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To find out more contact:  
Brian Dolby  
tel: +44 1636 812152  
email: [hello@proactive-pr.com](mailto:hello@proactive-pr.com)

**Editor**

Amy Saunders  
amy.saunders@dsairpublications.com

**Publisher**

Stephen Barnard  
Stephen.Barnard@web.de

**Sales**

Christopher Ayres  
chris.ayres@dsairpublications.com

**Sales**

Sam Baird  
sam@whitehillmedia.com

**Circulation Manager**

Elizabeth George

**Production**

production@dsairpublications.com

**Editorial Director**

Richard Hooper  
richard@dsairpublications.com

**Managing Director**

David Shortland  
david@dsairpublications.com

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DS Air Publications  
1 Langhurstwood Road  
Horsham  
West Sussex, RH12 4QD  
United Kingdom  
T: +44 1403 273973  
F: +44 1403 273972  
admin@dsairpublications.com  
www.globalmilitarycommunications.com

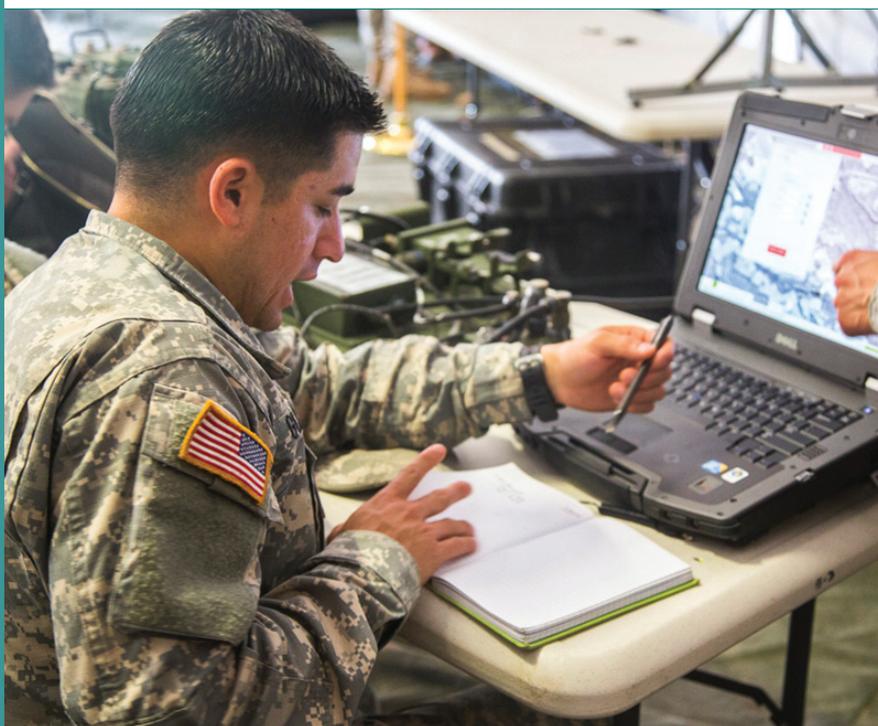
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● ● Photo courtesy Singapore Ministry of Defence

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Photo courtesy US Army

## Thales and ASV strengthen their partnership in the UK

After successful trials on Halcyon Unmanned Surface Vehicle (USV), Thales and ASV have decided to strengthen their partnership. Both companies have signed an agreement to develop autonomous Unmanned Surface Vehicle (USV) technology and capability for maritime, civil, security and military domains. Thales is a global technology leader with a unique capability to design and deploy equipment, systems and services to meet customer's operational requirements. ASV, an agile Small and Medium-sized enterprise (SME) with 60 employees spread across the UK and USA, has specialized expertise and experience in USV design, build, operation and maintenance. This agreement, which builds on the strong existing relationship and the combined skills and expertise of the two companies, provides world leading, innovative solutions for autonomous maritime requirements.

### Successful trials on Halcyon USV

The collaboration has already successfully delivered the innovative Halcyon USV, a key asset of the French – UK Maritime Mine Counter Measures programme (MMCM1). Designed and built by ASV, it provides high speed transit, stability, manoeuvrability and endurance. When enhanced with Thales's mission and autonomy management systems, Halcyon provides a highly capable and cost effective platform for the deployment of payloads for a wide range of maritime, civil, security and military applications.

A recent success is the support provided by Thales, with their partners ASV and SeeByte, to the UK's Defence Science and Technology Laboratory (DSTL) in the demonstration of a robust autonomous Mine Counter Measures (MCM) system through a collaborative systems approach. This was part of The Technical Cooperation Programme (TTCP), a multi-national forum for defence, science and technology. Halcyon, fitted with Thales's mission management system and integrated with the ASView control system, operated collaboratively in the trials to demonstrate reliable autonomous operations involving complex behaviours in a range of scenarios and sea state conditions.

These trials completed operator planned missions controlled from a remote operations centre, providing operator oversight and control over a communications link. It also showed how a USV can work autonomously with a multi-national squad of Unmanned Underwater Vehicles (UUVs). These successful trials represent a major milestone in Thales's roadmap to deliver robust autonomous USV operations. The two companies are collaborating on the delivery of the French – UK Mine Countermeasures (MMCM) contract, a programme which is key to the transformation of mine countermeasures capabilities and the future operational use of unmanned naval systems.

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● ● Photo courtesy Thales and ASV

## C4ISR assessment

As nations focus on filling the gaps in command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR) capabilities, the global market for related products will grow. Reassured by this trend, the C4ISR research community is working on developing systems capable of thwarting weapons such as hypersonic missiles, counter laser, counter unmanned aerial vehicle swarm and counter rocket-artillery-mortar systems.

Analysis from Frost & Sullivan, *Global C4ISR Market Assessment* (<http://bit.ly/1Jpd1Gu>), finds C4ISR procurement spending stood at \$106 billion in 2014 and estimates this to reach \$119 billion in 2019. In 2015, C4ISR accounted for nearly 16 percent of the total defense procurement spending. This ratio is expected to remain stable in most countries across the globe with cybersecurity, assured global positioning system (GPS) or navigation, unmanned sea vehicles and missile defense being priorities through 2019.

"Although the US will dominate global C4ISR spending, its share is likely to reduce from 36 percent in 2015 to 34 percent in 2019 due to a reduction in its force structure and higher procurement rates in Saudi Arabia, Japan and India," said Frost & Sullivan Aerospace & Defense Industry Principal Brad Curran. "Meanwhile, Africa will witness the highest C4ISR spending compound annual growth rate at 8.4 percent."

Despite the overall market optimism, the rising trend of equipment-sharing agreements among budget-constrained nations will limit C4ISR spending. Therefore, across geographies, moderately priced mature and proven systems will gain market share. Moreover, maintenance, spares, logistics and training services will become essential components of new sales.

The increased application of commercial off-the-shelf (COTS)-based computing, storage, security, networking and collaboration tools will further boost revenues. To cost-effectively meet military C4ISR operational goals, market participants will have to harness COTS hardware and software as well as the Internet of Things concept.

"The commercial success and reliability of mobile networks have facilitated the military application of remote sensing, big data analysis, robotics, miniaturization, cloud computing services and cyber security," noted Curran. "With IT moving from a hardware setting to a mobile software-defined environment that emphasizes connectivity and the Internet of Things, large commercial IT companies will expand their share of C4ISR spending at the expense of established systems integrators."



● ● Photo courtesy Rheinmetall AG

## Rheinmetall creates Europe's leading producer of military vehicles

Rheinmetall AG has decided to consolidate its Defence unit's extensive military vehicle activities in a new division called "Vehicle Systems". As a first step, Rheinmetall Landsysteme GmbH (RLS) and Rheinmetall MAN Military Vehicles GmbH (RMMV) have been placed under joint management effective from 1 January 2016. Ben Hudson (CEO) and Michael Wittlinger (CFO) will lead the new division.

Starting on 1 January 2016, Mr Hudson has also been appointed to the Executive Board of Rheinmetall Defence where he will represent the new Vehicle Systems division.

The resulting unit is poised to be a comprehensive supplier of tracked and wheeled military vehicles and turret solutions, capable of meeting the complete ground mobility needs of the world's armed forces – all from a single source. Under the new structure, Rheinmetall Defence will consist of the following three divisions: Vehicle Systems, Electronic Solutions and Weapons and Ammunition.

The united competencies of RLS and RMMV create a leading European systems supplier and the world's most robust platform for tactical land mobility solutions, with annual sales expected to reach euro 1.4 billion in fiscal 2016. The portfolio ranges from main battle tanks and wheeled armoured vehicles to state-of-the-art trucks, and features such technological triumphs as the Puma infantry fighting vehicle, the Kodiak armoured engineering vehicle, the 8x8 Boxer, the 6x6 Fuchs/Fox, the 4x4 AMPV, as well as the new division's TG, HX and SX truck families. Rounding out the portfolio is Rheinmetall's unsurpassed expertise in turret systems, exemplified by products like the Lance turret and the turret structure for the UK's new Scout reconnaissance vehicle.

The two management companies – RLS and RMMV – will pull closer together organizationally in the new division and present a common front, while still maintaining their own corporate seats and locations. The ownership structure of RMMV, in which MAN Truck & Bus AG holds a 49 percent stake, remains unchanged. Clear market trends explain the need for the new division: customers today are more interested in systems than platforms. Large, highly complex procurement programmes are placing ever-greater requirements on the defence sector. Rheinmetall Defence is responding to these changes in a proactive way, presenting a bold, confident face to customers around the globe: hence the new Vehicle Systems division.

Up until now, Mr Hudson has headed Rheinmetall's Combat Platforms business unit and served as the CEO of Rheinmetall Landsysteme GmbH. Prior to coming to Rheinmetall he held a variety of executive posts at General Dynamics, BAE Systems and served in the Australian Army. Mr Wittlinger has been with Rheinmetall since 2007, first as head of Group Controlling, then as the commercial Managing Director of Rheinmetall MAN Military Vehicles GmbH.

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## News Briefs

The German Ministry of Defence has renewed a contract with Airbus Defence and Space to provide free satellite communications and calls for German troops for another four years, starting 1st July 2016. The existing contract framework has been augmented to meet the ministries directive for the provision of free, unlimited voice calling and internet access to all servicemen and women during operations, exercises and trainings outside Germany in order to keep in touch with their family and friends.

Whereas previous services were based on a mixture of ministry paid free calls and services individually paid by the soldiers, as of July 2016 soldiers will get full, unlimited access to voice calling and internet connectivity in all relevant locations abroad. The new service includes the provision of media servers, giving troops free access to movies, digital newspapers and the forces broadcast service.

"German soldiers can surf the internet, chat or make skype (video) calls over Wi-Fi using their own devices. The service is available in accommodation areas and welfare areas, and in special locations, like internet cafés, which are also provided by Airbus Defence and Space. We at Airbus Defence and Space are proud to be the partner of choice for this important service. The fact that these communications will be free of charge for the soldiers will make a huge difference to the welfare of troops serving in conflict zones around the world," said Evert Dudok, Executive Vice-President of Communications, Intelligence & Security at Airbus Defence and Space.

Telephonics Corporation has been awarded a production contract from US Customs and Border Protection (CBP) for its Mobile Surveillance Capability (MSC) vehicles to be used by agents on the US and Mexican border.

The contract has a base value of \$13.5 million with options and includes system deliveries and Integrated Logistics Support (ILS). CBP has been operating two Telephonics' MSC vehicles on the southwest border for over nine months, as part of an Operational Utility Evaluation (OUE).

MSC is a fully integrated and rapidly deployable mobile ground surveillance system, able to reliably detect, track and classify small and slow-moving targets encountered during border surveillance operations.

This classification capability enables CBP agents to quickly gather intelligence leading to safer and more precisely targeted interdictions.



● ● Photo courtesy Claire Heinenger US Army

## Tracking friend and foe

In the network centric battlefield of today, situational awareness of every echelon of any military force is vital in order to lift the ‘fog of war’ and to prevent attack and ‘blue-on-blue’ incidents. Blue Force Tracking on land, sea and air, is a hugely valuable asset. The knowledge of where your enemies and allies are located is central to a successful mission.

**The military’s transformation to network-centric** warfare places huge emphasis on situational awareness. The battlefield is a confusing, chaotic place and is unlike any other experience. Soldiers and commanders must know where their fellow troops are and where the enemy is at any given time and in real-time. This will enable them to make important, split-second decisions. The bigger picture is something we hear a lot about in the military. A range of different communications and applications are helping the military to build up a comprehensive and accurate idea of what is going on in the field and therefore enabling them to operate more effectively – and more safely.

### Blue Force Tracking

The concept of Blue Force Tracking or BFT has given the military this ability. The overarching benefits of BFT were recognized when it was used extensively during the conflicts in Iraq and Afghanistan. According to Richard J. Dunn III, Senior Analyst at Northrop Grumman’s Analysis Center, BFT was a ‘game changer’. He wrote: “Although only 210 BFT systems were deployed with US forces in Afghanistan and 1,242 were deployed in Iraq (with US Army, US Marine Corps and British forces), the impact on coalition command and control capability was extraordinary. In Afghanistan and Iraq, BFT provided revolutionary improvements in tactical command and control that contributed significantly to coalition ground forces’ ability to conduct decisive combat operations over daunting distances at previously impossible speeds. In both conflicts, units equipped with BFT were able to answer the three critical questions – “Where am I? Where are my forces? Where is the enemy?” – with previously impossible speed and accuracy, even when spread over vast distances. This quantum improvement in situational awareness allowed commanders to make decisions and issue orders much more rapidly and to employ their forces to the full limit of their operational capabilities unrestrained by the limits of FM voice radio and paper map command and control.”

Using GPS and communications technology, BFT can

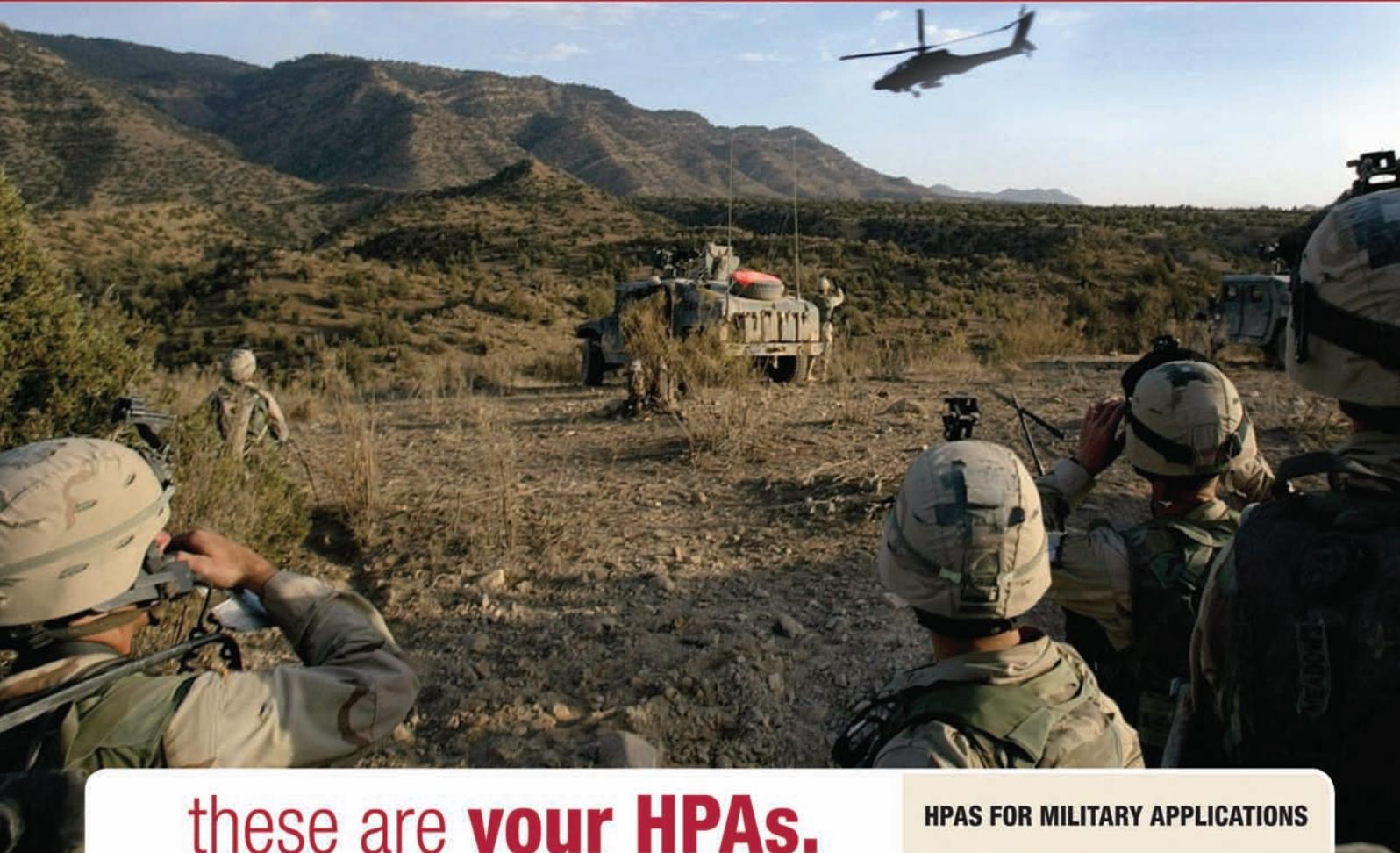
highlight where friends and foe are located, aiding situational awareness and making it easier for those in charge to exercise command and control. Where BFT is fitted, whether it be on a vehicle, a ship or aircraft, it can be located. This is especially valuable where a commander is trying to monitor troops over a large geographical area or in extreme weather conditions. Using space-based and mobile communications systems, BFT locates troops, gives precise positions and relays this information back to command and control in real time.

Friendly forces are shown in blue, and the enemy is shown in red. Satellite technology enables this due to its flexible nature and the fact that it may be used in any location regardless of how remote or hostile it is. BFT enables commanders to avoid blue-on-blue incidents and to maintain situational awareness at all times. It also facilitates target recognition and helps those in charge to direct their firepower to the correct target at the correct time.

BFT has now become an indispensable and sought after part of army communications equipment and has further capabilities built in such as two way text messaging and GPS for vehicles in motion. For the value of the BFT service to be fully effective, standards must be introduced and the system must be interoperable with all coalition forces. Satellite provides the principal means of communication for BFT systems today and due to a lack of military bandwidth COTS systems are becoming more and more popular in the armed forces. COTS are also more cost-effective and often easier to install. However, the main points that a BFT system must comprise are:

- A small, lightweight form;
- Flexibility and ease of use;
- Scalability;
- Ruggedness;
- Interoperability; and
- Standardization.

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Viasat upgraded the US Army's FBCB2 Blue Force Tracking system (BFT-2). In carrying out the upgrade, the company brought real-time situational awareness and better networking capabilities to the warfighter with BFT-2. This next-generation Blue Force Tracking 2 network and transceivers provide dramatic improvements in situational awareness through faster Position Location Information (PLI) refresh rates and timely Command & Control (C2) communications across the battlefield compared to the legacy system. This BFT-2 system has delivered improved network efficiency and reduced the Department of Defense's total operational expenditure for the specified capability. The US Army began fielding of BFT-2 in April 2012.

The FBCB2 BFT-2 network provides real-time C2SA information from brigade down to the warfighter and platform level, helping to increase combat effectiveness and prevent accidental attacks on Blue forces. ViaSat's BFT-2 system provides a fast, efficient, continuous monitoring of location and progress of friendly and enemy forces so that mobile and dismounted warfighters can see a clear, live map (with position reports updated in seconds) for accurate situational awareness. The next-generation BFT-2 system offers more accuracy and capacity than the original system, providing real-time location updates, instant messaging, and IP-capable networking to mobile air and ground platforms. Viasat supplies the BFT-2 network with air and ground transceivers, satellite ground stations, and network control centres, as well as satellite and terrestrial communications services.

With BFT-2, network users around the world can achieve real-time position accuracy by operating through a Ground Vehicular Transceiver or Aviation Transceiver globally. The average round-trip message latency through the network was proven to be less than two seconds.

ViaSat provides the following equipment and services in the new BFT-2:

- Small BFT-2 satellite terminals for a variety of ground vehicles and rotor/fixed wing aircraft;
- Hub equipment for high-speed two-way access to ground and airborne terminals;
- FIPS 140-2 Level 2 data link security to protect from adversarial traffic analysis and data probing;
- Network Operations Centre (NOC) equipment for overall network monitoring and control;
- Backbone network to connect all FBCB2 NOCs into a single

network for worldwide interoperability;

- Integration with fielded and future FBCB2 software versions; and
- Engineering services in support of the BFT-2 network.

#### JCR Logistics: a game changer in Blue Force Tracking

The US military relies heavily upon logistics vehicles and is using BFT to enable these vehicles to communicate with operational vehicles through two-way situational awareness and message exchange. This helps to form a complete and seamless picture on the battlefield. The army is highly reliant on the deliveries of vital fuel and other supplies from logistics vehicles and this system makes the whole logistics process safer. It allows the integration of the Army's Movement Tracking System with the Joint Capabilities Release (JCR) Logistics System which not only improves situational awareness for soldiers, but also streamlines services and creates efficiencies.

JCR Logistics enables logistics units to get the same mapping capabilities, the same operational picture and the

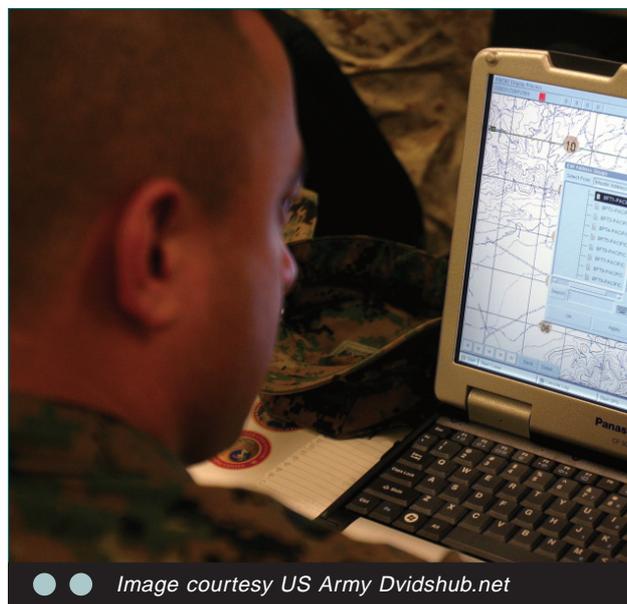


Image courtesy US Army Dvidshub.net

same messages as operational vehicles on manoeuvres.

JCR Logistics builds on the Force XXI Battle Command Brigade and Below/Blue Force Tracking system (FBCB2/BFT). This system was used in Iraq and Afghanistan and has been integrated into over 120,000 platforms. FCCB2's display shows blue and red icons over a geospatial imagery map, and paints a complete picture of the battlefield - including both friendly and enemy forces and terrain hazards.

The system underwent an upgrade in 2013 - the first of two - and incorporates the implementation of a faster satellite network and Type 1 secure data encryption. By integrating the movement tracking system, with JCR Logistics, users can communicate and track manoeuvre and logistics platforms together, thus enabling the safe and timely completion of missions.

#### Forewarned & forearmed

We all know how it feels to be under pressure to make a decision but when that decision involves lives, civilian or military, it's decision-making at a completely different level. Systems that can fill in knowledge gaps and that can work beyond line-of-

sight and over-the-horizon are now forming a critical part of network centric operations for the military. The systems must also be able to work effectively on land, at sea and in the air. The dependence that has been placed upon these systems has become intense and they are becoming more advanced with additional capabilities and are also coming down in price, making them more accessible, especially in terms of COTS systems that are interoperable and easy to use. If information is missing there could be catastrophic consequences. The systems help reduce human error and the possibility of tragic blue-on-blue deaths. These systems - that were not very highly acknowledged up until some years ago - are now carrying out a job that is quite simply saving lives.

Situational awareness given to militaries through BFT systems maximizes mission effectiveness and strengthens battlespace management through a shared common operating picture. Encryption ensures that two-way messaging is secure and near real time vehicle tracking provides highly accurate troop locations. The availability of these systems and their rapid pace of evolution reflects the fact that the safety of operating troops at all levels is of the highest priority.

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● ● Image courtesy US Army



● ● Video courtesy of Lockheed Martin

## US Navy to receive nation's 11th littoral combat ship

The Lockheed Martin-led industry team has launched the nation's 11th Littoral Combat Ship (LCS), Sioux City, into the Menominee River at the Fincantieri Marinette Marine (FMM) shipyard. The ship's sponsor, Mrs. Mary Winnefeld, christened Sioux City with the traditional smashing of a champagne bottle across the ship's bow just prior to the launch.

"It is an honour and a privilege to serve as the sponsor of the future USS Sioux City and to be a part of this major milestone along the way to her assuming her place as part of the great US Navy fleet," said Mrs. Winnefeld. "I also look forward to an ongoing relationship with her courageous crews and their families throughout the ship's lifetime."

Following christening and launch, Sioux City will continue to undergo outfitting and testing before delivery to the Navy in early 2017.

"The future USS Sioux City's interchangeable mission modules will empower her to face a variety of high-priority missions, from Anti-Surface Warfare to Anti-Submarine Warfare to Mine Countermeasures," said Joe North, Lockheed Martin Vice President of Littoral Ships & Systems. "She is ideally suited to navigate the reefs and shallows in the Asia-Pacific, as USS Fort Worth has demonstrated on her current 20-month deployment."

The Freedom-variant ships have demonstrated their value with successful deployments to Southeast Asia, including USS Fort Worth, which is providing the necessary capabilities for contingency operations in the region today. USS Freedom conducted a successful deployment to Southeast Asia in 2013 and is currently operating out of her homeport in San Diego.

"The Christening and Launch of the Sioux City (LCS 11) is a proud event for FMM," said Jan Allman, President and CEO of Fincantieri Marinette Marine. "It showcases the craftsmanship and engineering capabilities of our workforce. We are confident that this ship will play a vital role in the Fleet, and carry the spirit of our industry team as she sails the globe."

The Lockheed Martin-led industry team is currently in serial production of the Freedom-variant, and has already delivered three ships to the US Navy to date. The Sioux City is one of seven ships in various stages of construction at Fincantieri Marinette Marine, with two more in long-lead production. **GMC**

## News Briefs

Kelvin Hughes has successfully installed its new SharpEye™ upmast radar system on four new vessels commissioned by the Trinidad and Tobago Defence Force.

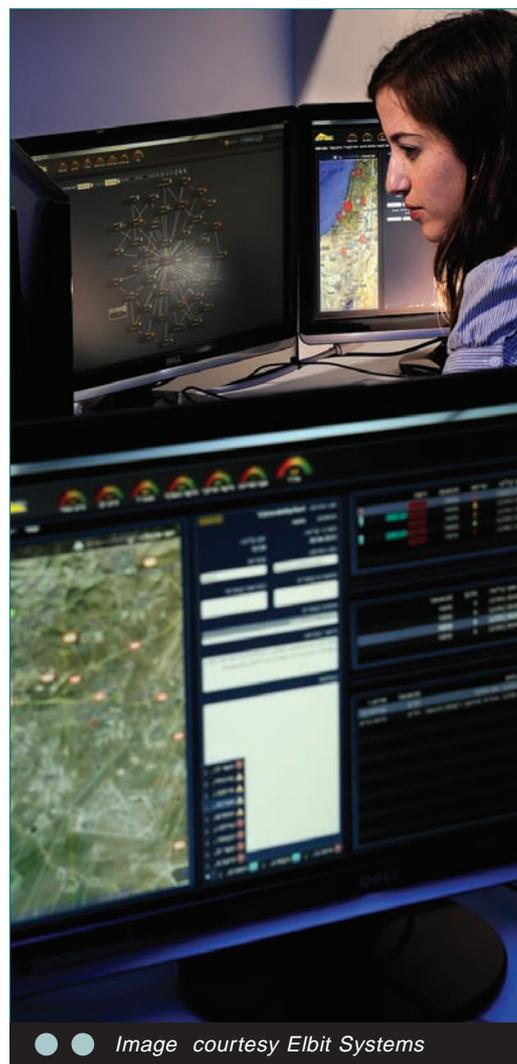
The Damen Stan Patrol 5009 Coastal Patrol Vessels are all now fitted with a Kelvin Hughes Advanced Surveillance System incorporating a SharpEye™ X-band radar, located upmast in a carbon composite housing with a stealth profile, as well as a tactical radar display. The four craft – the TTS Speyside, Quinam, Moruga and Carli Bay – will patrol Trinidad and Tobago's coastal waters and are also capable of operating in its Exclusive Economic Zone. The SharpEye™ radar was selected as the surveillance radar due to its superior target detection capability especially in poor weather conditions such as heavy rain and high sea states.

## Advanced cyber security simulator for Asia-Pacific country

Elbit Systems' wholly-owned subsidiary, CYBERBIT, has been awarded a contract to provide an Asia-Pacific country with CYBERBIT's CyberShield-Cyber Security Trainer and Simulator.

The CyberShield Simulator enables users, individually or as a group, to detect, respond and prevent cyber attacks, while experiencing advanced up-to-date attacks under real network protection conditions. The simulator presents various network protection scenarios, conducts follow-up debriefing and evaluates the results. The system will enable simultaneous training for multiple users on attacks directed at IT networks as well as industrial control networks (Supervisory Control and Data Acquisition – SCADA) used in most utilities.

Adi Dar, General Manager of CYBERBIT commented: "We are encouraged by this contract award from a customer in Asia-Pacific. The cyber threat is constantly increasing, bearing much potential impact on national infrastructures. I am pleased that we can contribute and improve the capabilities of governments to prepare and face this imminent and exponentially growing threat." **GMC**



● ● Image courtesy Elbit Systems



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## Wearable tech: challenges and conundrums

Technology such as smartwatches, fitness and activity trackers, tablets and smartphones is having a very significant impact on our everyday lives and we find these devices very useful in helping us to communicate, to keep up with day to day events and even to monitor our health. Militaries across the world are also assessing and developing ways in which wearable technology can be incorporated into military kit to enable better operational performance and enhanced safety. We delve into the world of wearable tech for the military.

**Technology is truly permeating into our everyday lives.** You can wear a bracelet that tells you how long you have slept for, how high your heart rate is, how many steps you have taken. You can wear a watch that may be used as a phone, provides Internet connectivity, camera and GPS. In our daily lives, we have access to the widest range of technology that we have ever had. We know how apps help us perform our everyday tasks and how they can alert us when something is not quite right. The military is exploring this technology to see how it may assist personnel on and off the battlefield. It makes sense. The truth is that wearable tech holds huge potential for the military but it also throws up some very important questions and problems too.

### UK MoD works toward wearables

If a soldier can wear technology it means that he has going to be much less fatigued during long operations. It can give excellent situational awareness to the wearer and provide a multitude of information that would be available at their fingertips. It can enable the wearer to track friendly forces and adversaries. It even enables them to monitor their own state of health and can be extremely useful by giving critical information when colleagues are wounded and need medical attention. These are just a few examples of the ways in which wearable tech can help.

Let's take a look at the work that the UK Ministry of Defence is doing in the wearable tech field. The Future Soldier Vision or

FSV is part of the UK MoD's plan to ensure that British soldiers have access to the very latest technologies and high quality equipment. The first phase of the concept has been developed by the Defence Science and Technology Laboratory (Dstl) and their industry partner Kinneir Dufort, along with the British Army. FSV was unveiled at DSEI 2015 and provides the MOD and industry with an aim point for what the soldier could look like a decade from now. It provides a platform to challenge what this future could be and how industry and academia could help the MOD to make it a reality.

The design includes:

- Head sub-system concept incorporating hearing protection, lightweight sensors for information sharing and an integrated power supply.
- Torso sub-system concept of segmented armour that can be customized to the user or situation with integrated connectors and power supply. It also features a quick release cord which releases armour at the shoulders in an emergency and flexible shoulder pads for added protection and to help with weight distribution when carrying loads.
- Smart watch style wearable communications concept which incorporates sensors to record the user's biometric data.
- Smart glasses concept which include a heads-up display, integrated camera and bone conducting headphones to increase situational awareness without compromising hearing.



● ● Photo courtesy Raytheon

- A robust personal role computer concept enabling better information sharing and communications between personnel.
- Ergonomically designed and customizable the weapon concept will allow targeting information to be shared between soldiers and their units.

The Future Soldier Vision is designed to work as an integrated system with survivability, enhanced situational awareness and network capability all central to the concept. Protection technology, a network of sensors for information sharing and power and data connectors will also all be built-in.

### Raytheon's Aviation Warrior

Raytheon has also developed its new 'Aviation Warrior' System which helps to raise pilot's awareness to a new level through state-of-the-art situational awareness technology that can be worn by the pilot. The system keeps warfighters fully connected even when separated from the cockpit.

The Aviation Warrior system consists of a wearable, centralized data processing computer that provides maps, sensor imagery, video and messaging data from multiple military networks. The device is integrated with a survival radio and GPS.

The data processing computer couples with a razor-thin, wearable display that controls all soldier-worn equipment and aircraft systems. The display can be worn on the wrist, leg, or vest. While inside the cockpit, the system communicates with a helmet that features hostile fire indicators, 3D audio and a monocular, and the ability to show critical flight information in a heads up display.

The system has been created especially for the US Army as part of the proposed Air Soldier programme and is a \$4.7 million contract. The system runs on Android or Windows operating systems.

### The medical case for wearables

Another stand-out application for wearables on the battlefield is

for health monitoring purposes. US troops already have access to smartphone technology to enable them to diagnose and gain access to medical information so that they may respond to emergency situations. However, the US department of Defense wants to take this a big step further and use wearable technology to monitor the health of troops in combat, enabling commanders and medics to determine which soldiers may be struggling due to fatigue and stress and other medical issues. The DoD has formed a partnership with a consortium of companies such as Apple, Lockheed Martin and Boeing, to investigate ways in which this can be actioned and introduced to the battlefield. Monitoring would include systems that can pick up real time physiological data on muscles and brain injuries to enable Army medics to triage more effectively. It also includes the development of devices that will eventually enable ECGs (electrocardiograms) and EMGs (electromyography) to be carried out even in extreme situations.

### The battery issue

The benefits in the use of wearable technology are many, but the big question has to be how they are powered. Any device is useless without a power source. At present, troops are required to carry a staggering amount of batteries on operations. The average soldier has to transport around 20 pounds of batteries at any one time. Lightening this load through the use of wearable technology would be a huge burden lifted from troops – but how can this be achieved?

This is still an area that is undergoing intense research and development and the question of how to cater for increased power demands without adding to the weight already carried by the average soldier is absolutely key.

Lincad is a UK-based company that is a leader in the design and manufacture of bespoke batteries, chargers and power management systems for the military. It recognizes the heightened demand for wearable tech and the benefits it can bring to military operations. It is for this reason that it recently announced it will be committing new R&D resources to power wearable military technology.

There are a number of potential avenues being explored by Lincad. As Peter Copplestone, Lincad's Operations Manager, commented: "The integration of wearable technologies and charging solutions such as energy harvesting and wireless charging, will largely be driven by technology and design. As a company this is a key area which we are very interested in exploring further."

### The security risk

So, we have looked at the massive benefits that wearable tech can bring to the battlefield. However, there's always something to rain on the parade but this is an issue that is of critical importance and that is security. Where there is Internet access or networking, there is a risk of jamming and hacking and threat that information flowing over the network can be exploited by adversaries. Last year, China placed a total ban on smartwatches and any wearable tech for their troops for the protection of state secrets. As in the civilian world, there are many issues surrounding any networked devices and applications such as Internet access, cameras, location information, voice calling and video.

The fact is that the challenge of cybersecurity is enormous and protection of these wearable devices is going to be of absolute paramount importance if this technology is going to be used widely across the military. Parameters must be established on how devices are used and what data users are permitted to access and store. Information, especially location data, is extremely precious to adversaries and can be easily exploited. Other information such as daily routine could potentially be accessed and used against troops as well as a wealth of other sensitive data. This will be a major stumbling block in bringing the concept of wearable tech to fruition. Wearable devices are just as vulnerable to hacking as any

smartphone or tablet and it is a major challenge for any defence department to overcome.

### Pros and Cons

Whilst the development of wearables for the military moves on and the technology pace quickens yet again, the obvious benefits of wearable devices can't be ignored. In terms of heightening situational awareness further for troops engaged in combat, it is invaluable. It gives unprecedented access to information for the boots on the ground. It also makes communication very easy and improves access to information and targeting. As we have seen there are further applications for wearable tech such as medical and targeting, even wearables for military dogs. The reduction in battery weight and the consideration of other power

sources is a major concern for troops that are only too accustomed to carrying an enormous amount of weight power packs. This could potentially be minimized through the use of wearables. There are undeniable benefits. However, the ghost of cyber security looms very large and it is easy to see why. This will have to be addressed to ensure that the network that the devices will operate on is hack proof and that there are strict parameters put in place in terms of the data and imagery that may be accessed and stored. That said, the investment being poured into the device technology itself and the power sources they will use is significant. Wearable technology for the military is here to stay and is part of the vision for the soldier of the future. How the issue of security will be overcome, we will have to wait and see.

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● ● Photo courtesy UK MoD and DSTL





● ● Photo courtesy Shutterstock

## Singapore Homeland Security: countering the terror threat

Homeland security is a very significant concern across the Asia-Pacific and with the increase in terror-related events and also the effect of natural disasters it is easy to see why. Last year, Singapore agreed to back the multinational coalition against the Islamic State. This move has automatically rendered Singapore as vulnerable to an attack on its citizens. Of most concern are the so-called 'lone wolf' attacks that are launched without warning and can strike anywhere and at any time.

**ISIS has singled out Singapore for attacks and this** means that forces have to be prepared for any incident.

Professor Rohan Gunaratna, Head of the International Centre for Political Violence and Terrorism Research (ICPVTR) commented at a roundtable session ahead of the inaugural Asia-Pacific Homeland Security conference that was held at the end of October 2015 in Singapore, that a multilateral response from ASEAN leaders is required to counter increasing terrorist threats in the region. He said that a united response was urgently needed to safeguard the region and to reduce the social and economic fallout of such incidents.

He added that the number of Islamic State (ISIS) supporters in the region has risen and warned that the frequency and gravity of attacks like those in Bangkok in August will increase if the region's leaders do not act together. He said more attacks would seriously harm overseas investment in the region, while also impacting local tourism.

According to Professor Gunaratna, there are now 30 terrorist groups pledged to ISIS, including 22 in Indonesia and five in Malaysia. More than 600 people from Southeast Asia have also left to fight with ISIS militants, including over 500 Indonesians and nearly 100 known recruits from Malaysia.

Thailand's Ministry of Tourism estimates the bomb explosion in Bangkok has cost its domestic tourism industry USD\$1.79 billion in lost revenue, with one million fewer tourist arrivals. Governments including Australia and the United States, have

also issued travel warnings for Malaysia and the Philippines.

Professor Gunaratna said, "Another high impact terrorism incident in ASEAN will bring further serious economic repercussions across the region as investor confidence dives, and more travellers are deterred by travel warnings. Socially, there is also a risk of paranoia forming in local communities as it has in Europe."

He continued: "While Indonesia, Malaysia, the Philippines and Singapore face the most direct terrorism threat, the problem requires an ASEAN-level response to ensure the future socio-economic security and stability of the region."

"To combat ISIS threat, the Five-Eyes intelligence-sharing alliance of Australia, Canada, New Zealand, the United Kingdom, and the United States is a good example of how ASEAN countries might work together on this issue. ASEAN governments could also be doing a lot more to support local religious leaders educate followers against recruitment to ISIS and empower communities to act as 'eyes and ears'," he concluded.

The importance of knowledge exchange is going to be a very important part of tackling the terrorist threat. In 2013, the Republic was criticised by the United States which said that Singapore's bilateral and multilateral engagement on counter terrorism and law enforcement was 'inconsistent and marked by a transactional mindset'. If leaders in homeland security can come together, whether they are from the private or public sector,

and share their experiences, a rich dialogue can begin and countries can work together instead of independently.

### Exercise Northstar 9

To prepare for an attack on Singapore, the Singapore Civil Defence Force (SCDF), along with other agencies, conduct an Exercise entitled Northstar. Northstar was first introduced in 1997 and last year saw its 9<sup>th</sup> iteration. The Exercise is intended to test readiness and co-ordination between national agencies in response to major emergencies and terror incidents. The exercise also serves to raise awareness of the entire Government response framework that has been put in place to safeguard Singapore's national security. In total, about 600 personnel and 60 emergency and supporting vehicles participated in the Northstar 9. Such exercises are part of the various agencies on-going efforts to validate and update operational plans and procedures. In total, about 400 personnel and 44 emergency and supporting vehicles participated in the exercise.

### Police efforts

The Singaporean Police Force has developed a number of groups that are used to keep dialogue up between themselves and the public and business community. Back in 2003, they established the Security Watch Group (SWG) Scheme which started off as a police networking platform for the commercial sector so that businesses could collaborate with police on the target-hardening of their premises. Buildings are grouped into clusters and they undergo a three-step process of threat assessment, auditing of systems and streamlining of operations through the pooling of resources.

Nonetheless despite the good rapport with the business community to fight crime and terrorism threats, there is still a discernible level of threat in the security climate. Hence there is a critical need to bring the existing mode of engagement with the business community through the SWG network to a higher

level, by adopting a broader and more holistic Home Team approach within it. As a result, the Singapore Civil Defence Force (SCDF) was roped in to jointly administer in the scheme.

Beginning in November 2006, the SWG Scheme underwent an upgrading exercise to incorporate both safety and security aspects of the Police and SCDF, and become officially known as the Safety and Security Watch Group (SSWG) Scheme. Through this conversion, the business community will be better equipped with robust measures to fight crime and terrorism threats effectively as well as become more confident to tackle future crisis incidents.

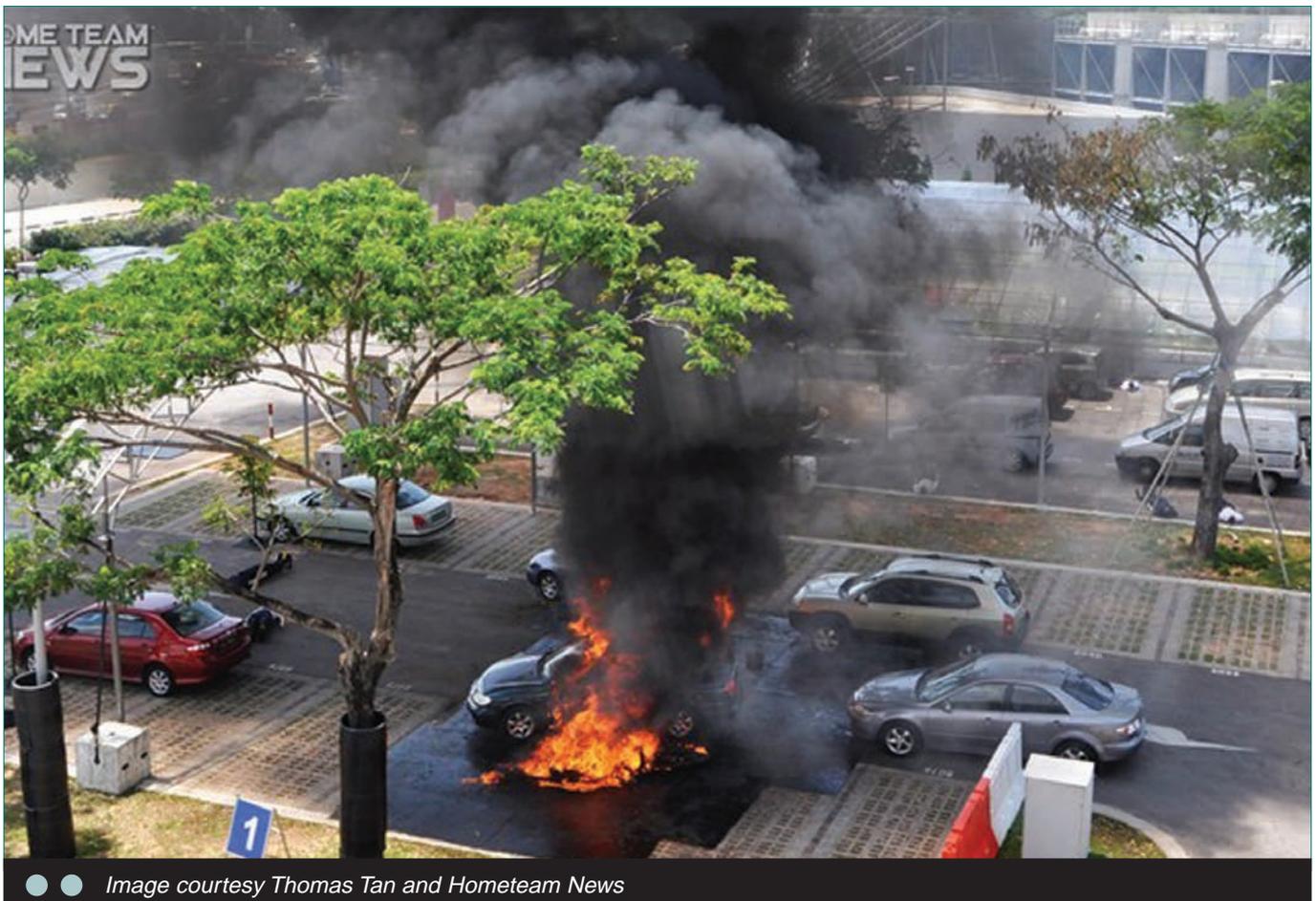
### Project Guardian

Singapore has followed London's lead by establishing Project Guardian, a public-private partnership that aims to enhance the skills and capabilities of private security personnel in mitigating a national crisis. It has been adapted from the City of London Police's Project Griffin, established in 2004. It aims to encourage all commercial companies employing private security protection services to pledge their support and assist the authorities in the fight against terrorism.

The aims of Project Guardian are to:

- Raise awareness and seek solutions to current terrorist and crime issues;
- Share and gather intelligence and information;
- Build and maintain effective working relationships;
- Maintain public trust and confidence through extended security presence; and
- Facilitate community ownership in security especially in the immediate response to crisis.

Under the PG scheme, SPF will collaborate with private security agencies and participating SSWG members to reach out to security personnel, in the bid to heighten their awareness on terrorism and counter terrorism. Security personnel will be



● ● Image courtesy Thomas Tan and Hometeam News

given the opportunity to attend workshops and participate in joint ground deployment exercises to test their responses and the establishments' contingency plans in simulated attack scenarios. For instance, "Exercise Heartbeat" is an annual collaborative exercise between the Home Team and the SSWG in dealing with terrorist attacks.

With security personnel briefed on how to respond effectively in a crisis, they can be relied upon to support evacuations, cordon support, crowd control, traffic diversion and emergency communications.

### The key

The involvement of all agencies, organizations and the public is key to Singapore's counter terrorism strategy. The result of information sharing can already be seen through the implementation of Project Guardian. It is initiatives like this that can help equip countries to be as prepared as they possibly can be for an attack and by involving all sectors of society and urging vigilance at all times. After the latest deadly attacks in Jakarta, there is a real sense of urgency from ASEAN countries and experts like Professor Gunaratna to deal with this impending threat through unification of assets and knowledge and to use their greatest resource – their people – to identify threats before they are allowed to escalate.

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● ● Photo courtesy Singapore Ministry of Defence



● ● Photo courtesy Singapore Ministry of Defence



**SOFEX JORDAN**

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FOR GLOBAL SECURITY**

**THE XI<sup>th</sup>  
SPECIAL OPERATIONS FORCES  
EXHIBITION & CONFERENCE**

**9<sup>th</sup> - 12<sup>th</sup> MAY  
2016**



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● ● Photo courtesy Staff Sgt. Jack Carlson III US Army

## Airborne ISR

Airborne intelligence has become a staple of any military's C4ISR portfolio and although budget constraints and changing priorities have struck militaries across the world, airborne ISR remains a top priority and an essential part of the C4ISR portfolio for both military and civil use.

**C4ISR or Command, Control, Communications,** Computers, Intelligence, Surveillance and Reconnaissance already plays a pivotal role in the military environment, but these systems are forecast to play an increasing role in operations going forward. C4ISR systems enable militaries to collect high levels of intelligence and information from a variety of different sources, including HD video, sensors and radar and enables commanders and soldiers or civil security agencies to take this information, to analyse it and display it in real time, facilitating excellent situational awareness and aiding rapid decision making across all domains. These systems are now fundamental to the modern armed forces and they are in huge demand. With prices coming down, the barriers to entry are also falling, making these invaluable systems available to militaries across the world. C4ISR systems are key to situational awareness and enable commanders to see the bigger picture using various layers of imagery and data.

According to Defence IQ's *Airborne ISR and AEW 2015-2016* market report, the global market for airborne intelligence, surveillance and reconnaissance is projected to grow at a CAGR of 3.2 percent between 2013 and 2023. This underlines the importance of these systems to militaries the world over. Airborne systems bring with them such a unique view of the battlefield or of an area under surveillance, that they are absolutely integral to modern warfare. The growth in the use of Unmanned Aerial Systems and other manned surveillance aircraft has been exponential. These air-based systems are the military's eyes and ears and so much more. Delivery of complex

imagery, data and video from a variety of cameras, sensors and radar on board, enable commanders to build up an incredibly detailed picture of the area that is being watched. The US has led the way in terms of airborne ISR, but what is clear is that other countries are also now looking to strengthen their airborne ISR capabilities.

### Australia

According to Defence IQ's report, the Royal Australian Air Force (RAAF) has signed a contract with Boeing for the delivery of four P-8A Poseidon Maritime Patrol Aircraft (MPA) to be accompanied by a full training simulator suite.

The Poseidon MPA is based on Boeing's Next-Generation 737-800 commercial aeroplane. It offers the worlds' most advanced anti-submarine, anti-surface warfare and intelligence, surveillance and reconnaissance capabilities.

Australia's participation in the P-8 program began in 2009 when the government signed the first in a series of memorandums of understanding to work with the US Navy on system design and development. The US Navy and the RAAF also established a joint program office that operates at Naval Air Station Patuxent River.

Production of the first Australian P-8A began in 2015, with delivery to the RAAF scheduled this year. Boeing will also provide the RAAF with a complete training system for the P-8A, using simulators to train pilots and mission crews to operate the aircraft, its sensors, communications and weapons systems without relying on costly live flights.

### Brazil

Brazil, a country that has a vast border to police and huge areas of the Amazon Basin to monitor, ordered 36 Gripen aircraft from Saab Defence and Security in 2014 which have now been delivered.

The Gripen Next Generation (NG) aircraft is a fully NATO-interoperable, true multi-role fighter with outstanding availability, tailored for the future Network Centric Warfare (NCW) environment and provides excellent tactical flexibility

Gripen NG offers superior situational awareness through an AESA radar,IRST passive sensor, HMD, cutting-edge avionics, next generation data processing and a state-of-the-art cockpit. Gripen NG also features proven Network Centric Warfare capabilities including advanced data communications, dual data links, satellite communications and video links. On-board sensors, in combination with HMD/NVG, deliver the ability to detect and destroy a wide variety of targets, even at night or in poor weather conditions.

In addition to the aircraft themselves, the Brazilian Ministry of Defence, through the Aeronautics Command (COMAER), signed a contract for Gripen NG weapon acquisition in April 2015.

### Japan

Japan is another country that is stepping up its aircraft and airborne ISR capabilities. According to Defence IQ, the Japanese MoD has requested its largest military budget in fourteen years at \$42.38 billion. Japan has placed an order for three RQ-4 Global Hawk UAVs.

RQ-4 Global Hawk is a combat-proven High Altitude Long Endurance Unmanned Aerial System with extraordinary ISR capabilities, providing near-real-time high resolution imagery of large geographical areas all day and night in all types of weather.

The Air Force Global Hawk evolved from DARPA technology and was deployed overseas shortly after the September 11, 2001 terrorist attacks. Today, the active Global Hawk enterprise

is made up of three complimentary systems. The Global Hawk Comms Gateway was unveiled in 2006 and operates the Battlefield Airborne Communications Node (BACN), a communications system that receives, bridges, and distributes information among all participants in a battle.

The Global Hawk Multi-INT is important for situation awareness and intelligence across huge areas of land and carries the sensor systems EISS (Enhanced Integrated Sensor Suite) and ASIP (Airborne Signals Intelligence Payload). The Global Hawk Wide Area Surveillance carries the Multi-Platform Radar Technology Insertion Program (MP-RTIP) which provides situational awareness and targeting information on both fixed and moving targets.

### South Korea

South Korea has also recently purchased four Global Hawk UAS and has awarded Raytheon a contract valued at up to \$45.7 million by Northrop Grumman to provide ground segments in support of the new systems.

Under this contract, Raytheon will deliver one building-based and one mobile ground segment to locations in South Korea. Work under the contract will be performed at Raytheon's Dulles facility and is expected to be completed by mid-2019.

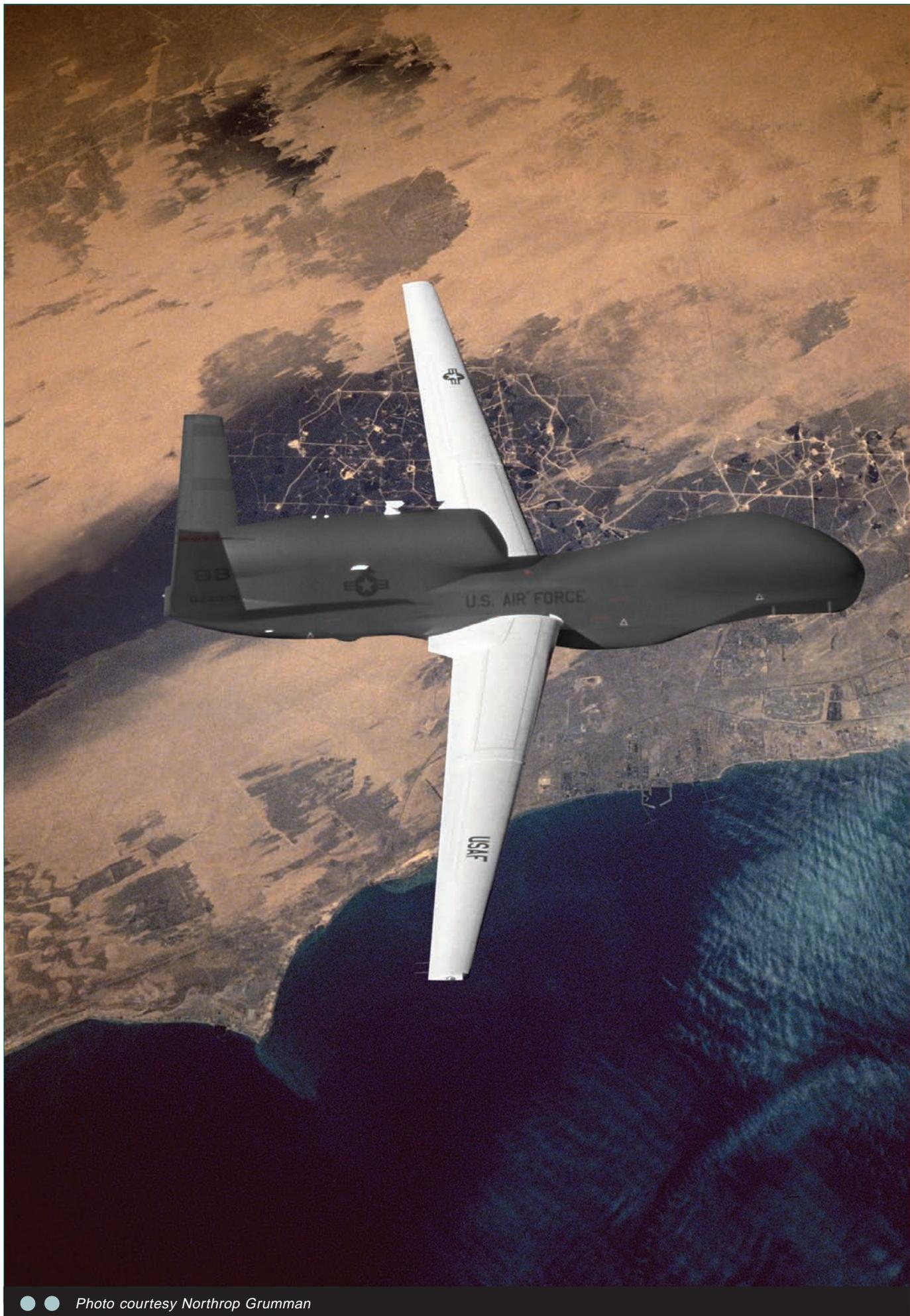
### US

The US Army awarded a contract to Sierra Nevada Corporation (SNC) and its partner, Leidos to design, produce, integrate and test for the Airborne Reconnaissance Low-Enhanced (ARL-E) program of record. The ARL-E program is a manned, multiple intelligence (multi-INT) airborne platform that provides a persistent capability to detect, locate, classify/identify and track surface targets in day/night, near-all-weather conditions with a high degree of timeliness and accuracy.

The single-award, indefinite-delivery/indefinite-quantity (IDIQ) contract has a five-year period of performance and a total ceiling value of \$661 million. The first task order under the IDIQ will provide the System of Systems (SoS) integration of an



● ● Photo courtesy Boeing



● ● Photo courtesy Northrop Grumman

extensible Mission Equipment Payload (MEP), including the modification of Bombardier DHC-8 aircraft. Through the duration of the contract, Leidos, the prime contractor, SNC and other teammates Argon ST (a Boeing Company) and L-3 ComCept, will provide an affordable, high-maturity solution using a flexible open architecture that enables integration of future capabilities. The goal is to promote growth and maximize the Army's investments.

With years of airborne intelligence, surveillance and reconnaissance (ISR) experience supporting a variety of military customers, including the US Army, the Leidos and SNC team provides solutions that meet the current and future mission needs for the Armed Services.

The team has operationally integrated and flown every type of Government identified sensor in the ARL-E solicitation, validating its offering for the ARL-E MEP as a technologically-sound, low-risk solution.

### US JSTARS

The US Air Force Joint Surveillance Target Attack Radar System (JSTARS) is being re-capitalised which means that its fleet of ageing E-8C reconnaissance aircraft that have been flying continuously for over thirteen years. The recapitalisation pre-engineering and manufacturing development contracts have been awarded to Boeing, Lockheed Martin and Northrop Grumman, and the programme will consist of four integrated components:

- 1) a commercial business jet derivative.
- 2) radar subsystem.

- 3) communications subsystem.
- 4) integrated battle management command and control suite.

The US Air Force wants to develop modular, scalable subsystems using an open systems architecture that will allow rapid improvements in the future. The new, modern airframe will enable the USAF's ability to detect threats, process data and distribute information.

Northrop Grumman is putting forward an adapted version of their Gulfstream G550 business jet, whilst Lockheed Martin is proposing their version of the Bombardier Global Business Jet. Boeing is set to offer their 707-300 business jet. The contract award is expected to be made in early 2017.

### Tried, tested and cost-effective

Airborne ISR is a part of the C4ISR portfolio that no military is prepared to cut back on, despite shrinking budgets. These eyes and ears in the sky are simply too important to ignore and, as we have seen here, countries all over the world are using airborne ISR for both military and civil requirements. Defence departments are looking to use tried and tested technology that they know is reliable and will yield results, but they are also very mindful that technological developments will mean that platforms must be easily upgraded. They are thinking about the future, yet keeping costs as low as they can. The airborne ISR platforms of today are built with this in mind. Manufacturers are constantly keeping one eye on the future and are ensuring to the fullest extent possible that their platforms, whether manned or unmanned, are able to deliver the communications of tomorrow as well as today.

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