orders (TSO)-certified Identification Friend or Foe (IFF) transponders and communications radios from other industry partners.

Trinational declaration signed for development of European MALE drone

In May, three of Europe's leading aerospace companies welcomed the agreement of France, Germany and Italy to conduct a definition study of a European-developed unmanned aerial system. Airbus, Finmeccanica and Dassault Aviation have all recognised the importance of purely European programme that will give the continent sovereignty in the development of new unmanned systems. The companies are conducting a two-year definition study of a Medium Altitude/Long Endurance (MALE) drone. A decision will then be taken on whether to start development and procurement of the system.

Unmanned aerial systems are in huge demand by European armed forces and their importance has been clearly recognized by this development project. Bringing together European defence giants will enable them to pool their experience and resources in order to develop a next generation MALE UAS that will be of huge strategic importance to European security.

The declaration follows the three companies' submission in May 2014 of a next-generation MALE UAS study proposal envisaging a 24-month "Definition Phase", immediately followed by a full "Development Phase". This will allow the delivery of the first solutions in the early 2020s.

In light of an increasing dependency of European states on non-European defence equipment and technology, Europe's largest military aerospace companies launched in June 2013 a joint call for the sustainment of key capabilities to ensure the continent's sovereignty in the construction of future military aircraft.

A definition phase focuses on tailoring new developments to customer requirements. It is the first phase of a system development and serves to reduce financial and development risk to a minimum – thanks to a "trade-off" process -before the launch of the subsequent full scale development addressing with the customers key issues such as competitive-ness, sovereignty, growth potential, compliance with joint requirements or certification. Usually a definition phase involves customer countries, their armed forces, procurement agencies and industries.

The "MALE 2020" Project foresees the development of a European Unmanned Aerial System for long-endurance missions at medium flight altitudes (MALE). Besides being an answer to European armed forces' requirements, it will take into account the need to optimize the difficult budgetary situation through pooling of research and development funding. With a sovereign European development, critical requirements around the certification of drones are inherently built into the programme from the onset. MALE 2020 is orientated to foster the development of high technologies and contribute to sustaining key competencies and jobs within Europe.

Portable UAS

But it's not all about large and long endurance UAVs. Militaries all over the world are using much smaller, man portable aircraft to carry out ISR duties.

Elbit Systems of Israel offer a battle-proven, high-performance mini-UAS called Skylark I-LE. Skylark has been selected and deployed as the Israel Defence Force's battalion level UAS and has also been delivered to over 20 users worldwide.

With a take-off weight of 7.5kg, Skylark is a highly covert UAS that enables intelligence, surveillance and reconnaissance missions, delivering actionable, high resolution video in real time to its easy to use mini ground control system and to forwardly deployed forces via remote video terminals (RVTs). The system is man-portable and can be deployed by dismounted teams or in vehicle based mobilisation / deployment configurations including on-the-move operation. Skylark I-LE is a highly autonomous system, including a fly-by-camera mode enabling

day or night detection and tracking of fixed or moving targets and intuitive mission execution with minimal training.

Skylark I-LE is ideal for lower echelons organic beyond-the next-hill reconnaissance, artillery forward observer functions force protection tasks. Its maximum payload weight is 1.1kg and it has an endurance of three hours. Its service ceiling is 15,000km and its range extends between 20-40km.

No let-up in demand

With such demand for varying UAV capabilities, there is a UAV available to fit many different types of mission, whether it is high altitude and long endurance down to finding out exactly what is going on round the corner or over the hill to deploying strike capability. However, these capabilities are constantly being built upon and widened through the use of different sensors, through video, through RF systems. As the Teal Group's report testifies, the UAV/UAS sector is the fastest growing of the aerospace industry, and the need for highly accurate, real time, detailed intelligence and surveillance, especially in the battlefield of today, will continue to drive this sector onwards. The wars that are being fought today are different in their nature to anything we have seen before, and the threats faced are constantly evolving. This type of capability, coupled with strike capability where necessary, is – whether we approve or not - where the future lies.

There is a high level of debate on the morality of armed UAV/UAS usage and there have been many protests by groups that oppose the use of drones, whether armed or unarmed. Groups have put forward various arguments against the use of unmanned aircraft. They argue that UAVs are autonomous and therefore act by themselves. They see a drone as a means of simply minimising Western casualties and that militaries are using high technology against an adversary that has no access to similar equipment. Groups against the use of UAVs see it as an emotionless and detached form of killing. It remains a very controversial and emotive subject.

Aside from the larger UAVs, small drones are also used more widely on the battlefield, and for civil government applications too. The drones may be packed away and carried in a backpack and deployed very quickly and easily by a soldier on foot. The range and capabilities of these small drones is being increased all the time. Even smaller 'nano' UAVs can also be used to detect dangers that may be lurking around corners and can be deployed to gather intelligence much closer to the ground. The US and UK militaries are looking very seriously at using this type of technology to detect threats on the ground.

In terms of larger UAV development, we only have to look at the development that companies such as Lockheed Martin and Skunkworks are making on UAV/UAS. The Sea Ghost, being developed for the US Navy's UCLASS system, is a formidable UAV that incorporates stealth. Boeing's Phantom Ray is also a stealthy UAV in development. There is much to look out for in this class of UAV.

Controversial but undeniably critical, the UAV is now a key part of military capability and the future holds a huge amount of potential for development and increased deployment of UAV/UAS in all spheres of defence. **GMC**

Photo courtesy General Atomics

COMPANY FOCUS

Supporting troops with life-saving communications

Mission Mobility is a Virginia-based company that provides networking to the tactical edge. The company develops products and services that provide a secure end-to-end network that works in even the harshest environments, where power is at a premium, for users who do not have to be networking experts. The company provides critical systems to the US Army.

In the hills of Afghanistan, US soldiers crouch behind rocks and communicate using ruggedized satellite-linked communication systems built in the USA. Mission mobility's systems are designed and manufactured to exacting specifications to support the military and are performance tested for the highest level of reliability. In these hills, a working communication link can be a matter of life or death.

Proud team making electronics for US troops in the field

Rebecca DiDomenico handles production management at Mission Mobility, the small business building these network communications systems in Chesapeake, Virginia. She says the entire team is proud to be making quality electronics in the United States.

"Most of these products go into the hands of soldiers," said DiDomenico. "They can be killed in action if they don't have proper working communications equipment. So we take the job extremely seriously."

Mission Mobility makes multiple lines of satellite, cellular and WiFi-based communication systems, and these are used in the military as well as in civilian settings, like the emergency crews working on the 2015 Nepal earthquake disasters.

The communication kits range in cost from $5,000 to $50,000, because of the complex components and the high priority placed on durability and non-stop performance in rough environments. This means that when you are making super-tough radio systems, testing is a huge part of the job. The Mission Mobility team has to test the router, circuit boards, and all other components individually. Every unit is built at the sub-assembly level, before going through multiple passes of quality assurance testing, often three hours per unit.

Partners help Mission Mobility achieve big things for its customers in dangerous situations

Mission Mobility has relied upon partners such as Screaming Circuits, an Oregon PCB assembly partner for more than six years, as well as Sunstone Circuits for its raw boards. Each Mission Mobility product often requires two, three or more different complete circuit boards.

"They're great to work with, and they do good work," said DiDomenico. "I send the centroid files and BOMs in, and then the parts. When we are crunched for time, I really appreciate the way they treat us like an important partner. You feel important to them like it's a small company."

DiDomenico says it's partnerships like these with Screaming Circuits and Sunstone that help the small Mission Mobility achieve big things for its customers in dangerous situations around the world. "We love coming to work every day knowing we're protecting the greater good. It makes us proud to help our troops by putting out a great product." **GMC**

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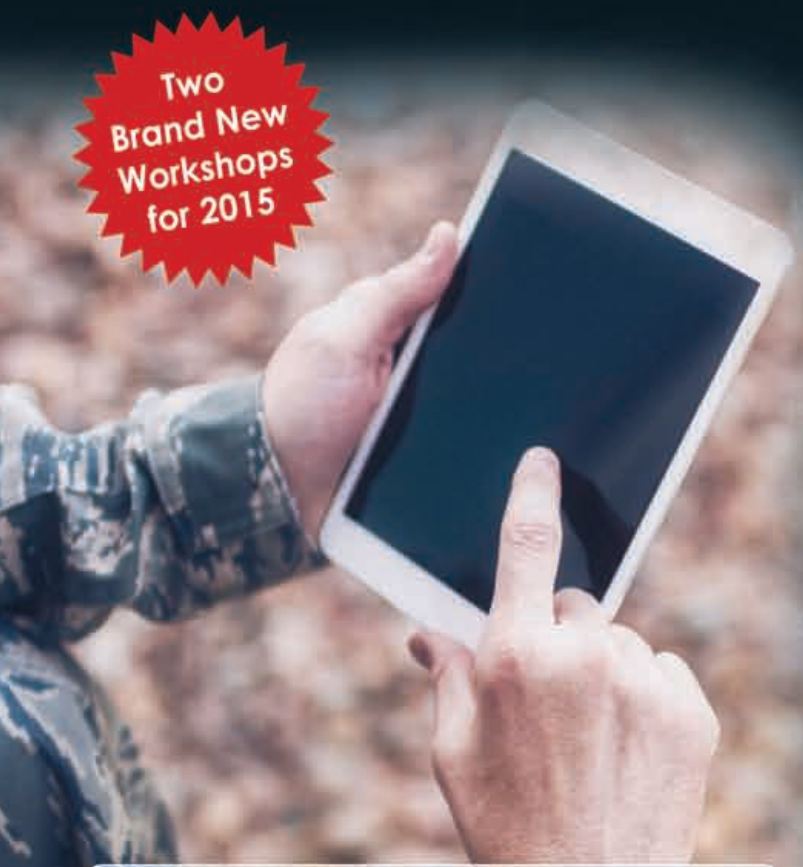

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B: Building and Managing Social Media Communities

Hosted by: **Andrew Morton,** Director of Social Engagement, **SHRM**

1.30pm – 5.30pm

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Powering the military

Military missions are heavily dependent on communications, yet those communications networks rely utterly on a source of power. Without power, there are no communications. The military operations of today are more dependent on power than ever but the sheer amount spent by defence departments on energy is increasingly being scrutinised. It's not just energy for communications, it's for vehicles, weapons systems – every system that you can possibly imagine.

Missions often require large and growing amounts of energy with supply lines that can be costly, vulnerable to disruption, and a burden on warfighters. Defence departments the world over are attempting to reduce the overall demand for operational energy; improve the efficiency of military energy use in order to enhance combat effectiveness; and reduce military mission risks and costs.

When it comes to the theatre of war and the boots on the ground, energy is absolutely central to military capabilities from vehicles to the individual warfighter. For those fighting, the power that they consume has been steadily increasing due to the level of sophisticated equipment they have to carry with them. Soldiers are weighed down with the sheer amount of equipment and weaponry they must carry but the huge increase in the use of C4I computers, radios and last mile communications equipment means that there is really an urgent need to address the power requirements of the warfighter and to reduce significantly that amount that they are required to carry by improving capability, range and endurance. During Operation Enduring Freedom, a soldier on a 72 hour operation would have to carry 16 pounds of batteries required for mission critical operations. Not only is this going to give the soldier a severe backache, it is not reducing the efficiency of the troops on the ground.

The military is underpinned by networks and equipment that relies completely upon a wide variety of different power sources. Securing this energy is vitally important, and attention has been turned to the production of greener energy that can cut costs but also make the military much more self-sufficient in terms of energy production for their needs both in theatre and on-base.

Militaries are also becoming increasingly conscious of taking a 'greener' approach to their power supplies.

Possibilities of solar power

Solar power is one 'green' technology that is being carefully looked at by defence departments. As the price of solar power begins to plunge, it makes great sense to the military to use this form of energy to provide extensive power to its troops and systems.

Manufacturers of power management systems are also looking to incorporate solar energy into their products. Lincad is one of these. The UK-based manufacturer is continuing to invest substantially in its ongoing research into solar power.

Solar has been integrated into the Lincad product range since 2012 when the company launched its Solar Charger, recognising a need to provide flexibility for the soldier in the field by offering a battery charging option when no AC or suitable DC supply is available. In 2015, Lincad extended this further, producing the Power Scavenger that can charge batteries from any DC input – from solar panels, a vehicle or another battery.

Always looking to the future of solar power technologies, Lincad was also involved in the 'Solar Soldier' initiative run by the UK MOD's Defence Science and Technology Laboratory (Dstl) to assess the feasibility of using wearable solar photovoltaic cells and thermoelectric devices to provide soldiers in the field

Photo courtesy Lincad

with a 'round-the-clock' power supply.

Advances in solar technology need to be matched by advances in energy storage technology such as batteries, and Lincad has been working with three other British energy companies – Oxis Energy, Pure Wafer and Solutronic – to develop safe, lightweight and robust solar energy storage systems for the military. Lincad's contribution has been to focus on the design of the required battery devices.

Whilst the main driver for Lincad has been the end user, providing equipment for the soldier that can ease the burden in the field, the company is also conscious of the wider environmental benefits that solar power offers. As a result, Lincad is working towards establishing its own on-site solar panel installation linked to a lithium-ion energy storage system to reduce its operating costs and further inform its R&D work.

Addressing the weighty issue of power

We have already talked here about the sheer weight of batteries that the dismounted soldier has to carry on operations, in addition to the weight of other equipment. This places a great deal of strain upon the individual and manufacturers know this. They are innovating in terms of batteries, to come up with something that is altogether lighter and more durable.

Denchi Power, manufacturers of batteries and chargers, specialise in making the dis-mounted soldier's life easier, and lighter. Denchi Power's Central Energy Source (CES) is the latest in a family of conformable batteries. The evolutionary device replaces the normal rigid case with a flexible canvas covered pouch. The pack can store, deliver, and scavenge power lessening the weight burden and eliminating cables and the need to carry spare batteries.

This battery incorporates its own integrated charging circuitry and offers flexibility and seamless plug and play. The CES has been developed for use in the BAE Systems Broadsword™ Spine™ system used to power the wireless Torso Vest. It is a key power source for the fully integrated dismounted soldier, with battery power scavenger and charging all in one. It also conforms to the UK Generic Soldier Architecture (GSA) Standard - Def Stan 23 - 12. As it uses the same Lithium-Ion cells as more conventional batteries, the CES will give the same long run time as other Denchi power batteries.

Fuel cells

The use of fuel cells for military applications is widely considered as an ideal way in which to power equipment in a clean and effective way. Fuel cells use hydrogen and oxygen to provide clean electrical power with only two by-products – heat and water vapour. They may be used to provide power to a variety of military applications – portable, stationary and for transportation. The systems have separate energy storage and power generation components making them suitable for back-up power applications and can provide critical power when it is needed. The fuel cell industry is working on lowering cost, durability and reliability in order to encourage wider adoption by the military – and also for mainstream applications too.

Energy Technologies' Inc. (ETI) Tactical Fuel Cells division specialises in the development of fuel cells for military use. As part of their ongoing relationship with the defence community, ETI was asked by the Mobile Electric Power (MEP) commands of the US Army and the US Marine Corp to integrate fuel cell technology into the array of power products provided by ETI. ETI reviewed state of the art fuel cells to determine which technologies best suited development into products suitable for defence applications.

ETI eventually went with a fundamentally new type of fuel cell, the Metal Hydride Fuel Cell (MHFC), which provides unique performance advantages over conventional technologies. Advantages include rapid startup and wider temperature operation; elements essential in developing a militarised product. In addition, the MHFC uses a low cost manufacturing approach. These basic characteristics are being further developed by ETI to provide and manage computer-grade AC and DC power while satisfying military performance specifications including the demands of harsh environments found in tactical applications around the world.

Energy Technologies, Inc. was recently awarded a $1 million grant through the Ohio Department of Development (Third Frontier Fuel Cell Initiative) to develop a robust fuel cell generator for the military.

A new approach to power

Military power supplies are the lynchpin of operations and it is vital that development continues to find the very best possible power solutions for the huge range of military equipment and also military bases and compounds that all require power. Dismounted soldiers require light and highly portable batteries, vehicles need shockproof, rugged batteries or fuel cells, and military camps and compounds require excellent back up for critical power needs. The military literally runs on power, and therefore it is essential that new power resources are developed to make militaries more efficient, more cost-effective, and also to take into account greener, more environmentally friendly technology. Just as the civilian world is looking for new powers resources, the same is happening in the military. Energy independence and security is more important than ever before. The less vulnerable our fuel sources are the better. Energy sources are prime targets for adversaries. It is vitally important that they are carefully considered, that they are highly reliable, sustainable, cost-effective and powerful. **GMC**

Photo courtesy DVIDShub.net

BT: future proofing the UK MoD

Over the past 15 years, BT has developed a deep relationship with the UK Ministry of Defence through work on its Defence Fixed Telecommunications Service contract (DFTS) and is now rolling out a new strategy to enable the MoD, along with other defence organizations, to meet the evolving threats and communications challenges today. Helen Jameson talked to Bill Holford, Vice President, Global Defence, for BT Global Services to find out more about his work and what he sees as the most pressing communications challenges defence departments face today.

Bill Holford, Vice President , Global Defence

BT's purpose is to use the power of communications to make a better world. It is one of the world's leading providers of communications services and solutions, serving customers in more than 170 countries. Its principal activities include the provision of networked IT services globally; local, national and international telecommunications services to its customers for use at home, at work and on the move; broadband, TV and internet products and services; and converged fixed/mobile products and services. BT consists principally of five customer-facing lines of business: BT Global Services, BT Business, BT Consumer, BT Wholesale and Openreach.

For the year ended 31 March 2015, BT Group's reported revenue was £17,979m with reported profit before taxation of £2,645m.

British Telecommunications plc (BT) is a wholly-owned subsidiary of BT Group plc and encompasses virtually all businesses and assets of the BT Group.

"For the last 18 years, BT has run the DFTS (Defence Fixed Telecommunications Services) programme which basically provides fully managed and secure voice, data and video services to the whole of the MoD within the UK and certain other locations internationally."

GMC: Can you tell us about BT's defence business and the reasons behind its establishment?

Bill Holford: BT, as a company, was originally part of the government and therefore has had a very close relationship with the UK MoD for the last 100 years. For the last 18 years, BT has run the DFTS (Defence Fixed Telecommunications Services) programme which basically provides fully managed and secure voice, data and video services to the whole of the MoD within the UK and certain other locations internationally. 18 years ago, the MoD had 19 different networks and we amalgamated them all into one secure network and, over that time period, saved the MoD almost a billion pounds. To give some statistics on DFTS:

- DFTS comprises 2,000 customer sites;
- Three million calls a year are made over the network; and
- It comprises the largest VPNs in Europe with 750,000 calls per day from 225,000 users.

On that foundation, we have built a deep relationship with the MoD at all levels of classification. We go from unclassified right the way up to top secret, in terms of some of the services we provide. We protect their network against cyber attack and we provide the firewalls through our Enterprise Gateway Service that screens all of their traffic with the outside world. Our Enterprise Gateway Services handle about 43 million emails each year and we provide dedicated 24 hours a day, 7 days a week, 365 days a year support to all of the MoD sites. For instance, we currently provide their 999 services, and their voice, data and video conferencing services.

Over the last 15 years we have moved into the mobile age. We have provided them with an initial secure Blackberry service, and we are now broadening that out into a secure mobile device service. We have 2,000 mobile devices on trial with the MoD at the moment and we will be expanding that significantly. The premise there is that we believe that any soldier, sailor or airman should be able to use the same tablet at home as he does on deployed operations. The technology behind that is quite complex, as is the level of security and cyber protection involved.

Another important thing to point out is the level of impact that BT the company has on the national infrastructure of the UK. The defence business is really focused across the south-west region. It's the M4 corridor from Bristol to London with Corsham and Salisbury Plain. In that region alone, BT employs one in every 230 employees working in the private sector and one in every 12 working in the IT and

Photo courtesy BT

communications sectors. Because of the services we provide, we are present in a lot of the military bases around the country and we provide a whole suite of managed site services to enable them to communicate – everything from Wi-Fi to structured cabling to CCTV to installing fibre rings to enable perimeter security.

We are also a key sponsor of SSAFA and Combat Stress.

GMC: What are the greatest communications challenges that face the UK MoD or other defence departments, at the moment?

Bill Holford: I would say that they are going through a massive period of change - operational change, financial change, yes, but also from the technological perspective. The operational demands that they have placed on them, coupled with the level of technological change I think puts a challenge on them that is unsurpassed in the last 50 years. Look at the move to the Cloud, which is massively important. We live in a world where it is very difficult to predict where, when and what kind of conflict the armed forces are going to go into. Five years ago we had three major conflicts around the world with many thousands of our armed forces deployed. Going forward, we could have fewer people deployed but over a much higher range of operations. There could be 20 different minor conflicts going on, so the ability to have the technology to draw on the communications they need in an agile and flexible manner is a massive challenge, and the Cloud helps with that.

Intrinsically coupled to that is the security challenge and there are two aspects to that. The first is obviously a defensive one. It's a case of re-thinking the risk in a landscape of changing threats. Hacking is no longer a hobby. The rise of the collective that are publicly focused on disrupting not just armed forces but governments in general is a very real issue. On the other side of that coin there is the need for information superiority. It's about getting as much information about the landscape you are going to be moving into. While 80, maybe 90 percent of that information is publicly available through open sources, it's no good creating a massive splash on the Internet which signals exactly what it is you are going to be doing in a few months time, so being able to cover your tracks is a challenge. Those areas are ones that BT is particularly good at.

I think there is also a challenge in terms of collaboration. Gone are the days when the armed forces go to war as a single entity. It is all about collaboration with other countries. This poses massive communication difficulties and also massive security difficulties in terms of the information being shared. This week's friend is next week's enemy. You only have to look at the growing relationship with Iran. How do they make decisions on how to protect their information? The other is mobility – possibly the key challenge. How do you become mobile enough when, historically, you have had a pretty fixed infrastructure? How do you move into a position where you can communicate securely, but in a mobile manner particularly when you can't predict the level of power you will have in the battlespace. There are a vast range of technical choices that must be available at different levels of contingency.

Ultimately, I think those challenges are the main ones that the MoD faces.

Photo courtesy UK MoD

GMC: The military is faced with constantly evolving threats and one of the biggest has to be Cyber Security. It is such a complex issue. How is BT addressing this threat?

Bill Holford: We have a very strong infrastructure that is backed up by what we call BT Protect. This is the range of services that BT uses to protect its own network. Those are through strong network monitoring, a very strong sensor network and through innovative technology solutions that enable us to identify where or when any of our networks have been infiltrated or tampered with, both on a physical and cyber basis. We also have very strong gateways that enable us to filter out the wrong kind of traffic, analyze it, and visualize where it's coming from. It is particularly strong in terms of monitoring the Internet and understanding the global themes and how they are developing from the cyber perspective and how they can proactively prevent intrusion as well as deal with it when it happens.

GMC: How does BT offer excellent innovation at an affordable price amid large cuts in defence spending?

Bill Holford: Over the last year we have been working on our future strategy, and this addresses how we can innovate yet deliver at affordable prices. We call it Enabling Information Superiority. Ultimately, it is about focusing on information as a force multiplier to the MoD. How do you gather it? How do you exploit it? How do you manage it? What tools and services do you use to ensure that the right people have access to the right information at the right time to make the right decisions? That is essentially how you go about carrying out warfare nowadays. The way we manage that balance between customization and cost,

At one end of the spectrum we have fully customized services and products that we have worked on for the last 15 years that we have worked on in the form of DFTS. What those give us is the insight and technical knowledge to understand exactly what the customer demands are. At the other end of the extreme, we have a strong portfolio of COTS products. We are one of the biggest global managed network service operators in the world. We operate in more than 170 countries and provide services to 98 percent of the FTSE100 companies. That level of scale enables us to have a very strong portfolio of standard connectivity security and voice, data and application services.

We adapt COTS products for generic defence requirements, and the way we are making it cost effective is by focusing on four key portfolios: Secure Mobility, Secure Services and Cyber, Smart Bases and Global Connectivity. By choosing four portfolios that we think are going to be particularly applicable to the customer's requirements and by basing them on the standard products, but by using some of the very specific experience and knowledge that we have, we manage that sliding scale between commodity and fully owned capability. They can be as high or low on that scale as they want to be.

GMC: What kind of Morale, Welfare and Recreation services does BT offer to service personnel?

Bill Holford: We have a forces discount for any type of BT residential services and over the last couple of years we have been focusing heavily on Wi-Fi. With the forces coming back from Germany and Afghanistan, Wi-Fi was identified as one of the key influencers on morale. It is accepted that you have Wi-Fi nowadays. We have been rolling out a welfare Wi-Fi service that

has been going into NAAFIs and into Junior Ranks Clubs and this is also matched with a Defence Business Internet proposition, which is an unclassified Wi-Fi service for business use. I think we have gone out to just over 40 sites now. One good example would be RAF Brize Norton where there is a massive site and a massive level of throughput of personnel either going or returning from operations. We installed a Defence Business Internet solution and that enabled us to put Wi-Fi into Gateway House which is accommodation where troops stay the night before they are deployed and also free Wi-Fi into the terminal building so we can guarantee that they can contact their families just before they leave and immediately upon their return. We are very proud of that.

GMC: How does BT work with the UK MoD to accommodate the need for mobile communications on the battlefield?

Bill Holford: As part of the Enabling Information Superiority strategy, we began our secure mobile device rollout. It is our flagship innovation. It will be a range of Android devices, although we can provide services on Apple as well. It enables people to get access to their email, a range of applications including HR reports, expenses, leave, instant messaging and social media. It also critically provides a mobile device management solution, so that as a device is moved from one location at a particular level of security to another location with a higher level of security, the user profile is understood and so certain applications are disabled on the tablet. For example, they couldn't use their camera at a highly secure site. From our perspective, it's just one step from that to moving it into the deployed environment and we are heavily focused on making that move. To integrate this into an end-to-end solution, I would say we would be looking at the next 3-5 years to the point of operational deployment.

GMC: What are you plans in terms of the global defence market? Do you work with other militaries around the world already?

Bill Holford: We have strong plans in this area. We have talked extensively about our excellent relationship with the UK MoD. We also have an organization called BT Federal, which is an autonomous company that sells to the US Department of Defense, so is growing our presence in Washington. We have a strong relationship with NATO. So those three pillars are key to our growth strategy moving forward. The plan is to develop a single portfolio of services along the four groups in our Enabling Information Superiority strategy, and providing those services to all three of those markets – the UK, the US and NATO. That helps with the collaboration between those organizations. If they are using the same services from the same company we can help them to collaborate more effectively. Over the next year we will be going after a large number of bids for those three organizations, rolling out the services that we are developing along the lines of our strategy.

GMC

Photo courtesy UK MoD

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CHAIRMAN 2015:

Squadron Leader (Ret'd) Keven Gambold, CEO, **Unmanned Experts**

EXPERT PANEL INCLUDES:

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Colonel Robert Kiebler, Commander, 49th Wing, Holloman AFB, **United States Air Force**

Colonel Enrique Martinez, Chief of the Acquisition Programs Section, **Spanish Air Force**

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DSEI to attract global defence industry to London

The biennial Defence & Security Equipment International (DSEI) event is the world's largest land, sea and air defence and security exhibition, bringing together senior international trade and military experts from across the entire supply chain in an optimal business environment.

The biennial DSEI event held in London will take place from 15-18 September 2015 and is a world leading land, sea and air defence and security exhibition.

Keynote speeches will be given by all four UK MOD Service Chiefs of Staff in the exhibition floor theatres: Admiral Sir George Zambellas, First Sea Lord and Chief of the Naval Staff of the Royal Navy; General Sir Nicholas Carter, Chief of the General Staff, British Army; Air Chief Marshal Sir Andrew Pulford, Chief of the Air Staff, Royal Air Force and General Sir Richard Barrons, Commander Joint Forces Command, will speak on days that are themed for their individual Services.

DSEI will also feature a strong international speaker line up including: Admiral Carlos Ortega, Mexican Navy; Admiral Nguyn Van Hin, Commander Vietnam People's Navy; Lt Gen Alexander Schnitger, Commander, Royal Netherlands Air Force; Rear-Admiral Bernard Blejean French Navy -ALRI; and Rear Admiral Tony Dalton, Head Helicopters, Unmanned Aerial Systems and Guided Weapons Division (HUG-D), Australian Defence Organisation.

In addition to the Service Chiefs and reflecting the increased level of content for 2015, DSEI will host around 300 seminar sessions and keynotes across seven theatres and four strategic conferences facilitating knowledge sharing and networking around key topics and technical areas. DSEI's seminars will address the challenges, developments and future of the Defence & Security sector's ever-changing landscape providing the global platform of choice for key government figures and influential policy makers within the sector. These include: Air, Naval, Land, Security and Special Forces, Medical Innovation, Unmanned and Global Partnerships.

The exhibition at DSEi will be split into several zones: Land Zone, Air Zone, Naval Zone, Security and Special Forces Zone, Unmanned Zone, and Medical innovation Zone.

Land Zone

The Land Zone is the largest zone at DSEI and features the land theatre for insight into the future of the international land sector.

With prime contractors to niche specialist suppliers, the Land Zone demonstrates the latest platforms from major vehicle manufacturers and suppliers in the defence industry. Suppliers will include BAE Systems, General Dynamics, Jankel Armouring, JCB Government & Defence, Land Rover, Patria Oyj, Rheinmetall and Supacat.

The exhibition floor additionally plays host to a series of seminars focused on debating future force structure; requirement and procurement priorities; and joint operations doctrine.

Air Zone

The Air Zone offers a dedicated Air Theatre and an increased static vehicle display. This year's event will address the frontline operational requirements and support functions available to the aerospace and rotary sector. A range of static displays are expected to include a Merlin, Wildcat, Sea King and Eurofighter Typhoon multi-role combat aircraft, among others.

The Air Zone has full support from the Royal Air Force. Air Vice-Marshal Malcolm Brecht, Chief of Staff Air Capability, said: "DSEI 2015 enables us to highlight themes that will influence future UK air capability, and we will continue to pursue the excellent opportunity that DSEI 2015 provides to engage in high-level industry briefings and bilaterals."

DSEI's Air Zone is expanding to address the frontline operational requirements and support functions available to the aerospace sector. The Zone includes: a capability area dedicated to the aerospace supply chain; a comprehensive seminar programme reinforcing the show's broader themes of procurement, training, export maximization, SME support and

an outdoor static display area to provide the aerospace industry with a forum in which to showcase the latest innovations to existing and prospective international customers.

Naval Zone

The proximity of the Royal Victoria Dock enables DSEI to play host to a range of vessels, from warships to high speed craft. It also includes an expanded marina and in depth scenarios to showcase related products, technologies and services.

The Naval Zone at DSEI 2015 gives exhibitors the opportunity to engage with established and emerging markets seeking new suppliers for their maritime defence and security requirements.

The dedicated Security & Special Forces Zone showcases security equipment and systems to counter priority threats, such as cyber attacks and terrorism, as well as an enlarged special forces and tactical equipment area.

The new Security & Special Forces Zone centralises the security sector's expertise with a bespoke community in order to increase networking opportunities for both exhibitors and visitors.

Unmanned Zone

The 2015 Unmanned Zone will host the full spectrum of unmanned system designers, manufacturers and supply chain for all applications and developments across the military and security sectors.

Current exhibitors participating in the Unmanned Zone include AIE, Creative Electronic Systems, DOK-ING, Eli Military Simulations, Galleon Embedded Computing, IAT 21, Linwave, Milrem, Northwest UAV, and Reamda.

In addition to the Unmanned Zone, companies presenting unmanned technologies elsewhere in DSEI include primes such as Selex, Northrop Grumman, QinetiQ, BAE Systems, Boeing, Elbit, Uvision and Thales.

Exhibitor round-up

Here are just some of the companies you can expect to see on the show floor at DSEi this year.

ADVANTECH WIRELESS

Advantech Wireless is the leading wireless broadband communications solution provider for Commercial, Critical Infrastructure & Government and Military clients. Smarter solutions give clients the freedom to reach farther, to achieve reliable connectivity anywhere in the world, and accomplish critical missions of global significance. The company designs turnkey terrestrial and satellite communications solutions that maximize performance and minimize operational costs, all with uncompromising quality.

Visit www.advantechwireless.com for more details

AR MODULAR RF

AR Competitive Edge products supply a multitude of unique RF solutions to companies around the world. The company's limitless support network reaches the far corners of the globe. AR products are backed by the company's "Competitive Edge" warranty, the best and most comprehensive warranty in the industry. When companies purchase from any AR company they have the peace of mind that comes from knowing the global leader will be there to help with any problems today, tomorrow and always.

Visit www.arww-modularrf.com

BOEING

Boeing is the world's largest aerospace company and leading manufacturer of commercial jetliners and defence, space and security systems. A top US exporter, the company supports airlines and US and allied government customers in 150 countries.

Boeing products and tailored services include commercial

Photo courtesy DSEI

and military aircraft, satellites, weapons, electronic and defence systems, launch systems, advanced information and communication systems, and performance-based logistics and training.
Further information may be found at www.boeing.com

CPI SATCOM

CPI is a leading producer of RF equipment for use in satellite uplink applications around the world. The company designs and manufactures the most technologically advanced and efficient high power amplification products in the industry. These include TWT amplifiers, solid state BUCs, travelling wave tubes and klystrons.
Further information on CPI Satcom can be found at www.cpii.com

ELBIT SYSTEMS

Elbit Systems is an international high technology company engaged in a wide range of programs throughout the world. Elbit develops and supplies a broad portfolio of airborne, land and naval systems and products for defence, homeland security and commercial applications.

The company operates primarily in the defence and homeland security arenas. The nature of military and homeland security actions in recent years, including low intensity conflicts and ongoing terrorist activities, as well as budgetary pressures to focus on leaner but more technically advanced forces, have caused a shift in the defence and homeland security priorities for many of its major customers.

As a result there is a continued demand in the areas of C4I systems, intelligence, surveillance and reconnaissance (ISR) systems, network centric information systems, intelligence gathering systems, border and perimeter security systems, unmanned aircraft systems (UAS), unmanned surface vessels (USVs), remote controlled systems, cyber-defence systems, space and satellite based defence capabilities and homeland security solutions.

There is also a continuing demand for cost effective logistic support and training and simulation services. Elbit believes its synergistic “one-company” approach of finding solutions that combine elements of various activities positions it to meet evolving customer requirements in many of these areas.
Further information may be obtained from www.elbitsystems.com

EM SOLUTIONS

EM Solutions is recognized by customers globally for designing and manufacturing differentiated microwave and RF products and systems for satellite and broadband communications.

Renowned for technologically-superior design, manufacture, and support of microwave technology, EM Solutions is a leader in supplying next generation high speed communications products that assist in the delivery of real-time voice, data and multimedia anywhere in the world.

Committed to innovation and delivering quality solutions, EM Solutions consists of an agile team of people able to provide superior communication technology quickly and accurately with full design, manufacture, testing and support services available in-house and governed by strict IS9001 quality practices.
You can find out more at www.emsolutions.com.au

ESRI

Militaries rely on geospatial awareness for virtually every aspect of operations. From mission command to intelligence, surveillance and reconnaissance (ISR) to training area management and mission support; geospatial information plays a strategic role. Esri provides geospatial solutions to meet the needs of armed forces. With Esri technology, you can quickly

Photo courtesy DSEI

visualize information, perform analysis, and make better and faster decisions.
More details are available at www.esri.com

GEM CABLE SOLUTIONS

A leading UK manufacturer, GEM Cable Solutions provides total network solutions through a flexible package of bespoke services and products.

The company works across the globe to support business growth with an unrivalled level of technical and procurement expertise, precision manufacturing on any scale and easy access to trusted brands and tailor-made equipment.
Find out more at www.gemcable.co.uk

HARRIS

Harris provides advanced, technology-based solutions that solve government and commercial customers' mission critical challenges. The company has approximately $8 billion in annual revenue and about 23,000 employees — including 9,000 engineers and scientists — supporting customers in more than 125 countries.
Learn more at www.harris.com

INVISIO

INVISIO develops technologies and products for audio communication. The business concept is to develop, market and sell headset products and PTT-units (Push To Talk) for audio communication under its own trademark and through OEM collaborations with industrial companies (contract development). The Company's vision is to enable people to communicate comfortably in all sound environments.

INVISIO® was founded in 1999 and holds the invention of the patented Bone Conduction Technology for best possible speech in all sound environments. Furthermore the company provides the patented Soft Spring™ for optimal wearing comfort.
For more information visit www.invisio.com

NEWTEC

Newtec is specialized in designing, developing and manufacturing equipment and technologies for satellite communications. As a pioneer in the industry, Newtec is dedicated to creating new possibilities for the broadcast, IP trunking and backhauling, consumer and enterprise VSAT and government and defence markets. Its products and technologies can be applied in a wide range of applications from DTH broadcasting, video contribution and distribution and disaster recovery and backbones for backhauling, to small and medium enterprises, SCADA networks, manned and unmanned aircrafts, border control and Morale, Welfare and Recreation (MWR).
Visit www.newtec.eu for further information

Photo courtesy DSEI

ORBITAL ATK

Orbital ATK's Defense Systems Group is an industry leader in precision weapons, tactical rocket motors used in air, sea and land-based systems, missile-warning products, and ammunition and gun systems, serving America and its allies. The group is the largest US producer of small-calibre ammunition, as well as a leading manufacturer of medium and large-calibre ammunition and gun systems. In addition, the group develops advanced capabilities for missile-defence interceptors, fusing and warheads, weaponized special-mission aircraft, and propulsion control systems. It also provides extensive experience and expertise in defence facility management, modernization and automation worldwide.
Further information may be found at www.orbitalatk.com

SAAB GRINTEK

Saab Grintek Technologies is a leading empowerment technology group based in South Africa and recognized globally for its innovative high tech electronics, with a focus on ICT and energy management, logistics support and global connectivity services.

The core competencies of Saab Grintek Technologies are founded in its strong technology base and system integration capabilities. This strength enables it to develop internationally competitive products, provide world-class partnerships, and add value through customization, integration and technical support.
For further information visit www.saabgrintek.com

SAVOX

Savox Communications was founded in 1982 and today is one of the largest professional communication solution providers in the world. The Savox Communications Group with headquarters in Luxembourg and operations in Finland, Germany, France, UK, US, Canada and the People's Republic of China, has created a global manufacturing network to support customers in all of its main geographical markets.

Savox Communications is focused on providing safety, rescue and communications products and solutions that improve and save lives, whatever the conditions. Its product lines; Searchcam, Entrylink, Delsar, Con-space, Promate, Classic, Direct, Covert and Defense represents a unique and broad spectrum of products being used by working professionals in daily operations around the globe.

With more than 30 years of experience serving the Police, Security, Fire, Rescue, Military, Maritime and Industrial markets, Savox provides a unique insight into the end-user requirements which allows it to produce the most innovative and market driven solutions available.
See more at www.savox.com

ROHDE & SCHWARZ

For more than 80 years, Rohde & Schwarz has stood for quality, precision and innovation in all fields of wireless communications. The privately owned company is strategically based on four pillars: test and measurement, broadcasting, secure communications, radio monitoring and radio location. The electronics group, headquartered in Munich (Germany), has a global presence and is among the world market leaders in all of its business fields.
Discover more at www.rohde-schwarz.com

STEATITE

Steatite is a market leader in the design, development and supply of rugged and industrial computers, custom lithium battery solutions, secure communication systems, antennas and subsystems ideally suited to harsh operating environments. Steatite has spent years developing a strong reputation for creating solutions to meet the operational demands of its customers. Dedicated in-house teams support clients by designing, building and supplying the most advanced range of components and systems tailored to their application requirements. Steatite is a part of the Solid State PLC group of companies, quoted on the UK AIM market.
Visit www.steatite.co.uk for more details

SELEX ES/FINMECCANICA

Selex ES, a Finmeccanica company, is an international leader in electronic and information technologies for defence systems, aerospace, data, infrastructures, land security and protection and sustainable solutions. From the design, development and production of state-of-the-art equipment, software and systems to through life support, Selex ES partners with its customers to deliver the information superiority required to act decisively, complete missions and maintain security and protection for operational effectiveness.
For more information go to www.selex-es.com

THALES

Thales is a top-tier partner of defence forces worldwide. It works with customers to design and to provide the best possible solutions for effective defence missions. The goal is to assist armed forces in obtaining and maintaining operational superiority. Thales has forged a solid reputation in the defence industry as a result of high-performance solutions and strong investment in key research areas.

Over 50 of the world's navies rely on the company's solutions to better prepare for the challenges of the sea. It is also the leading supplier of C4ISTAR systems to NATO.
Find out more at www.thalesgroup.com

VITAVOX

Vitavox (a division of Secomak Ltd) has been providing naval and military communication systems, including PA systems, military grade loudspeakers, microphones, headsets and other sound reproducing equipment to MoDs for over 80 years. Vitavox products can be used for applications such as; main broadcast, intercom and loud-hailing on both land and at sea. Vitavox systems and components are the toughest and long-lasting available today for military and naval specification.

Vitavox was established in 1931, by an electrician specialising in wireless, who volunteered for service in the navy. During his time at sea, he realised the importance of the on-board internal communications and on return to dry land he began to manufacture products that would meet the high demands of the maritime environment. Vitavox is now based in Elstree, England and continues to be one of Britain's true remaining defence manufacturers of the highest specification audio equipment. Vitavox systems are specifically designed and manufactured for use in the most damaging and hazardous operational environments, encountered both by equipment and service personnel. Vitavox provide solutions by manufacturing products to fit a specific operational and functional requirement. Vitavox work with customers to integrate required features into the design and manufacture of the product, as well as offer customers an off-the-shelf selection of products. Vitavox also provide their customers with post-purchase support making Vitavox the primary choice for applications deployed in today's modern battlefield, in both army and navy scenarios.
Visit www.vitavox-sound.com for more information

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