



European Security & Defence

7/2017

International Security and Defence Journal



COUNTRY FOCUS: FINLAND

Fighter Pilot Training



Norway's Defence Revival

New focus on Arctic operations in response to Russia's military build-up



Securing Strategic Sites

Increasing terrorist threats require the revision of current protection concepts.




FULLY
INTEGRATED



C4I

SOFTWARE



FROM HEADQUARTERS
TO THE TACTICAL EDGE

www.systematic.com/sitaware

SYSTEMATIC
SITAWARE

SYSTEMATIC

A Challenge for Europe



Donald Trump has never made any bones about his opinion of the "Joint Comprehensive Plan of Action" (JCPOA), signed in July 2015 by the then US Secretary of State John Kerry. Aimed at reining in the Iranian nuclear programme, President Trump describes the JCPOA as one of the "worst deals" the USA has ever got itself into. This particular utterance might perhaps not be accorded any great significance, given that he has greeted other agreements by the previous administration with equally deprecatory remarks. However, now he is following words with action, and stepping up the pressure on the regime in Teheran, and some of the arguments which he set out in his speech on 13 October 2017 cannot be dismissed so easily. Right from the outset, critics have warned that the agreement does nothing more than gain time for Iran, without any modification to its intentions. In fact, reintegration into the global economy could help the country get back on its feet, which in turn means that it could pursue its destructive policy from a position of greater economic strength and even more successfully than before. Indeed, over the past few years Iran has left no stone unturned in seeking to build up its influence in the Middle East, and in the process to stir up or exacerbate conflicts. Shoulder to shoulder with Russia as a supporter of the Assad regime, Iran is de facto no longer just an ally, but dominant over Syria. In its hybrid conduct of war, it services subversive and terrorist movements, so as to destabilise Yemen for example, and to bring together the players in the anti-Saudi game in that particular theatre. The desire for the destruction of Israel is unabated. While founded on ideological and "religious" grounds, the actual geostrategic interests of Iran would call for another policy, and one that is perhaps even contradictory. The regime in Teheran is, however, not the sole unsettling factor in a region driven by crisis: to the west, with the Maghreb and the Sahel zone, it abuts another area with which it in many respects has close bonds. For years the focus has been on bringing down the "Islamic State". Now that this grotesque parody of the historical Caliphate is steadily disappearing from the map, other problems are emerging from its shadow. Some of these awaken old memories. Saudi Arabia and Egypt are in competition for dominance in the "Sunni camp". Riyadh is also trying hard to prevent neighbouring states on the Ara-

bian Peninsula from escaping its influence, if necessary making recourse to means such as invasion (Yemen), "military support" (Bahrain) or isolation (Qatar). These power struggles are overlaid by the conflict between "the Shiites" (led unchallenged by Iran) and "the Sunnis", a conflict that is not solely an issue between states. In some of the Gulf States, including Saudi Arabia, there are substantial Shiite populations that are suspected of being Teheran's fifth column, and who are discriminated against in public life. Things are no longer the way they were only 20 years ago, when the autocrats sitting relatively safely in the saddle were playing classic power politics. Following the fall of the Iraqi dictator Saddam Hussein, the balance of power in the region has shifted in favour of Iran. The "Arabellion", the Arab Spring, however depressing its results were in the end, has at least exposed how fragile the apparatus of regime power really is. Sustained low oil prices rob the potentates of the means to buy social peace; beneath them a demographic time bomb is ticking. Pressure is growing from generations which are steadily increasing in numbers, often well educated, and no longer to be isolated from foreign media and influence – and patently without a solution on the horizon as to how to meet their expectations for a better life. The Kurds, too, are seeking to exploit this ever more volatile and more explosive situation, and are challenging the existing borders. Their demand for their own state is still limited to their autonomous region in northern Iraq, but because the 40 million-strong population is spread over three other states too – Syria, Turkey and Iran – expectations of a domino effect run high. But support for the Kurdish leadership in Erbil from the international community is relatively low, even from those whom it views as its allies: at present only Israel appears to be content with an independent Kurdish state. The Euro-Atlantic community of states will have to find a response to this potent situation, because their security interests are threatened, and further escalation could have substantial economic consequences. Some seem to be placing their bets on the Russians setting things to rights, even if Moscow is pursuing its own aims. These bets, however, ascribe to Moscow an aptitude for the stabilisation of critical regions for which, regrettably, there has been no example in recorded history. **Peter Bossdorf**

Alliance Ground Surveillance



Photo: Northrop Grumman

The new system will enhance NATO's capabilities significantly. **Page 40**

SECURITY POLICY

- 10 Norway's Defence Revival**
Stephen Blank
- 16 Protecting the 5th Republic**
The French Internal Security Challenge
David Saw
- 20 Deadlock in the Caucasus**
EU's Engagement with Abkhazia Needs a New Boost
Jan Blinka

COUNTRY FOCUS: FINLAND

- 24 Strengthening the Pillars of Security and Defence**
Finland's Policy in a New Environment
Teija Tiilikainen
- 28 Finland's Defence Today and Tomorrow**
Jarmo Lindberg
- 34 "We are following the European directives strictly."**
Interview with General (retd.) Raimo Jyväsjärvi,
National Armaments Director and Director General,
Resource Policy Department, MoD Finland
- 36 "We wish to maintain our operational independency in all situations."**
Interview with Lieutenant General Kyösti Halonen, Deputy
Chief of Staff, Logistics and Armament,
Finnish Defence Forces
- 38 The Finnish Defence Industrial Base**
Capabilities and Perspectives
Tuija Karanko

ARMED FORCES

- 40 Alliance Ground Surveillance**
Camille Grand

Urgency in the Middle East



Photo: Kongsberg

Regional air forces are re-equipping to meet escalating security threats. **Page 91**

- 44 "We need to have the new F-110 frigates by 2023 or 2024."**
Interview with Admiral Teodoro López Calderón,
Chief of Staff, Spanish Navy
- 48 Italy's 2017 Defence Budget and the 2017-2019 Planning Document**
Luca Peruzzi
- 52 Challenges in Thailand**
David Saw

ARMAMENT & TECHNOLOGY

- 57 Last Line of Defence**
The Market for Aircraft Self-Protection
Georg Mader
- 63 KC-46 PEGASUS Status Report**
Sidney E. Dean
- 66 Fighter Pilot Training**
William Carter
- 70 Securing Strategic Sites**
Tamir Eshel
- 74 Calming the Storm**
Equipment for Riot Control
Doug Richardson
- 79 CBRN Training and Simulation**
Dan Kaszeta
- 82 Technology Driving Increased Simulation Fidelity**
Trevor Nash

INDUSTRY & MARKETS

- 85 Danish Defence Industry 2017**
Jørgen Bo Leimand
- 91 Urgency in the Middle East**
Regional Air Forces Are Re-equipping
Alan Warnes

- 94 **"We continue to invest in the finest technical minds to develop new solutions"**
Interview with Alex Hooper, Vice President Global Sales & Business Development, Revision Military
- 96 **Business Perspectives for European Defence Industry in Latin America**
Harry Campbell
- 100 **Virtual and Live Firing Under One Roof**
Interview with Michael Paulk, Director of Virtual Systems, Meggitt Training Systems

■ VIEWPOINT FROM ...

- 15 **Oslo**
Bjørn Domaas Josefsen
- 23 **Berlin**
Wolfgang Labuhn

■ THE BRUSSELS BACKDROP

- 46 **Coping with the Rocket Man: US and EU Approaches**
Joris Verbeurgt

■ MARKETING REPORT

- 88 **Danish Cooperation Led to International Success**
Systematic A/S

■ COLUMNS

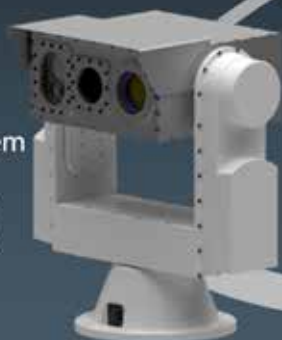
- 1 **Editorial**
- 4 **Periscope**
- 99 **Masthead**
- 102 **Firms & Faces**
- 104 **Preview**

Index of Advertisers

Bittium	31
boger electronics	41
Ceska zbrojovka a.s. (CZ)	3rd cover
Enforce Tac	9
ESG Elektroniksystem- und Logistik-GmbH	67
Eurosatory	33
Eurofighter	27
Eurojet	29
EXPAL	11
GPEC	101
KADEX	90
Kallman	51
Lockheed Martin	4th cover
Miltech Hellas	3
Rafael	71
Revision	5
Robonic	35
Sensoror	59
SOFEX	22
Systematic	2nd cover
WB Group	7



•**MLT-TDR-10**
Advanced Long Range
Thermal Surveillance System
(Thermal Cam / Day Cam /
GPS / LRF / Gyro-Stabilized PTZ /
Control Stations / Auto Tracking)



•**MLT-TDR-5**
Short Range Thermal
Surveillance System
(Thermal Cam / Day Cam /
LRF / Gyro-Stabilized PTZ)



•**MLT-IRB-75U**
Multi-Sensor Thermal Binocular
(Thermal Cam / Day Cam / GPS / LRF /
Compass / Tilt Indicator / Image
Recording)



■ The Netherlands to Buy AIM-120 C-7 Advanced Medium Range Air-to-Air Missile (AMRAAM)

(ck) The US State Department has approved the sale to the Netherlands of 26 AIM-120 C-7 Advanced Medium Range Air-to-Air Missiles (AMRAAM), one AMRAAM Guidance Section Spare (MDE items), 20 AMRAAM Captive Air Training Missiles (CATM), missile containers, control section spares, weapon systems support, test equipment, spare and repair parts, publications and technical documentation, personnel training, logistics, technical support services, and other related elements of logistics and program support. The estimated total cost is \$53M. This sale is to

Photo: Raytheon



support the foreign policy objectives of the United States by improving the security of a NATO Ally which continues to be an important force for political stability and economic progress in Europe. The sale will improve the Netherlands' capabilities for mutual defense, force modernisation, and NATO interoperability. This sale will enhance the Royal Netherlands Air Force's ability to defend the Netherlands against future threats and contribute to NATO operations. The Netherlands maintains the AIM-120B in its inventory and will have no difficulty absorbing these missiles into its armed forces. The prime contractor will be Raytheon Missile Systems.

■ IAI Develops Unmanned Helicopter

(ck) The AIR HOPPER, an unmanned helicopter developed by Israel Aerospace Industries (IAI), has successfully completed first tests. IAI demonstrated the AIR HOPPER to officials of the defence industry and the IDF. The demonstration covered two scenarios, the first simulating carrying a seriously-wounded soldier to a extraction point for life-saving treatment, airborne monitoring of vital signs and real-time dispatch to the ground. The second scenario simulated carrying logistic supplies to an isolated force at the front line, which could not be accessed otherwise without risking more troops. As an unmanned helicopter used to provide supplies to sites where ground access is difficult or dangerous, the AIR HOPPER is based on a small, manned

Photo: IAI



helicopter with a payload of 100-180 kg, flight time of two hours and speed of up to 120 km/h. The AIR HOPPER runs on an internal combustion engine which uses ordinary, 95-octane fuel. Its price is lower than that of a manned transport helicopter, which allows procurement of multiple unmanned helicopters to achieve flexible deployment and low-cost provisioning to the front lines. The AIR HOPPER responds to the need in transporting equipment to the battlefield during warfare while preventing loss of lives and minimising the risks faced by logistic convoys en route such as roadside explosives, ambushes or anti-tank weapons. The operator using the autonomous system supervises the execution of the mission and the convoy's vehicles in real time from a safe area outside the threat range of the battlefield. The system's open architecture renders it compatible with a range of platforms with no need for special adaptation, maintaining the performance level of the vehicle concurrently with the weight capacity of the platform. The system moves independently and precisely over prolonged periods of time, day or night, including in tough field conditions and in any weather.

■ L3 Delivers Final AIRSEEKER to UK RAF

(ck) L3 Technologies has delivered the third and final RC-135V/W RIVET JOINT (RJ) signals intelligence aircraft to Britain's Royal Air Force (RAF), a milestone mark-

Photo: US Air Force



ing the completion of the US Air Force (USAF) and UK Ministry of Defence (MOD) AIRSEEKER programme. The three UK RJ

aircraft form the backbone of the UK's AIRSEEKER capability, providing intelligence, surveillance and reconnaissance (ISR) resources in support of global security missions. Upon touchdown at RAF Waddington, Lincolnshire, UK, the aircraft was formally transferred to the RAF, completing hardware deliveries under an FMS contract valued at approximately US\$1Bn. Taken together, the UK RJ and USAF RJ aircraft form a combined fleet of 20 aircraft, and L3 will perform future baseline upgrades and periodic depot maintenance on the fleet. L3 has also delivered a station to support ground operations and training systems to train both operators and maintainers. Under the agreement, the UK purchased three RJ aircraft for conversion by L3 from KC-135R tankers to the RC-135W configuration. The first two aircraft were delivered in 2013 and 2015, upon gaining their airworthiness releases.

■ Bittium TOUGH MOBILE Smartphone Receives Security Classification

(ck) The Bittium TOUGH MOBILE smartphone is the first mobile solution in the world to have received a national "Confidential"-level information security classification. With TOUGH MOBILE it is possible to process classified information and transfer it between the smartphone and connected back-end solutions. In order to achieve Confidential level classification there are specific security requirements regarding the processing of classified information and secure wireless transfer of files which must be met: the Bittium TOUGH MOBILE smartphone and its back-end system are designed for this classification level. The smartphone includes features such as a hardened operating system, hardened user identification, and data transfer. It has a dual-boot functionality that it a device with completely separate operating modes, public and confidential. The public operating mode is meant for personal use where social media applications are freely available. The confidential operating mode is completely separated from the public mode, hardened for secure use, and meant for demanding use by authorities and other users requiring a high level of information security. This dual-boot functionality enables both personal and professional use with high-level information security within the same device.

Photo: Bittium





REVISION.

HEAD PROTECTION “REVISIONIZED,”

WE ARE DRIVEN BY A POWERFUL MISSION TO DELIVER INNOVATIVE, PROTECTIVE SOLUTIONS THAT CAN SAVE LIVES.

Revisionized means we are always researching and developing the next generation of advanced soldier solutions. So our military head protection systems provide maximum ballistic, blunt-force and impact protection but do it at the lightest weight with maximum comfort.

Revisionized means we create custom solutions for your specific challenges so your soldiers have every advantage to function at their best.

Maybe that's why we have been chosen to supply the next-generation helmets for British and Danish Armed Forces and Canadian Special Forces. And, Revision recently won the contract to provide the ACH Gen II helmet to the U.S. Army.

Your soldiers deserve the very newest and best head protection. They deserve to be “Revisionized”.



revisionmilitary.com

■ EXPAL Showcases Global Portfolio for EOD & C-IED Missions

(sb) EXPAL attended the 3rd C-IED Technology Workshop in Madrid (Spain), organized by the Counter-Improvised Explosive Devices Centre of Excellence (C-IED COE), with the support of NATO and the Spanish Chief of Defence.

EXPAL develops innovative initiation systems, combat engineering equipment and EOD solutions in cooperation with key NATO countries. Their equipment is in use in over 40 armed forces worldwide. As part of the portfolio offered by the company, at the 3rd C-IED Technology Workshop EXPAL highlighted its latest developments in this area of activity. The S-402 Electronic Initiation System minimises involuntary initiation due to static, stray or induced currents. Its technology is innovative in the defence and security fields: the exploder and detonators have been upgraded with digital electronics in order to increase operator safety. Its solid configuration, light weight, modest volume, reliability and safe operation make this system ideal for use by engineers, Special Operations Forces, EOD specialists and rescue teams.

The S-402 consists of an ES-402 Exploder, and DS-402 Detonators. The ES-402 Exploder has the capacity to check and initiate up to 10 electric DS-402 Detonators. This system can be used in a radio-dense environment, among electronic countermeasures or near static currents.

During this event EXPAL also showed, in collaboration with Madrid-based Proytecta Security, the AUNAV family of high-technology robots with varied capabilities to defeat and neutralise EOD and IED threats. Both the S-402 and aunavNEXT robot were present at EXPAL's booth.

EXPAL develops and manufactures C-IED systems and products based on providing maximum efficiency, simplicity of operation and, above all, safety of use for combat engineers, EOD users and Special Operations forces; and the company develops, produces and integrates a large portfolio of products and services for the defence and security industries. Currently, EXPAL's products and services are employed by over 60 countries.

■ Advanced Anti-Radiation Guided Missile

(ck) The US Navy has awarded Orbital ATK a contract worth US\$350M to continue production of the AGM-88E Advanced Anti-Radiation Guided Missile (AARGM). This contract will deliver advanced capa-

bility to US warfighters and covers All-Up Round missiles and Captive Air Training Missiles for the US Navy, Italian Air Force, and other allies through Foreign Military Sales orders. AARGM provides the US Navy and Allies with critical mission capabilities to counter the accelerating proliferation of surface-to-air threats. AARGM is a supersonic, air-launched tactical missile system, upgrading legacy AGM-88 HARM systems with advanced capability to destroy hostile air defence systems. AARGM is able to engage traditional and non-traditional advanced land- and sea-based air-defence threats, as well as striking time-sensitive targets. AARGM is a US Navy and Italian Air Force international cooperative major acquisition programme, with the US Navy



Photo: Orbital ATK

as the executive agent. AARGM is currently deployed and supporting operational requirements for the US Navy and US Marine Corps. The missile is integrated into the weapons systems on the FA-18C/D HORNET, FA-18E/F SUPER HORNET and EA-18G GROWLER aircraft. AARGM is anticipated to achieve Initial Operational Capability on the Italian Air Force's TORNADO ECR aircraft in 2018.

■ New Special Ops Helmets

(ck) At AUSA, Revision Military, a company producing head protection solutions, presented its new suite of Special Operations Forces (SOF) helmets called BATLSKIN CAIMAN. The CAIMAN family includes the CAIMAN Ballistic Helmet System, two visor variants, a rail system, a liner and suspension system, and helmet covers. Revision also presented its tactical headset system SenSys ComCentr2. Integrating advanced electronics and software into a sleek and user-focussed design, Revision's ComCentr2 headset offers natural-sounding audio and enhanced sensory performance. The digital system enables mission-critical communication, improving command, control and communication on the battlefield while enabling dismounted close-combat users to detect vital sounds in a noise-polluted environment. The headset allows for advanced electronic features and offers an upgrade path for technological improve-



Photo: Revision Military

ments. The ComCentr2 is a communications solution for the dismounted close-combat warfighter and is plug and play with the wider soldier system. Active Noise Reduction (ANR) technology mitigates low frequency noise generated by military vehicles, protecting hearing and improving speech intelligibility. Full 360° situational awareness is achieved through an array of two forward- and two rear-facing microphones which provide front and rear audio detection. 3D spatial communication enables users to hear radio communications in a three-dimensional listening environment, further decreasing the cognitive burden of monitoring multiple nets.

■ 104 German LEOPARD 2 MBTs to be Modernised

(ck) Rheinmetall will modernise part of the Bundeswehr's fleet of LEOPARD main battle tanks, implementing various upgrade measures. The Düsseldorf-based technology group will be responsible for key parts of a combat performance upgrade programme that will bring 104 LEOPARD 2 tanks up to the state-of-the-art. Coupled with additional services, the modernisation



Photo: Bundeswehr

package is worth a total of €118M. The first retrofitted LEOPARD 2 A7V tanks will reach the Bundeswehr in 2020. Rheinmetall will transform a total of 68 LEOPARD 2A4, 16 LEOPARD 2A6 and 20 LEOPARD 2A7 main battle tanks, bringing them up to the A7V

standard. In the process, Rheinmetall specialists will eliminate obsolescent features in the fire control computers and control consoles as well as installing new laser rangefinder and thermal imaging devices. In addition, Rheinmetall will supply the new L55A1 gun for the 68 LEOPARD 2A4 MBTs to be modernised. These tanks will be able to fire the latest generation of armour-piercing ammunition in the upper pressure zone. All 104 LEOPARD 2A7V tanks will be capable of using Rheinmetall's new programmable DM11 multipurpose round.

■ New Tank Trailer

(ck) TII Group has developed a new armoured tank flat-bed trailer, the PTL 70-90. The PTL 70-90 is available with up to eight axles and can carry payloads up to 115 tonnes. It features robust design based on proven commercial applications, and tyre-preserving lifting axles combine with automatic tyre pressure adjustment to ensure minimal wear and tear when being used for strategic transport or in the toughest operating conditions. Terrain such as deserts or swamps is difficult or even impossible for most trailers to drive over when transporting battle tanks and similar heavy loads. TII



Photo: TII Group

Group claims that its PTL 70-90 trailer can transport military tracked vehicles weighing more than 100 tonnes across such terrain. The PTL 70-90 comes with a hydrostatic additional drive labelled Offroad Power Booster, which provides full mobility thanks to a combination of pulled and driven axles if the prime mover has reached its limit. For this, an auxiliary diesel-driven unit produces oil pressure which is used to drive hydraulic motors in one or more axles as soon as the traction of the tractor is breached. The driven axles can be switched to fully automatic status as and when required. The drive unit also serves as a power supply for tactical systems and makes the KAMAG PTL 70-90 the ideal system carrier. The PTL 70-90 is only one of numerous vehicle types in the military portfolio of the TII Group (TII Defense Solutions).

■ RUAG Receives Order for Two Aircraft from Bangladesh Navy

(ck) RUAG Aviation will deliver two new production Dornier 228 aircraft to the Bangladesh Navy (BN), expanding their existing fleet to four Dornier 228s. The aircraft will conduct surveillance and patrol flights for maritime security, exclusive economic zone control, and search and rescue



Photo: RUAG

(SAR) operations. This contract reinforces the BN's efforts to increase their naval and coast guard surveillance activities. The new Dornier 228s will also extend the BN's reach and endurance options for SAR and natural disaster missions. Naval and coast guard organisations worldwide rely on the Dornier 228 for its versatility, speed, range and endurance, and its cost-effective operability.

WB GROUP

Our reality
is Your future

www.wbgroup.pl

WB ELECTRONICS 
WB GROUP

MINDMADE 
WB GROUP

FLYTRONIC 
WB GROUP

RADMOR 
WB GROUP

AREX 
WB GROUP

■ DTC and MOHOC Announce Integrated Video System

(ck) The awkward shape of sport cameras render them inappropriate for defence purposes, and in response, Domo Tactical Communications (DTC), a wireless communication provider and MOHOC, Inc., a producer of helmet cameras, have announced their integration of a wireless camera solution. By using the MOHOC and MOHOC IR (infrared) cameras together with DTC's SOL8 Software Defined Radio (SDR) to communicate via DTC's COFDM Point to Point and Tactical IP Mesh waveforms, users are able to remotely access real-time video in a tactical battlefield environment,

Photo: DTC



facilitating real time decision-making and risk assessment. The patented MOHOC features a low profile, extreme ruggedisation, and simple user interface for defence purposes. DTC's COFDM waveforms provide high-capacity connectivity in challenging environments and sit seamlessly alongside existing public or private infrastructure. They penetrate into non-line-of-sight (NLOS) environments and can deliver end-to-end encrypted video for both training and mission operations in military and law enforcement.

■ Thales to Train Pilots of the A400M Military Transport Aircraft

(ck) Airbus has contracted Thales to deliver another two A400M military training simulators which will be the seventh and eighth A400M simulators. The French and German air forces will benefit from these new simulators in 2019 and 2020 respectively. The two new simulators will enable A400M crews to train for missions such as in-flight refuelling and low-level tactical operations in a safe environment. Thales is the only provider of A400M Flight Simulators through OCCAR (Organisation Conjointe

de Coopération en matière d'Armement). So far, Thales has delivered five orders for

Photo: Thales



A400M simulators and two flight-training devices to France, Germany, the UK and the International Training Centre in Seville. A sixth simulator will be delivered to Spain in 2018.

■ FLIR Introduces new Surveillance System

(ck) At AUSA in Washington D.C. FLIR introduced the FLIR Lightweight Vehicle Surveillance System (LVSS). Designed as a mobile surveillance solution, the FLIR LVSS is mounted in the bed of a standard pickup truck, converting it into a rapidly deployable yet covert surveillance command and control centre for border security, coastal surveillance missions and force protection. The FLIR LVSS integrates TacFLIR 280-HD or TacFLIR 380-HD multi-spectral high-definition imaging systems (including MWIR, SWIR, EO and EMMCD) for medium to long range identification of potential threats. Also integrated with LVSS are the FLIR RANGER R20SS or FLIR RANGER R6SS radar, for the ability to detect and identify more than 500 targets simultaneously, and



Photo: FLIR

automatically cue the imaging sensor. Easily deployed and locally operated inside a truck cab, the FLIR LVSS enables users to establish a command and control capability wherever it is needed. The mobility of the platform and flexibility of the system provide agility to adapt to changing conditions and threats. With a 16-foot mast that can

rise above trees and obstacles, the sensors create a surveillance picture comprising data, video and geospatial locations to identify and classify potential targets for rapid action. With the mast stowed in the truck bed, the vehicle remains inconspicuous.

■ Jenoptik Introduces Modular Air-cooled Alternator

(ck) At AUSA in Washington D.C., Jenoptik showcased an air-cooled 600-ampere alternator. For around five decades, Jenoptik has been supplying tried-and-tested, liquid-cooled custom alternators for energy systems with different capacities. At the AUSA, the company presented a modular air-cooled alternator with a capacity from 400 to 600 amperes. This generator marks the start of Jenoptik's plans to offer an alternator product line with a continuous capacity range from 200 to 1,000 amperes. The modular design of the new 600-ampere alternator allows to fit with existing motor capacities, installation spaces, and harsh environmental conditions. Its open interface offers standardised or customised options in terms of belt-driven or direct drives,



Photo: Jenoptik

controllers, connectors, or fastenings. The alternator accommodates a number of military platforms with demanding energy requirements, such as those for defense, reconnaissance, logistics, or medical care. Measuring 230 mm in diameter and 300 mm in length, the alternator weighs just 40 kg. The product has a target mean time between failures (MTBF) of 6,000 hours.

■ Polish WB Group Introduces Revolutionary New Personal Soldier System

(sb) During AUSA 2017 WB Group, one of the two biggest Polish Defence Groupings, unveiled their new system for dismounted soldiers on the future battlefield. The system, known as U-GATE, uses augmented reality technology which superimposes computer-generated images into the user's field of view. Many companies are looking

to adapt this technology for military use but WB Group are one of the first to develop a working product.

U-GATE is a C4ISR-E(xtended) system which enables forward-deployed and Special Forces operatives both to direct strikes by guided munitions - including loitering and precision-guided - and to analyse the battlefield. Further uses and resources also apply: the U-GATE operator can command and control WB Group's own Micro-UCAS system, the WARMATE, for example, and other nearby UAV/UAS using a virtual Ground Control Station user interface. The U-GATE system allows each soldier to observe the battlefield and simultaneously: see the location of friendly troops on a digital map, including terrain view,



using the built-in camera; identify opposing forces; receive a live-stream video from each of the U-GATE headset's integrated video cameras; send and receive emails with attached photos, archived/saved voice and video recordings; receive information from a UAV and operate/control the loitering UCAS WARMATE; receive voice and text commands; transfer/forward data about detected targets to higher levels of command; and easily and accurately measure the distance and position of objects in their field of view. The U-GATE headset uses Augmented Reality (AR) technology to give soldiers the ability to visualise the battlefield and add information or markers that can instantly be viewed in both their and other operative's field of view, ranging from the immediate, tactical level, up to the highest levels of command. Augmented Reality permits quick and efficient access to graphics and data for each soldier, avoiding the need to look away from the battlefield towards a handheld device. Also, AR simplifies interpreting and understanding commands and relating battlefield data to

the actual environment. The headset which includes sensors, video cameras, and high-resolution displays has a mass of below 1.5 kg.

The U-GATE System integrates the wide-band Software-Defined Radio, PERAD, to allow data transmission between different headsets and weapon system operators, and a portable computer to process the acquired data.

The U-GATE system facilitates and accelerates the OODA (Observe, Orient, Decide, Act) process by small groups of soldiers. It incorporates observation, analysis and strike abilities into one device and enhances independent action at the tactical level while enabling "hands-On" at higher command levels. Small combat groups can operate completely autonomously in difficult-to-access or isolated areas using the U-GATE system - which of course makes it ideal for Special Forces applications.

The demonstration at AUSA showed that the U-GATE system has significant potential, and its introduction should be regarded as one of the more significant events at an extremely important and successful event.

ENFORCE TAC

International Exhibition & Conference
Law Enforcement, Security and Tactical Solutions

THE SPECIALIZED EXHIBITION – BECAUSE REALISTIC DRILLS ARE KEY!

7 – 8.3.2018 NUREMBERG, GERMANY
49° 25' 2" N , 11° 6' 54" E

enforcetac.com

Conference partner



Those under the age of
18 and private individuals
will not be admitted.
Identification required.

We're happy to provide more information!
NürnbergMesse GmbH
T +49 9 11 86 06-49 32
visitorservice@nuernbergmesse.de

NÜRNBERG MESSE

Norway's Defence Revival

Stephen Blank

Most analysts, and even occasionally Russian officials, contend that cooperation in the Arctic is growing and that it remains primarily a zone of peace for both East and West.

Yet Russia's aggression in Ukraine and steady militarisation of the Arctic suggests a different story and despite peaceful rhetoric and actual cooperation, Norwe-

then. Already, in the fall of 2014, Norwegian officials recounted to this author their concern over Russia's "unpredictability". Moreover, that revival of thinking about

(Greenland, Iceland, United Kingdom) into the North Atlantic, the role of Norway as a vital hub of NATO's maritime strategy is enhanced. This is particularly the case since recent exercises have shown that NATO is neither tactically nor procedurally ready to deal with the myriad threats submarines breaking through the GIUK gap can pose. This finding should impart even more urgency to Norway's already growing defence capability, particularly in the maritime domain.

Already, in 2006, Norway emphasised the Arctic, and specifically its European component, as its "most important strategic target area" that constitutes a "new dimension of Norwegian foreign policy". Russia's assertive claims to the Arctic that began a year later and their consequences – increased international attention to the Arctic and Russia's military build-up and aggressive threat assessment and behaviour – have obliged Oslo and its allies to follow suit and upgrade their capabilities as well. So despite the agreements over the Barents Sea with Russia that were reached in 2010 and have been observed since then, Norway has enhanced the presence of its armed forces in its north that borders Russia and the Arctic Ocean and intensified maritime surveillance with "Barents Watch", a full-spectrum monitoring and information system for its northern seas and coastal areas. Norway also moved its military command headquarters to the North to enhance its capacity to operate in the North and the Arctic. As a consequence of this move a large part of Norway's jet fighter force, modern frigates, and army staff moved North while Oslo also sought enhanced capabilities by adding advanced air-to-sea missiles to its purchase of 48 F-35 fighters. All of Norway's defence activities continued in parallel with strong diplomatic activity and expanded research into the Arctic as it became more hospitable for international commercial use.

Photo: MoD Russia



Russian Delta IV Class strategic missile submarine operating in the Arctic

gian policymakers have responded to the threats posed by Russia's ongoing militarisation of the Arctic by rebuilding Norway's defences both unilaterally and in tandem with NATO. Indeed, that defence revival actually began even before Russia invaded Ukraine in 2014 and has intensified since

defence and security has occurred in conjunction with other Nordic countries' growing concern for the security of their Arctic interests and what appears to be enhanced Nordic defence cooperation both within NATO and outside of it.

Author

Dr. Stephen Blank is a Senior Fellow at the American Foreign Policy Council. He is the author of numerous foreign policy-related articles, white papers and monographs, specifically focused on the geopolitics and geo-strategy of the former Soviet Union, Russia and Eurasia. He is a former MacArthur Fellow at the US Army War College.

Probes by Russian Submarines

Norway's role in these processes is not just of interest but it also possesses major strategic significance. Norway guards the entrance from the Arctic to the North Atlantic, the crucial maritime avenue of NATO reinforcement and replenishment in case of a European conflict and also the medium through which vital cables and information installations operate. Inasmuch as we have seen repeated probes by Russian submarines exiting through the GIUK Gap

New Focus on Arctic Operations

However, Russia's military build-up continued to generate still greater concern even before 2014. In 2012, a year after Russia announced the creation of specially organised military units for Arctic operations, Norway announced plans to reequip

Defence & Security Global Solutions

Air · Land · Sea



**Weapon Systems, Ammunition
& Energetic Materials**



**Technological Systems
& Applications**



**Maintenance Services
& ILS**



**Demilitarization
& EOD Services**

expal.biz



@EXPALSystems



EXPAL (MAXAM Group)

Photo: Forsvaret



Norway has intensified maritime surveillance with “Barents Watch”, a full-spectrum monitoring and information system for its northern seas and coastal areas.

one of its units as an Arctic Battalion. In early 2012 Norway hosted the NATO exercise “Cold Response”, the largest Arctic manoeuvres for a decade. This exercise comprised US, Canadian, Swedish, French, and UK forces and also used Swedish territory while Swedish planes operated over northern Norway. Not only did this exercise signify gradually growing Nordic defence cooperation, but it also showed that the UK and France as well as the US and UK now took the High North seriously. Norway’s Foreign Minister, Jonas Gahr Støre, clearly welcomed this NATO show of interest in the High North even though he was clearly at pains to omit Russian threats, whose existence he denied. Instead he referred to climate change and its consequences and simply mentioned the need to resist anyone’s military pressure. Nevertheless even though this exercise clearly was conducted as a crisis response operation in response to a UN mandate under Chapter VII, and therefore not a combat operation as such but a peace response or humanitarian operation, it apparently angered or alarmed Russia. Thus in 2013 Norway reported that during 2012 it had seen an increasing number of Russian warplanes near its airspace. And had to scramble its jets 41 times, intercepting a total of 71 Russian aircraft in Norway’s airspace, clearly a sign of increased military pressure against Norway. Nevertheless, throughout 2013 NATO made clear that it was not interested in raising its profile in the Arctic and did not see it as an area that might become a conflict zone. Nevertheless the Russian invasion of Ukraine in 2014 and subsequent developments like the overall militarisation of the

Arctic and the revelation of the Russian army’s enhanced capabilities and anti-Western threat assessments, enshrined in official documents of 2014–15, have all transformed defence thinking across Europe and the Nordic region. In 2015 Senator John McCain (R-AZ) commented on what he had learned on a trip to Scandinavia: “Officials from each of the countries I visited expressed the same concern: Russia is threatening the security and prosperity of the Arctic and Northern Europe by assertively deploying its military power, patrolling its neighbours’ coastlines both above and below water, and building or reopening numerous military outposts across the region.”¹

Collaboration with NATO Allies

As a result Norway, in collaboration with its NATO allies, has steadily increased its general military capability as they have done. Thus NATO has not overlooked the Arctic even if the situation there still needs more attention, especially as noted above with regard to ASW to safeguard the GIUK gap and the Sea Lines Of Communication (SLOC) in the North Atlantic. The deterioration of the Arctic and European security situation thus found expression in Norway’s 2016 Long-Term Defence Plan. This paper opened with a ringing affirmation of NATO’s importance to Norway: “NATO and the transatlantic security community remains the cornerstone of Norwegian security and defence policy. Norway needs close relations with its allies. The defence of Norway depends on the arrival of allied



reinforcements before a crisis situation develops into an armed confrontation, and on the ability to escalate defence operations seamlessly, if required. Facilitating greater allied presence in Norway is important to Norwegian security. Interoperability among allied forces and allied presence in Norway through exercises and to ensure credible deterrence and host nation support related to such activities, along with preparations to receive allied reinforcements remain a priority. These measures contribute to the ability of Norway and its allies to ensure a robust defence posture in peacetime, in crisis, and during times of conflict.”²

Even though this document refused to single out Russia as an enemy and emphasised that Norway and the Arctic were at peace and that the latter was still an area of international cooperation, the language used left no doubt about the centrality of the Russian threat to Norway and its allies in contemporary defence planning.

“Even though Russia does not constitute a military threat to Norway, the combination of military modernisation and the will to exert influence through military power place Russia as a central factor in Norwegian defence planning. Areas in Norway’s immediate vicinity are also central to Russian nuclear deterrence, and Russia’s military presence and activities in the North have increased in recent years. The High North continues to be characterised by stability and cooperation, and Russian strategies for the Arctic still emphasise international cooperation. At the same time, we cannot



Photo: Forsvaret

Initial Operating Capability (IOC) for the first Norwegian F-35A is planned for 2019.

rule out the possibility that Russia in a given situation will consider the use of military force to be a relevant tool, also in the High North. Additionally, while a potential crisis is unlikely to develop in Norway’s immediate region, a conflict erupting elsewhere may directly affect us.”³

Increasing Defence Budget

Therefore the ministry requested and has obtained a sizeable increase in its budget to invest in strategic capabilities and restructure the armed forces to meet new chal-

lenges and increase operational capability of the armed forces even as their number shrinks. This call for increased spending in 2016 came on the heels of the government’s 2015 proposal for increasing the defence budget by 9.8% including a near doubling of funding for the F-35, significant strengthening of its intelligence service and increased patrols in the High North. And that proposal came after the departing Labour party government budget of 2014 that also represented the biggest per capita defence spending among NATO members in Europe.

More recently, Defence Minister Ine Eriksen Søreide observed that over the next 20 years Norway will increase its defence budget by NOK189Bn (\$22Bn) adding F-35 fighters, new maritime patrol aircraft, submarines, air defence, land power capabilities and intelligence. She also announced here that Norway had signed agreements with the other Nordic states to get easier access for all of them to each other’s air, sea, and land domains, for common peacetime defence training, not least in the Arctic. Finally she made it clear that, “A crisis of conflict in the Baltic Sea region may also spread to the High North.”

Obviously this posture, for all its carefulness about depicting Russia as an enemy, has dismayed Moscow, leading to the classic Russian response, continued military build-up in the Arctic and around Norway, more bluster, and more threats. In 2016, Russian military construction in the Arctic prompted Norway to ask the United States to send 330 Marines to Norway to assist in the defence of the High North. The minute this was revealed, Norway got a nuclear threat from the Russians. In addition, Russia claimed that because of this its relation-



Photo: Forsvaret

In early 2012, Norway hosted the NATO exercise “Cold Response”, the largest Arctic manoeuvres for a decade.

ship with Norway is now “put to the test”. The journal *Arctic Deeply* reported in April that, “In the past two years, Moscow has brought military equipment and personnel through Norway’s non-militarised Svalbard archipelago in apparent violation of a treaty, fired ominous missiles from the Arctic Ocean submarines after warning Sweden not to pursue full NATO membership, increased military flights along Norway’s coast and, this past January, banned two of Oslo’s top members of parliament from a scheduled state visit. That same month, the United States deployed several hundred marines in Norway, but snap Russian war games have demonstrated that Moscow can launch overwhelming force across the entire Arctic overnight.”⁴

The journal also reported that Moscow now barely gives notice of snap exercises and conducts them close to Norway’s border, leaving the impression that these exercises could be preparatory to some sort of invasion or that they could catch Norway by surprise.

Russian Intelligence Activities

In February, Norway’s police announced that Russian intelligence was targeting Norwegian individuals in Norway and hinted that Russian hackers could have been behind an attempted digital attack on the Labour party’s parliamentary group. Military intelligence warned of a heightened threat. The Russian embassy also sent a three-page letter to the Barents Observer and other media accusing Norway of biased anti-Russia rhetoric and Cold War mongering. This letter stated that it is no longer tolerable for Norway to choose the topics (and thus limit them) where cooperation with Russia could occur. It stated that cooperation should go beyond fisheries, environmental protection, nuclear and radiation safety, and search and rescue. The embassy further bluntly stated that, “Norway’s proposed selective approach – cooperating on this, not cooperating on that – is untenable. Biased and far from reality, anti-Russian rhetoric, voiced by our Norwegian partners, ignoring our interests will inevitably affect all areas of cooperation, contrary to the needs required to form a climate for building a positive agenda for bilateral affairs.”⁵

Unfortunately, such behaviour is not confined to Russia’s relations with Norway. If anything, as Norwegian diplomats observe, such Russian behaviour towards Norway has been restrained. Instead this kind of aggressive rhetoric and behaviour has been entirely characteristic of Russian

policy, particularly, though not exclusively, towards its smaller neighbours or interlocutors, including Finland, Denmark and Sweden. Therefore, and given Søreide and the government’s assessment of Russian behaviour and capabilities, it is clear that further Norwegian and allied military and political reinforcement continues to be necessary. Furthermore, it already is clear that the priority area for this reinforcement

US–UK–Norway maritime and surveillance cooperation in the High North and North Sea”. What makes this crucial is the fact that the US will operate the P-8 aircraft out of Keflavik and collaborate with Norway and the UK in joint operations in the North Atlantic. Similarly, Norway announced that it would not only buy new German models as its new submarines, it also would join forces with Germany to produce precision-



Photo: US Navy

Norway will procure five P-8 maritime surveillance aircraft from the US.

and cooperation will be naval and air capabilities to defend Norway’s Arctic coastline and naval approaches to the GIUK gap and the North Sea. And those are the priorities outlined by Søreide: a renewed maritime focus in the North Atlantic and High North and a functional assessment of NATO’s (and by implication Norway’s) command structure.

Strengthening Maritime Surveillance

Keith Eigenes, Director of the Ministry of Defence’s Department for Security Policy and Operations, in justifying this priority, points out that Norway has jurisdiction over ocean areas in the Arctic and North Atlantic that are seven times the size of Norway and about the size of the Mediterranean. Given the size of this responsibility, Eigenes was also happy to point out that it was very important that both France and England had shown growing interest in defending the High North alongside Norway. Thus in late 2016 Norway announced that it will buy five P-8 maritime surveillance aircraft from the US, a move that will reinvigorate the “northern triangle of

strike fifth-generation naval missiles which are unique in the world and are based on passive sensor technology and low radar signature. These naval moves accord with the observation by Defence Minister Søreide that maritime power and presence in the North would be a key component of any robust and coherent NATO strategy to meet new security challenges.

As regards the air forces, Major General Tonje Skinnarland, CINC of the Royal Norwegian Air Force, observed that the modernisation of the Air Force “is not just about adding new platforms; it is about shaping joint capabilities for the defence of Norway in a high-intensity operational setting.” Brigadier General Jan Ove Rygg, Chief of the National Air Operations Centre, further observed that the modernisation programme will encompass the entire armed forces, even if right now naval and air forces are the priority: “We need to build an effective national command and control capability which seamlessly works with core allies who are crucial to defence operations in the High North.”

The importance of allied coordination to repel the naval threat posed by submarines or surface vessels exiting the Arctic into the



Photo: Fotvarett

F-18, F-16, Eurofighter TYPHOON and DA-20 ready for takeoff in Bodø, Norway, during Arctic Challenge Exercise 2015

GIUK gap without sufficient NATO domain awareness or ability to counter them and then threatening the SLOC clearly has gotten NATO's attention. As a result of the earlier war games mentioned above that demonstrated the gravity of the threat and NATO's years-long failure to think seriously about it, NATO officials are now discussing recreating the Atlantic Command to counter those threats in the Arctic and North Atlantic.

Whether or not that command is restored, NATO and the Nordic countries have each stepped up their exercises. For example, NATO launched a large multinational naval operation devoted to anti-submarine warfare and tracking in northern waters in June while Norway, Sweden, and Finland conducted a joint aerial exercise over the Arctic. But allied cooperation will clearly transcend merely holding exercises. For example, Norway clearly envisions the use of the F-35 and P-8 capabilities as essential to shaping a common operational activity among allies whose shared data provide synergistic benefits that are greater than the sum of all the parts of their cooperation. Specifically the US, UK, Denmark, Holland, and Norway will utilise the combined capabilities offered by the F-35 and P-8 to create a comprehensive maritime domain awareness operation for the North Atlantic and High North from the UK to Norway to counter the Russian threat.

These capabilities put together a capability that can allow for rapid maritime domain awareness, equally rapid data processing and decision-making capability and strike capability. These integrated capabilities provide an exemplary case of air-sea integration and are also, to use an older term, outstanding examples of what Marshal Nikolai Ogarkov, Chief of the Soviet General Staff, 1977-84 called reconnaissance strike complexes. Obviously a glance at the map shows that for this allied operation to be truly comprehensive in protecting against a Russian threat to the North Atlantic, Canadian cooperation is vital and its

capabilities must be revived, especially in the light of Canada's own critical interests in the North Atlantic and High North.

Nevertheless, even if Canadian support for these allied and Norwegian operations takes a long time to develop or even fails to develop, it clearly will be the case that Oslo has grasped the threat and is taking well-conceived steps to enhance its own capabilities in tandem with those of its allies. Its focus on maritime issues, air-sea integration with regard to maritime domain awareness and strike capability signify its understanding of the threat, especially in the light of Russia's recent naval policy statement suggesting more construction of formidable naval strike capabilities and submarines to enter into the GIUK gap and challenge NATO. Thus Norway's priority naval investments that are receiving the bulk of its resources are anti-ship, anti-air, and anti-submarine capabilities to counter the threat posed by Russia's increasingly capable naval forces in a context of equally increasing aggressive behaviour.

Conclusions

Norway's response, along with that of both the non-aligned Nordic states and the allies, indicate that Russia's behaviour is as aggressive as reported (there still are those in the West who wish to apologise for it or minimise it) and that NATO's combined response, however slow, is gathering steam and adding critical capabilities to the new challenges of defending the Arctic, the North Atlantic, and Europe in the new strategic environment. What has been done to date and what still needs to be done underscores the old truism that eternal vigilance is the price of democracy, for it is now all too clear that even if Norway understandably refuses to label Russia as an adversary, Moscow's behaviour has been and continues to be adversarial even in the Arctic, not to mention in Europe. In effect NATO and its individual members have had no choice but to accelerate military pro-

grammes, ramp up defence spending, and forge much tighter operational and alliance bonds with each other. Furthermore the "zone of threat" now clearly extends from the North Atlantic to the Baltic and the Black Sea or Mediterranean and is a combined arms threat as Russia not only utilises its air, sea, land, and nuclear forces as well as non-kinetic capabilities to keep Europe and the US under constant pressure.

We can guess or attempt to understand the motives behind Russia's aggressive behaviour, but the facts of it cannot be denied and must be met by pooling allied capabilities and developing or investing in new ones to meet the demands of a rapidly changing security and strategic environment as well as changes in technology and the character of war.

If nothing else, the situation around Norway not only highlights these changes in technologies and the character of contemporary war; it also shows us that the complacent argument that the Arctic remains a zone of peace is seriously flawed. Even if Moscow repeatedly proclaims that the Arctic should be a zone of peace, its behaviour belies that argument and has forced not only Norway but the allies and even non-aligned states like Sweden and Finland to take due precautions against threats there. And, as Minister Søreide said, threats in the Baltic cannot be omitted from any serious strategic assessment of the Arctic and High North. Norway's response to its new threats shows us not only a great deal about the nature of NATO and contemporary maritime operations, it also shows us what resolution and allied cohesion can accomplish and just how much of it we need even in peacetime. That is a lesson that too many governments forgot after the end of the Cold War. And the recovery of the awareness of what the alliance must do to hold together and fulfil its purpose is not only an example of the eternal vigilance that democracies need, it also – and this is no less true for individual states like Norway – shows that those governments and the alliance as a whole can – if they truly will it – recover that awareness of their collective responsibility. Domain awareness is not just an operational mission. Rather it is a strategic necessity. ■

(Endnotes)

- 1 Jacqueline Klimas, "Freezing the US out of the Arctic," <http://www.washingtonexaminer.com/freezing-us-out-of-the-arctic/article/2572852>, September 28, 2015
- 2 Norwegian Ministry of Defence, Capable and Sustainable: Long-Term Defence Plan, June 17, 2016, <https://www.regjeringen.no/globalassets/departementene/fd/dokumenter/rapporter-og-regelverk/capable-and-sustainable-ltp-english-brochure---print.pdf>, p. 4
- 3 Ibid., pp. 8-9
- 4 Randall Hyman, "The Big Chill: Norway and Russia's Icy Rift," Arctic Deeply, April 3, 2017, <https://www.news-deeply.com/arctic/community/2017/04/03/the-big-chill-norway-and-russias-icy-rift>
- 5 Ibid.



Viewpoint from Oslo

Photo: Bjørn Domaas Josefsen



**Bjørn Domaas
Josefsen**

**Editor-in-Chief of
MilitærTeknikk –
the Scandinavian
Military Magazine**

Norwegian Elections Defence Politics a Key Issue for the First Time in 60 Years

For the first time in 30 years, a government led by the Conservative Party (Høyre) was re-elected in the parliamentary elections on 30 September 2017.

The Government with ministers from the Conservative Party and the Progress Party (Fremskrittspartiet) and with parliamentary support from the Liberal Party (Venstre) and the Christian Democratic Party (Kristelig folkeparti) has remained in force, and even though their parliamentary base was somewhat diminished, the four parties still comprise the majority.

The most significant trend constituted by this election, however, is on the opposition side. Labour (Arbeiderpartiet) lost more than 3.5% compared to the 2013 results. Since World War II, Labour has been by far the biggest party in Norwegian politics, and the party is still the largest albeit by a small margin (2.4% ahead of the Conservative Party). But the result is a severe setback for Labour. In politics, it is almost like a "law of physics", that the leading opposition party will gain support and not lose voters.

The other interesting trend is the rise of the Centre Party (Senterpartiet), up from 4.3% to 10.3% of the total vote. The party has not achieved such a high result in any parliamentary elections since 1994, when the party was the leading opponent to Norwegian membership of the European Union. The main political base of the Centre Party, originally founded as a Norwegian agrarian party, is traditionally supportive of farmers and rural areas, against centralisations and in favour of the small communities in the Norwegian districts.

Norway has a long tradition of negotiating broad political settlements within several areas of the society, like pensions, climate policy, immigration and asylum policy, etc. These settlements are

agreements that give the main directions within the areas for years to come, and they guarantee broad political support for financing the settlements' costs.

In November of last year, the Government, together with the two supporting parties and together with Labour, agreed on the Defence settlement for the armed forces.

This agreement states an overall political support of the long-term plan for the armed forces, including the support of financing several main investment programmes like the F-35 fighters, new submarines and new P-8 POSEIDON maritime patrol aircraft. But the settlement also points to the need for a more cost-effective structure of the armed forces, and it thus suggests closing several military bases and establishments and moving their activities to bigger units.

Fierce protest from the districts was raised, as many of these military bases are cornerstone workplaces in local communities. The most exposed military base to be closed is the Andøya Air Force Base in the North. For almost 40 years, the air force base at the northern point of the island Andøya has been the home base of P-3 ORION maritime patrol aircraft. But with the renewal of the maritime patrol aircraft fleet, new P-8s replacing the ageing P-3, the defence settlement implied to shut down Andøya Air Force Base and move the base to the Evenes Airport, approximately 90km further south. Besides being a major civilian airport in Northern Norway, Evenes is also to become the frontline base for F-35 fighters.

Every analysis concludes that the relocation of the maritime patrol aircraft base from Andøya to Evenes means an annual cost reduction of between NOK30M and NOK200M.

But of course, the air force base is a cornerstone employer at Andøya, and moving the base to Evenes will lead to a significant reduction of jobs in the Andøya community.

The Centre Party campaigned that Andøya Air Force Base should remain operational as the home base of new P-8 aircraft. The party has also taken a stand against closing down several other military establishments in rural areas all over Norway.

This has obviously given the party a boost in the constituencies that will suffer from the armed forces moving to other locations.

In the local council of Andøya, the boost effect for the Centre Party was enormous, from 8.3% in 2013 to 71.7% in 2017.

The same trend can be observed in many other election districts, though not to the same extent as in Andøya.

As their poll results dropped through their election campaign, the Labour Party got into a "state of panic", and several party spokespersons expressed second thoughts about the defence settlement, implying that the party might reconsider the closing of both Andøya Air Force Base and other military bases. This was of course interpreted by the parties in office as evidence of Labour's unreliability and opportunism in such important matters as the nation's defence. Mixed signals and trying to stretch out their defence policy, in the hope of satisfying opposite groups of voters, was certainly one of the factors that led to the Labour Party's second most disastrous election result since World War II. And for the Centre Party, fighting to preserve several military bases in rural areas was undoubtedly one factor for the achievement of their best result since 1994. So, for the first time since the political debate on Norwegian NATO membership in the late 1940s, defence politics played a key role in a parliamentary election.

Protecting the 5th Republic

The French Internal Security Challenge

David Saw

It is just before 08:20 in the morning, a four-man fire team from the Foreign Legion positions itself around the entrance of the building that they have been tasked to protect against a possible terrorist attack. The location for this activity was not in Mali or the Middle East, it was in the centre of Paris on a side-street just off the Avenue de l'Opéra, the building being protected was an Elementary School (students aged six to 11 years old), with the threat being a potential mass casualty attack. This was the reality of the French internal security challenge in 2016.

In September 2016, the then French Prime Minister Manuel Valls noted that the police and intelligence services in France were monitoring some 15,000 people who were

be disappearing any time soon and that there were no easy answers to make it disappear. The aim was to be realistic and to remind the French people that they had to

across France. Perpetrators of these were domestic groups such as Action Directe (operating from 1979 to 1987), Corsican nationalists, Basque nationalists (ETA) and Breton nationalists. Amongst the international perpetrators were Hezbollah, often in association with the Lebanese Armed Revolutionary Factions (FARL) and later the Committee for Solidarity with Arab and Middle East Political Prisoners (CSPPA), Abu Nidal, Palestinian and other Middle Eastern Groups and Carlos Ramirez Sanchez (Carlos the Jackal).

Between November 1986 and December 1994 there was only one terrorist incident, an arson attack on a cinema by a militant Catholic group that injured 14. Then came a major upturn in terrorism due to the Armed Islamic Group (GIA) of Algeria. In December 1994, Air France AF8968 from Algiers to Paris Orly was hijacked and forced to land in Marseille. French security forces stormed the plane but the incident cost seven their lives and wounded 25. Between July and October 1995 the GIA carried out eight bomb attacks on the Paris Metro and RER mass transit systems killing eight and injuring over 140 people. There was then a hiatus until December 1996, when the GIA committed a bomb attack against the Port-Royal RER station that killed four and injured 170.

From January 1997 until December 2011 there were six terrorist attacks, with five killed and 26 wounded. Of these six attacks, five were domestic and only one, a bomb attack on the Indonesian Embassy in Paris in October 2004 could be classified as international terrorism. In total, between the end of 1986 and March 2010, the human cost of terrorism in France was 24 dead and over 375 wounded. Statistically, in comparison to the numbers from

Photo: via author



Paris is one of the most visited cities in the world, with the Eiffel Tower being one of the many iconic images associated with the city. Paris has also become a prime terrorist target; any terrorist outrage in Paris is guaranteed the oxygen of publicity that terrorists so desperately seek.

in the process of radicalisation. Prior to that, in the aftermath of the Nice terrorist attack in July 2016, Valls had been heavily criticised for saying; "We must learn to live with terrorism." It was perhaps not the most clever statement to make. What Valls was trying to say was that the threat of terrorism would be a constant, it would not

be united in the face of terrorism and had to be strong to confront the terrorist threat. Terrorism is not a new phenomenon in France, neither in terms of domestic terrorist attacks nor attacks inspired by international terrorist groups. Between 1980 and 1986, terrorist attacks led to 66 dead and 721 wounded in incidents



Photo: Dicoad

La basilique du Sacré-Cœur de Montmartre is one of the many sites in Paris patrolled by troops under Opération Sentinelle. Over 10,000 troops are deployed on internal security missions in France, with 7,000 on patrol work and 3,000 as an intervention force.

1980 to 1986, there had been a significant reduction between 1986 and 2011 in the toll of dead and injured from terrorism.

The New Terrorism

Then, in March 2012, came the first manifestation of what we could describe as the “new terrorism”. As previously noted, in the 25 years between 1986 and 2011 the death toll from terrorism was significantly lower than the rate of fatalities and wounded in the six years between 1980 and 1986. This resulted in the threat of terrorism retreating from the forefront of public consciousness. Yes, there was al-Qaeda and there were terrorist incidents in Europe and elsewhere, but there was nothing like that in France. This complacent attitude would soon be challenged.

Mohammed Merah was born in October 1988 in Toulouse, his parents were divorced, he became a petty criminal and had been imprisoned twice for various offences. Merah did have significant psychological problems, but at some point he also appeared to have become radicalised and went on to visit Afghanistan, Egypt and Pakistan. Somewhere in all of this Merah tried to join the French Army but was rejected due to his criminal record, he even tried to join the Foreign Legion at one point. By 2011 Merah had come to the attention of the French authorities and had been placed on the ‘Fiche S’ terrorist watch list.

Despite the fact that he was a known radical, Merah managed to acquire a .45 calibre pistol and other weapons and then embarked on a wave of terror that lasted from 11-19 March 2012. The first incident on 11 March saw Merah arrange to meet a senior NCO of the French Army 1er Régiment du train parachutiste to purchase a motorcycle, who he then murdered. Then on 15 March at a shopping centre in Montauban, north of Toulouse, Merah shot three soldiers from the 17e Régiment du

génie parachutiste, killing two and wounding the other so badly he was in a coma. Merah’s final terrorist act was on the Ozar Hatorah Jewish school in Toulouse, killing a Rabbi and three children (ages 3, 6 and 8) and seriously wounding a 17-year-old boy. Merah, who called a French TV station to claim he was defending Islam and was protesting French involvement in Afghanistan, was linked to al-Qaeda. Meanwhile, the

and had no difficulty obtaining weapons. Despite being on Fiche S, he was able to kill seven persons and wound five more before he was stopped.

There was no wave of attacks after Merah, but there was a stabbing incident in La Défense that wounded a soldier in May 2013, while in December 2014 a man entered a police post in Tours and then stabbed and wounded three policemen before being killed. Both cases were Islamist linked. At this point there was acceptance that there was an Islamist-based threat, although its seriousness and cause remained unclear.

On 7 January 2015, Saïd Kouachi and Chérif Kouachi, two brothers of French nationality, who claimed to be acting for al-Qaeda, attacked the offices of French satirical magazine Charlie Hebdo with automatic weapons, killing staff, visitors and two policemen. The death toll was 12, with 11 wounded including four seriously injured. Charlie Hebdo was particularly hated by Islamists and had been attacked before, its then offices had been fire bombed in November 2011, hence the police guard. Elsewhere in Paris on the same day, Amedy



Photo: Prefecture de Police

La brigade de recherche et d'intervention (BRI) of the Paris Prefecture de Police on a training exercise located on a tourist boat. Note the Heckler & Koch G36 assault rifle and the ballistic shields being used; these shields were used during the storming of the Bataclan and resisted 7.62x39 mm fire from AKM assault rifles.

security forces had found Merah’s location and attempted to arrest him on 22 March 2012, eventually storming his apartment in the process of which Merah was killed. Subsequently they discovered that he possessed a significant arsenal of automatic weapons, a shotgun and numerous pistols. Mohammed Merah was the beginning of the “new terrorism” in France, he was a French citizen, was radicalised in France

Coulibaly, a friend of the Kouachi brothers, shot and wounded a jogger, the next day he murdered a municipal police officer and wounded a street cleaner. On 9 January Coulibaly entered Hypercacher, a Jewish supermarket in Porte de Vincennes, eastern Paris, and took hostages. Four hostages were killed and later Coulibaly was killed after police stormed the building. Both Kouachi Brothers were later killed by the



Photo: Dico

Four soldiers from the 2e régiment étranger d'infanterie (2e REI) of the Foreign Legion on an Opération Sentinelle internal security mission outside the Gare de Lyon in Paris, one of the main railway stations in the capital. The rules of engagement for the military have been relaxed compared to the past, but they still limit freedom of action.

security forces. The events of January 2015 led to 20 deaths and 22 wounded. Subsequently it emerged that Coulibaly had pledged allegiance to the Islamic State. The January 2015 attacks demonstrated a developing pattern, the perpetrators were all French born, had all been in prison and had been radicalised in France. They also had no problem acquiring weapons such as assault rifles and sub-machine guns. In February 2015 three French soldiers guarding a Jewish community centre in Nice were attacked and wounded in a stabbing incident. April 2015 saw a terrorist attack in Villejuif, south of Paris. Sid Ahmed Glam staged abortive attacks on two churches, shot and killed a female civilian and then managed to shoot himself by mistake leading to his capture by the police. Glam had an AK-47 assault rifle and an automatic pistol, with more assault rifles found once his home was raided.

On 26 June 2015 at Saint-Quentin-Fallavie, near Lyon, Yassin Salhi, a delivery driver, born in France, but with Islamic State links, murdered his boss and then drove his truck into gas cylinders at a factory intending to cause an explosion. A minor explosion resulted, wounding two, but Salhi was captured, and later committed suicide in prison. August 2015 saw an attempt by Ayoub El Khazzani to commit a terrorist attack on the Thalys train travelling from Amsterdam to Paris. Khazzani was equipped with an AKM assault rifle and a pistol, but was overpowered by train passengers.

What came next was unexpected. On 13-14 November 2015, Islamic State terrorists launched a sustained assault in Paris. The first attack came at 21:16 hours on 13 November at the Stade de France where France was playing football against Germany. The game was already in progress when a terrorist wearing a suicide bomb tried to enter the stadium. When he was prevented from

entering, he detonated outside the stadium area killing himself and an innocent bystander. There were also two other suicide bombers in the area who killed themselves over the next 37 minutes. Had the attackers been able to get into the stadium or mingle with the crowd as it headed for the stadium the result would have been carnage.

Another wave of attacks commenced at 21:25 in the 10th arrondissement of Paris, here terrorists attacked a cafe/bar and a restaurant, some 15 people were killed and 10 severely wounded. Elsewhere a separate terrorist attacked another restaurant in the same area, killing five and wounding eight. All of the terrorists escaped in vehicles. In another part of Paris, the 11th arrondissement, at 21:36, two terrorists attacked another restaurant, killing 19 and wounding nine critically before escaping by car. In another part of the 11th arrondissement, a suicide bomber entered a café and ordered a coffee before detonating and killing himself and injuring 15 others.

The most extreme attack took place at the Bataclan, a music venue with a 1,500-person capacity in the 11th arrondissement. Three terrorists equipped with assault rifles and grenades attacked at 21:40, by 22:00 they had taken between 60 and 100 hostages and the police had started to arrive. Specialist police units then arrived and, concerned for the safety of the hostages, stormed the Bataclan at 00:20 on 14 November, securing the site some 38 minutes later. The three terrorists were killed, two detonated suicide vests and the third was hit by police fire leading his vest to detonate. Of the nine terrorists involved in the events of 13/14 November, only two survived and these were killed, along with a woman aiding them, when security forces stormed an address on 18 November in Saint-Denis. In addition five suspects were arrested, with five police officers and a civilian injured.

Total casualties from the terrorist assaults were 130 dead and 368 injured.

Since Then

After the terrorist attacks, the French government instituted a State of Emergency that provides the security forces with increased powers for surveillance, searches, arrests, preventative detention such as house arrest and the power to ban demonstration and public gatherings if they are deemed to be under threat. The State of Emergency legislation remains in force, although the Macron administration could seek to institute new security legislation to replace the existing system.

The fact that terrorists appeared to have no problem in obtaining assault rifles and other automatic weapons was a major shock for French law enforcement, put simply the police did not have the firepower to respond. The most common small arms available to the police were the SIG Sauer pistol and the M12SD 9x19mm sub-machine gun, a licence-produced version of the Beretta PM-12. After the November attacks a number of Mousqueton A.M.D. rifles were deployed by the police in Paris, this is the Ruger Mini-14 carbine in 5.56x45mm NATO. Originally the A.M.D. was acquired for use by the prison system, but they were later deployed more widely to law enforcement units under the Ministry of the Interior. In contrast, the Gendarmerie has access to more sophisticated weapons such as FAMAS assault rifles and Heckler & Koch (H&K) MP5 sub-machine-guns, for example, with special units being even more generously equipped.

Even before the November events, the Ministry of the Interior had decided to acquire new weapons for the police and had selected the H&K G36C and G36K assault rifles in 5.56x45mm for the requirement, with deliveries commencing in March 2016 and being complete by the middle of that year. Also acquired was new body armour, as the existing inventory was less than state of the art.

While the French government might have improved its judicial and physical tools to confront terrorism, it rapidly became apparent that this new wave of terrorism was different to anything encountered previously. Terrorist tactics evolved quickly, attacks were random, organisational structures were difficult to penetrate and radicalisation was often so rapid that a passive supporter could rapidly be turned into an active terrorist. The other extraordinary feature of the current threat was its size, as previously noted, last year the then French Prime Minister stated that the security force-



Photo: Prefecture de Police

A chemical, biological, radiological and nuclear (CBRN) defence exercise being conducted by the units of the Paris Prefecture de Police. Thus far the terrorist threat faced in Paris has been conventional, but Islamic State and other radical groups have been known to use chemical weapons in Syria.

es were monitoring 15,000 people in the process of radicalisation. Add to that active supporters and potential shooters both in France and overseas and the numbers of targets to follow are enormous.

In 2016 the Islamist threat saw the use of vehicles as weapons, the first attack was against soldiers in Valence with four injured and the perpetrator captured. The most serious ramming attack came in July 2016 on Promenade des Anglais in Nice, the attacker used a truck to drive into the crowds, killing 86 and wounding 434, before being shot and killed by police. Stabbing incidents with targets including police, the military, a priest and a rabbi saw three killed and 14 injured, as well as one terrorist killed. Fortunately a plot to bomb Notre Dame

Cathedral in September 2016 was foiled. This terrorism has both social and economic impacts. Tourism is of great importance to Paris and the surrounding region, according to figures released by the Comité Régional de Tourisme in early 2017, terrorist incidents saw visitor numbers reduced by 1.5 million and this decreased tourism led to a loss of €1.3Bn to the local economy in 2016. In 2017 (up to early September) attacks have been less deadly, but they continue with one policeman killed as well as 15 security forces and civilians wounded, with three terrorists killed. Attacks in 2017 have taken place on the Champs-Élysées, near the Louvre, Notre Dame and at Orly Airport. These are all high profile locations. More than 1,700 French citizens/residents

have gone to fight for the Islamic State since 2014, many have died and more recently the French military in association with Iraqi forces has looked to track down and neutralise French jihadists. Nevertheless many trained Islamic State fighters will return to France. They pose an enormous threat, especially since French de-radicalisation efforts have been acknowledged as less than effective. Potentially these people could form the cadre for a new wave of terrorism, aided and abetted by new recruits radicalised in prison or via the internet.

The reality of the situation is that the threat of Jihadist terrorism in France and in Western Europe as a whole is not going to go away. The critical point is this is not just a struggle against terrorism, it is also a battle against an ideology that employs terrorism as a fundamental part of its message. You can attempt to fight radicalisation and try and de-radicalise those already in the Jihadist sphere, but you will not achieve any real results unless you attack the ideology behind Jihadist/Islamist terrorism. Thus far there has been no serious and sustained attempt to confront this ideological challenge. As for the current terrorist threat level, the best indication is to look at how concerned the authorities are as regards security around schools. On Wednesday, 6 September, in the centre of Paris at a College (students aged 11 to 16) the children were leaving the school at 12:30 as it is a half-day, standing across from the school entrance the other side of a narrow street were two policemen. Both were wearing tactical vests over light body armour and one was carrying a H&K G36 5.56x45mm assault rifle, an indication that the perception of the terrorist threat is undiminished. ■

European Security & Defence Now available in e-paper format!

MITTLER REPORT

Enjoy reading European Security & Defence as e-paper for your tablet computer or smartphone.



App available in Axel Springer AG's iKiosk

Single copy: 2.99 Euro
Subscription (8 issues/year) 10.99 Euro

1. Install iKiosk app on your tablet device (available as freeware in Apple App Store and Google Play Store)

2. Select European Security & Defence in iKiosk and order!

European Security & Defence

ORDER

MITTLER REPORT VERLAG GMBH · Baunscheidtstraße 11 · 53113 Bonn, Germany
Fax: +49 (0) 228 35 00 871 · info@mittler-report.de · www.mittler-report-shop.de

Deadlock in the Caucasus

EU's Engagement with Abkhazia Needs a New Boost

Jan Blinka

The EU's official stance supports the territorial integrity of Georgia; however, since 2009 there have been attempts to approach the Abkhazian population under the umbrella of so-called "Engagement without Recognition".

The success of this approach has been limited by many different factors, the positions of the main actors being among them. The lack of deeper engagement in recent years and nonexistence of Sukhu-

achieving a permanent peaceful solution. As is the case also with other secessionist territories that have separated themselves from their "parent states", Abkhazia currently seeks international recognition of its

ent states", some of which are ambitious to integrate into Euro-Atlantic structures. This is especially true for Georgia, which would like to become a member of both the European Union and NATO.

From Abkhazia's perspective, however, the conflict with Georgia was resolved by the proclamation of independence and its subsequent recognition by Russia and three other countries. Although Abkhazia strives for full international recognition, this partial recognition is a victory in itself, as the factual subjugation to Tbilisi was broken



Photo: hromadske.ua

Since the closure of two checkpoints in March 2017, only the checkpoint at Enguri Bridge allows the border between Abkhazia and the rest of Georgia to be crossed.

mi's multi-vector foreign policy have left Abkhazians with only one option, driving them further into Russian orbit. Yet, this development is not in the interests of Abkhazia, Georgia, or the European Union. Russia has been the only winner in this so-called frozen conflict in the Caucasus. Abkhazia, as one of two de facto states situated on the internationally recognised territory of Georgia, is a product of an armed conflict, which evolved from its hot phase to current "frozen" state without

independence. Although these entities are not considered to be a legitimate part of the international system, they are not temporary anomalies but rather permanent phenomena that more or less meet the definition and functions of a state.

Unresolved conflicts represent a threat to the security, stability and socio-economic development of the regions that now form the border of the European Union. With its enlargement, the European Union has come into direct proximity of seven de facto states. Because one of the aims of the European Neighbourhood Policy is to contribute to the positive development and stability of bordering regions, it is in the European Union's interest to actively address those frozen conflicts. This notion should be shared also with the former "par-

and, thanks to Russia's security guarantees, Abkhazia does not have to worry about Georgia's violent attempts to revive its sovereignty over the territory.

For Abkhazia, the Conflict is Solved

Nevertheless, the current Abkhazia is more isolated than before 2008. As most states recognise the territorial integrity of Georgia, they do not have any political, economic, and mostly also social or inter-personal relations with Abkhazia. Because of this isolation, Abkhazians rely heavily on the cooperation with Russia, which not only ensures the security and defence of the territory, but also contributes heavily to its budget, pays Abkhaz pensions, invests in

Author

Jan Blinka is an analyst at the Association of International Affairs Research Center, Prague, Czech Republic.

local infrastructure, and de facto monopolises the trade sector. Russian influence on Abkhazia grew even more after the signing of the treaty on alliance and strategic partnership in 2014. Since that time, some of Abkhazia's activities with the European Union have had to be agreed with Moscow. Abkhazia has thus escaped from one unequal relationship to get into another.

Due to the current geopolitical context, this situation will not change anytime soon. After the crisis in Ukraine, the relations between the European Union and Russia are at the lowest level since the end of the Cold War and the question of Abkhazia suddenly began to be viewed through the lens of Crimea's annexation. Until the change in the international environment comes, the isolation of Abkhazia will continue, and thus dependence on Russia will grow and reconciliation with Georgia will be less and less possible.

This situation does not bring benefit either to Georgia, which aims to regain the separatist territory under its control, or Abkhazia, whose interest is formal and factual independence. The only beneficent is Russia, which can not only further increase economic, political and administrative integration of Abkhazia, but also continue using it as leverage to Georgia's Euro-Atlantic aspirations.

Supporting Abkhazia's Opening

In reaction to war with Russia and the subsequent recognition of Abkhazia and South Ossetia's independence by Moscow, Georgia passed two key documents, namely Law on Occupied Territories and the State Strategy on Occupied Territories. They aim to limit wider international recognition of those separatist entities, however, while doing that, they also limit any relations that a third party could have with Abkhazia, thereby throwing it deeper into Russian influence.

In this context, Georgia had to accept the fact that efforts to return Abkhazia under the control of Tbilisi are in the current international situation unrealistic, and should therefore focus on the second best possible solution – which is a less isolated and more independent Abkhazia, which can develop relations also with other countries, thereby balancing the influence of Russia. Tbilisi's effort should be to encourage the greatest possible participation of Abkhazia in international relations and the acceptance of the Western perspective on human rights, democracy and the rule of law.

This opportunity will be welcomed even in Sukhumi, where many fear Russia's grow-



Photo: EUMM

Patrol of the EU Monitoring Mission (EUMM) Georgia in the Samegrelo region near the Abkhazian border



Photo: Kremlin

Abkhazia's de facto President Raul Khadzhimba (left) and Russian President Vladimir Putin signed a military and economic agreement in Sochi, Russia, on 24 November 2014.

ing influence. Contrary to the situation in South Ossetia, Abkhazians have stronger feelings for their own independence and thus some politicians, like former de facto president Sergei Bagapsh, are in favour of multi-vector foreign policy, which remains, however, more a theoretical concept than practical doctrine.

The other positive impulse should come from the European Union, which has a lot to offer, in having a clearly articulated strategy towards Abkhazia.

Non-recognition without Engagement

In 2009, the European Union's Political and Security Committee discussed "Non-paper on the parameters for EU's engagement and non-recognition policy", which was

later promoted by Peter Semneby, then EU Special Representative for the South Caucasus, as the Engagement without Recognition with the aim to reduce Abkhazia's isolation. This strategy, however, was never officially approved, and so far the European Union has no written strategy on Abkhazia making all the decisions ad hoc.

Since the European Union has repeatedly supported the territorial integrity of Georgia, the non-recognition component has been wholly fulfilled. However, finding the appropriate content for the engagement failed. In its engagement activities, the European Union has been limited, among other things, by Georgia's law on occupied territories. As stated by the staff of the Ministry of Reconciliation, "It would be very difficult to imagine, that EU would conduct any activities in the territory of Georgia, where

Abkhazia belongs, without having due regards of Georgia's government." Another limiting factor is the different positions of the EU's member states. For example, France is very reticent in any engagement activities, while Sweden supports strong engagement and thus actually defines how far the European Union can go. The lack of sufficient content is also recognised by Abkhazians, as they nicknamed the strategy as "Non-recognition without Engagement".

As seen from Sukhumi, the relations with the European Union have been complicated since the collapse of the Soviet Un-

ion. As an Abkhazian scholar pointed out, "Europeans did not take our concerns seriously, they saw us as pro-communists and pro-Moscow supporters, but in fact we were afraid to be in one state with Georgians. Europeans never condemned human rights violations done by Georgians during the war and this all created mistrust towards the EU."

For Abkhazians, the European Union is not a status neutral actor, as it does not recognise Abkhazia and associates the conflict resolution with the position of Georgia. Distrust towards the European Union is further supported by the Russian media, which is

thoroughly consumed within Abkhazia, and which portrays the EU's engagement activities and its assistance to Abkhazia as the process of its re-integration to Georgia. While its impact within the Abkhazia is limited, the European Union continues to be active in conflict resolution on the political level as well as in conflict mediation and transformation. Apart from being the mediator of the ceasefire agreement between Russia and Georgia in 2008, the European Union co-chairs Geneva international discussions and created several mechanisms to reduce tensions on the line of contact. The presence of EU's monitoring mission and so-called Incident Prevention and Response Mechanism help to build confidence between the parties and limit armed clashes. "Thanks to the presence of EUMM on the ground, there is no exchange of fire like is the case in Armenia-Azerbaijan conflict. The mission helps to stabilise the status quo," commented one of the EU's Special Representatives for South Caucasus staff.

Engagement Needs New Meaning

What could the European Union do to change this situation? On the one hand, the European Union should remain faithful to its policy of non-recognition until Georgia decides to take a different stance. On the other hand, the European Union should push Georgia to be more flexible on allowing a wider scope of engagement activities as there is no such thing as implicit or creeping recognition – under international law, the state has to claim explicitly that it does recognise another state as legitimate. Thirdly, the European Union should give new content to its engagement strategy; especially the flexibility on the freedom of travel will be highly appreciated. Abkhazians should have the opportunity to travel and study within the European Union, as the isolation of the territory and its people serves only one actor. ■



NETWORKING FOR GLOBAL SECURITY

THE XIIth SPECIAL OPERATIONS FORCES EXHIBITION & CONFERENCE

Conference: May 7th, 2018
Exhibition: May 8th - 10th, 2018





Viewpoint from Berlin



Rough Seas on the Way to "Jamaica"

Wolfgang Labuhn

The inconclusive results of the German parliamentary elections on 24 September 2017 have put the German defence policy on hold for the time being. The previous, rather cosy, coalition government of Christian Democrats (CDU/CSU) and Social Democrats (SPD) agreed amicably on the need to strengthen Germany's armed forces again following Russia's annexation of the Crimea in March 2014 and support of the separatists in Eastern Ukraine. After many years of cuts, German defence spending has since grown to finance 18,000 more armed personnel by 2024, 13 additional A400M airlifters, five new corvettes, two more submarines and 100 more LEOPARD 2 main battle tanks than originally planned, to name but a few of the numerous new projects. The SPD even agreed to NATO's commitment to spend at least 2% of the GDP on defence. This unity only fell apart during the election campaign when the 2% target was declared "absurd" by the SPD and when the Social Democrats also stopped the procurement of several UAVs from Israel (HERON TP) to be equipped with guided missiles at a later stage. However, having suffered a crushing defeat in the general election, the Social Democrats have announced not to serve as a junior coalition partner in Germany's government any longer. As the Left Party and the right-wing Alternative für Deutschland (AfD) are not deemed suitable coalition partners, Angela Merkel's only option to form a coalition government with herself as Chancellor for a fourth term is to join ranks with the Greens and the Liberals (FDP). Nicknamed a "Jamaica" coalition, because the respective party colours match those of the Jamaican national flag negotiations are not to start before November 2017 as formidable obstacles block the way to a coalition agreement. While defence matters were not high on the agenda during the election campaign, the manifestoes of the three potential partners in government differ considerably on several issues. Christian Democrats, Liberals and Greens have repeatedly emphasised their commitment to NATO and to smooth transatlantic relations as well as accepting more responsibility for international crisis prevention including substantial contributions to UN peacekeeping missions. And before the election, Chancellor Merkel clearly stated that her party intended to increase defence spending until 2024 "step by step in the direction of 2% of the GDP". Her potential new partners in government beg to differ. The Greens refuse to accept NATO's 2% goal and condemn the volume of German arms exports especially to non-NATO countries involved

in armed conflicts, like Saudi Arabia. They demand comprehensive legislation to introduce strict guidelines for all future arms exports. This view is shared by the Liberals, who are back in parliament after a break of four years following their failure in 2013 to secure at least 5% of the popular vote required for parliamentary representation. In addition, the Liberals demand European armed forces with a joint command and controlled by the European Parliament alongside NATO. The Liberals also expect closer cooperation within the European Union to develop and procure new weapon systems. Whether Mrs Merkel will manage to forge a "Jamaica"-style defence policy with Greens and Liberals – both basically still considered pacifists and pushing for an EU Army – remains to be seen.

Whatever the results of the pending coalition talks in Berlin, the new German coalition government will not have much choice but to adhere to a number of bi-national and multi-national defence projects already agreed with NATO and EU partners. A joint Franco-German army brigade was already established in 1989. German and Dutch military cooperation now extends to joint airborne and tank units as well as sharing the use of the biggest ship in the Royal Netherlands Navy HNLMS KAREL DOORMAN, a multi-function support ship for amphibious operations. In Lithuania one of NATO's multi-national "Enhanced Forward Presence" battlegroups has been deployed under German command. Germany and France will jointly use a squadron of 10 C-130J HERCULES airlifters to preserve capabilities thus far provided by their ageing fleet of C-160 TRANSALLs. Germany will also be a partner nation of the European Multinational MRTT Fleet (MMF) involving the procurement of up to eight Airbus A330 Multi-Role Transport Tanker aircraft (MRTT). At the last Franco-German Council of Ministers in Paris on 13 July 2017 a number of specific bilateral defence projects were identified. Germany and France now plan to develop a 5th generation fighter to replace their existing fleets of Eurofighter TYPHOON and RAFALE aircraft. The German LEOPARD 2 and the French LECLERC MBTs are to be replaced by a new joint development. Germany and France have also reaffirmed their commitment – together with Italy and Spain – to embark on a joint programme for a European Medium Altitude Long Endurance Remotely Piloted Aircraft System (MALE RPAS) providing "all necessary military capabilities". It now remains to be seen whether all potential coalition parties in Berlin are willing to carry this already well-packed defence rucksack to "Jamaica".



Strengthening the Pillars of Security and Defence

Finland's Policy in a New Environment

Teija Tiilikainen

Finland is tightening its bonds with its main security policy partners in an increasingly tense political environment. The country's partnership with NATO is getting closer, even if full membership is not being actively promoted by any visible societal actors. An extended network of bilateral defence cooperation is a new dimension of Finland's policy, which is still firmly anchored in the construction of a true European policy of common capabilities and preparedness for the protection of European security. Continuous dialogue with Russia at a high political level throughout the crisis has helped to resolve bilateral issues and to communicate the EU's position.



Photo: MoD Russia

The Russian and Chinese navies conducted a joint naval exercise dubbed "Joint Sea 2017" on the Baltic Sea in July 2017.

Finland's security-policy environment has changed significantly during the past few years. The tension between Russia on the one hand and the EU and the US on the other has changed the atmosphere in the Baltic Sea Region. The emerging climate of cooperation among coastal states on topics such as the environment and transportation has now reverted to its Cold War status. The Russian annexation of Crimea and its action in Ukraine, followed by Western sanctions, have once again made the Baltic Sea Region

one of the European theatres of heightened politico-military confrontation and tension. The new aggressive approach in Russian foreign policy together with the strengthening of its military bases in the region have nourished a sense of insecurity, and they have called for NATO countermeasures in support of its allies along the southern borders of the Baltic Sea.

The worsening security-policy situation in the immediate Nordic-Baltic neighbourhood is increasingly understood in the light of a transition in the global balance of power and changing dynamics in relations between the great powers. A strengthened China is tying the US more strongly to Asia and giving Russia more manoeuvring space in Europe. A vacillating US policy on transatlantic relations resulting from the change

of presidential regime is part of the same phenomenon. For the time being, however, this is in contrast with the vitality of NATO on the ground in the Baltic States and Poland, and its balancing of Russian action.

Finland's Policy on Multilateral Security

The worsening security environment has clear implications for Finland's security and defence policy without, however, triggering major changes in the key pillars of its security-policy doctrine. These pillars were established in the early 1990s when Finland – unlike the other Nordic countries – did not carry out a major reform of its defence system following the collapse of the Soviet Union. Instead, it maintained the key tenets of its previous policy, in other words a territorial defence system together with a conscript army. Irrespective of the changes in Finland's political environment, and of the diminishing likelihood of open military conflict, the risk of armed conflict was never entirely abolished in the Finnish defence-policy doctrine. With a credible national defence still playing a key role in the country's overall security policy, there has been more variation in the formulation of its attitude towards international cooperation in security policy.

Finland has been constantly broadening and strengthening its role in the context of international security and defence cooperation since the mid-1990s. The country's decision to join the EU but remain outside NATO still stands, but it has not prevented Finland from developing its partnership with NATO in multiple ways. On the doctrinal side, the worsening security situation

Author

Teija Tiilikainen is Director of the Finnish Institute of International Affairs (FIIA).



Photo NATO



Sweden and Finland took part in their first-ever NATO foreign ministers' meeting in Brussels on 20 May 2016. From left to right: Swedish foreign minister, Margot Wallström, Finnish foreign minister, Timo Soini, and the High Representative of the European Union for Foreign Affairs and Security Policy, Federica Mogherini.

has led the Finnish political leadership to further emphasise the country's option, if needed, to change course and apply for membership. Thus far, there have been no signs of such a change in thinking among the political elites, even if Finland's dependence on the Swedish decision on this issue is more visible in a worsened security situation. The increasing military tension around Finnish borders has not strengthened popular support for NATO accession from a level of around 20 per cent. This roughly corresponds with the level of support for the two parties in favour of Finland joining NATO, the centre-right National Coalition Party and the small Swedish People's Party. Given the new security-policy environment, and the consequent new emphasis in NATO on its Article Five tasks, Finnish and Swedish NATO partnerships have been elevated to a new level. This enhanced partnership status was confirmed in NATO's Wales Summit of 2014, which recognised Finland's (and Sweden's) solid contributions to NATO-led operations and improved the likelihood of a political dialogue with the organisation. Both countries signed a Host Nation Support agreement with NATO, which concerns the role and rights of allied forces in Finnish and Swedish territories. As Partnership for Peace (PfP) countries, both Finland and Sweden have been taking part in NATO military exercises for a long time. Their participation has continued, even if these exercises have become more focused on tasks of collective defence in the past few years, which could be considered another sign of a deeper partnership.

Finland's strengthened willingness to engage in international cooperation on security and defence policy applies equally to the EU framework. The country's slightly cautious attitude towards EU defence cooperation in the early years of its EU membership changed gradually to being fully supportive of a deepened common security and defence policy in all dimensions. Finland has

contributed actively to EU-led military and civilian operations, including to the battle groups. Its expectations for the Union's role in security and defence nevertheless extend beyond crisis-management capabilities, which is reflected in the country's approach to the most recent developments in the EU's security and defence policy. It has been in Finland's interest for the EU to start exploiting all the possibilities for deepened security and defence cooperation enabled in its current treaties, and to adopt a more focused strategy concerning its security needs and vulnerabilities.

Finland has thus welcomed the new focus on the planning and production of European capabilities, promoted with the support of the European Commission and the newly established European Defence Fund. It has equally supported Permanent Structured Cooperation, which allows for a group of

Photo: Hybrid CoE



NATO Secretary General Jens Stoltenberg attended the official inauguration of the European Centre of Excellence for Countering Hybrid Threats (Hybrid CoE) in Helsinki on 2 October 2017.

countries to make more far-reaching commitments concerning capabilities and operational tasks. Finland is also one of the very few EU member states that have stressed the significance of the Union's mutual defence clause (art. 42.7), which became part of the Lisbon treaty in 2009 and obligates member states to defend each other in case of an armed attack. The clause was invoked for the first time in the context of the Paris terrorist attacks in November 2015, when many member states – Finland among them – increased their contribution to international operations to allow France to shift focus to its own territory. The possibility to increase common preparedness for tasks of mutual assistance – irrespective of the clause's intergovernmental character – has been raised in the context of the EU's Global Strategy for Foreign and Security Policy (2016) and its implementation plan on defence. The political and economic hurdles against such a move are obvious, however, and it is more likely that the focus of European policy on security and defence will be, apart from capability development, on border security and measures against hybrid threats including cyber attacks. Finland has used its initiative in the context of countering hybrid threats, resulting in the establishment of a European Centre of Excellence for Countering Hybrid Threats in Helsinki in 2017, as a joint endeavour among several EU and NATO countries.

A New Bilateral Approach Emerges in Finland's Policy

Finland's policy of active participation in international security is not limited to multilateral cooperation, and in the past few years it has been strengthened with the establishment of several bilateral relationships. Regional defence cooperation among the Nordic countries (NORDEF) is now solidly positioned as a forum for pragmatic cooperation on capabilities and armaments, operations and training, and exercises. Both regional and bilateral cooperation are perceived in the Finnish policy as instruments complementing and supporting Finland's role in the broader EU and NATO frameworks. The implication is that not even the most far-reaching Finnish-Swedish defence cooperation is meant to replace them.

Bilateral defence cooperation with Sweden has been elevated to a new level, reflecting the mutual benefits and interests of the two countries in the new environment. With its limits and possibilities this cooperation has also gained a lot of visibility on the political agendas of the two countries. A common understanding is that it should be able to take forms not delineated at the outset, and



COUNTRY FOCUS: FINLAND

to extend beyond peace-time. It should cover common operative planning for all possible crisis scenarios. It was in this atmosphere that a report from 2015 assessed ongoing cooperation in all branches of defence, and the possibilities to extend it in new directions. Existing cooperation covers functions such as capabilities and interoperability, logistics, surveillance and communication, training and exercises, and common units in operations.

Although there are single political voices in Finland seriously proposing a treaty arrangement between Finland and Sweden in the form of a military alliance, this option is explicitly excluded in recent Swedish political documents. On the other hand, legislative changes carried out (Finland) or prepared (Sweden) are a further indication of the political importance of cooperation. Legislative changes that came into force in 2017 enabled Finland, for the first time, to assist another state with the provision of combat forces and to take decisions on such assistance in a fast-track procedure. Even if this new preparedness is not limited to cooperation with Sweden, this cooperation still served as a basis for the new laws. A corresponding fast-track procedure – which is more explicitly linked to cooperation with Finland – is currently being considered in the framework of a Swedish governmental study and could lead to legislative changes at a later date.



Denmark, Finland, Iceland, Norway and Sweden participate in the Nordic Defence Cooperation (NORDEFCO).

Whereas bilateral cooperation with Sweden is anchored in the familiar framework of Nordic cooperation, other relationships that have been consolidated recently have novel aspects. Finland has recently concluded bilateral agreements on defence cooperation with several NATO countries, including the US, Germany, France, the UK, The Netherlands, Poland and Denmark. In most cases these agreements, the contents of which

Photo: Finnish Defence Forces



Finland has more than 300 soldiers deployed to UNIFIL. Finnish troops serve in UNIFIL both in the Irish-Finnish Battalion and in the French-led Force Commander's Reserve Battalion.

have not been disclosed in detail by the political leadership, seem to serve as a broad framework for later needs.

Defence Policy in a Changing Environment

Although the key pillars of Finland's defence system remain unchanged, it has still been necessary to reconsider many details of this policy in the light of the worsening levels of threat. The starting point is that potential conflicts in the Baltic Sea region could now break out more quickly than previously, given the lowered threshold for the use of military force. It is thus acknowledged that this and the increasingly multifaceted means that might be used against Finland (including hybrid and cyber action) require preparedness from the Finnish defence forces to react more quickly and increasingly in cooperation with other international and domestic actors.

Finland had seriously reduced its defence budget (by 10%) and decreased the number of wartime capabilities to 230,000 soldiers before the security environment deteriorated. This tide turned in 2015 and, specifically, training and exercises could be resumed at their earlier levels. There was a change of law in 2016 enabling the defence forces to call in reservists for exercises in an accelerated procedure if there were a need to raise the level of preparedness. Laws dealing with the provision and receipt of international assistance mentioned above, and specifying the competence of Finnish political institutions and procedures to make decisions in situations in which Finland needed to ask for international military assistance, originate in the same need to adjust to an intensified security situation. Another dimension of Finland's defence policy that reflects the tenuous international environment is the country's participation in international crisis management, which has clearly been on a lower level during the past few years. Budgetary constraints and changing political priorities in defence policy have

forced the Finnish government to reduce the crisis-management budget by €5M–€10M annually. Whereas the numbers of Finnish troops in international operations approached 2,000 in the early years of the millennium, the number is currently around 500, of which two-thirds are engaged in the UNIFIL operation in Lebanon. The new level also reflects the lack of new, major EU and NATO operations in the wake of Afghanistan and Kosovo.

Conclusion

It is implied in recent Finnish security and defence policy that Finland has adjusted in many ways to a radically changed political environment. The potential for inter-state conflicts has grown stronger in Northern Europe, as the threshold for the use of military force has become lower. At the same time, possible means to be used in conflict situations have become more multifaceted. Finland is sticking to the old pillars of its security and defence policy in this increasingly complicated environment, although some new ingredients have been added to support them. The Finnish political leadership has been keen to stress Finland's role as a member of the Western community, but outside NATO, as well as its firm commitment to its key institutions. The country's partnership with NATO appears to imply a commitment that is deeper than that required of many full members, but without any expectations of the guarantees set out in the organisation's fifth article. An open-minded approach to the EU's deepening security and defence policy as well as the potential to strengthen bilateral relations anchor Finland to its European partners and neighbours, and they are expected to strengthen its capacity to manage geopolitical and other vulnerabilities. Last, but not least, an alert and up-to-date national defence force functions as a deterrent and makes Finland an attractive partner for international cooperation in security and defence policy. ■

Photo: ESD archive

TOTAL PARTNERSHIP



BENCHMARKING EXCELLENCE

- **Effective:** being the most powerful and reliable swing role fighter
- **Proven:** in global operations with highest operational statistics
- **Trusted:** to deliver performance, political and industrial partnership

 **Eurofighter
Typhoon**

Effective Proven Trusted



www.eurofighter.com



Finland's Defence Today and Tomorrow

Photo: Finnish Defence Forces



Jarmo Lindberg

This year Finland celebrates its one hundredth year of independence. Throughout their history, the Finnish Defence Forces have been an important part of our society, both in times of peace and war. Even today, national military defence has the strong support of the Finnish people. According to the latest survey carried out at the end of 2016, more than 70 percent of Finns are of the opinion that Finland should be defended by arms in all situations.

Finland was one of the few European countries that did not give up the principles of total defence, a broad reserve or the general conscription that it requires when the Cold War ended. The weakened security situation in Europe of late shows us that we have acted sensibly.

The Defence Report published by the Finnish Government in February 2017 gives clear guidelines for the use of our defence capability and its development far into the 2020s. The Defence Report assesses the military operating environment, describes the current state of our defence and outlines the future of our defence capability.

Finland's Security Environment and the Changing Nature of Threats

In the last few years, Finland's security environment has become more unstable and unpredictable at the same time as military activities in our neighbouring areas have increased considerably compared to the situation half a decade ago. Russia has brought new weapon systems to the vicinity of our borders and strengthened its troops in the area of the Western Military District. The NATO countries have also strengthened the defence of Eastern Europe and the Baltic Sea region by placing permanent troops and systems in the area. The states in Fin-

land's neighbouring area have responded to the changes in the security environment by developing the readiness of their armed forces and making decisions concerning new materiel procurement, as well as by increasing appropriations for their armed forces.

Along with the increase in traditional land, sea and air-based operations, also information networks and systems – the cyber dimension – has become an operating environment of warfare. Information networks and the data they contain have become a means of influencing an opponent more extensively and unexpectedly than by conventional military means. For example, a cyber-attack can very rapidly paralyse many critical functions of society in parallel. Traditional and new means of warfare can also be used together in many different ways. In today's world, external and internal security can overlap, or can be even be impossible to separate from one another. One cannot defend oneself against multidimen-

sional threats using only one resource or one actor. More extensive cooperation between different authorities, organisations and economic life is needed in responding to threats. Finland's model for comprehensive security, where the preparedness and cooperation of authorities is clearly regulated and interoperability is practised regularly creates a strong foundation for responding to these kinds of threats, too.

The Defence Report Provides a Clear Direction for National Military Defence

As outlined in the Defence Report, there are no foreseeable changes in the central principles of our defence. The foundation of our defence remains our Finnish model, which is formed according to our circumstances and needs, and which illustrates the principles and realisation of Finland's defence. The foundation of our defence rests on our well-known choices: general

Photo: Finnish Defence Forces



The Finnish Defence Forces are endeavouring to improve readiness. The first conscript detachments of the readiness units have reached operational capability.

Author

General Jarmo Lindberg has been Commander of the Finnish Defence Forces since 1 August 2014

"When you're in a hostile environment, miles from a safe landing area, the last thing you need is a question mark about reliability.

I had complete confidence in the EJ200 engines,
allowing me to focus on the combat task."

UK RAF Wing Commander in Libya

**The EJ200: the engine
that gets you home.**

With cutting-edge technology and unrivalled build quality, the EJ200 has proven time and again to be the most reliable engine in its class.

To find out how our market-leading design and maintenance concept ensure that you will always be able to fulfil your operational requirements, visit us at www.eurojet.de

Photo: © Eurofighter / Geoffrey Lee



EUROJET

Power. Precision. Performance.



Photo: Finnish Defence Forces



Participation in international assistance is the newest of the Finnish Defence Forces' tasks. It allows Finland to provide and to receive international military assistance that is requested on the basis of EU's solidarity clause or the mutual assistance clause. Pictured are Finnish and Swedish naval vessels at sea.

Photo: Finnish Defence Forces



The most important capability development programmes of the Finnish Defence Forces at the beginning of the next decade are the replacement of our F/A-18 HORNET fighters (shown) and the SQUADRON 2020 naval programme.

conscription, not relying on any military assistance, and a credible defence that covers our entire country. Behind our choices lies the strong will of our citizens to defend their country.

National military defence is a part of the vital functions of Finland's overall security and safety, along with public order, the subsistence and functional capability of the population, and leadership of the state, to mention just a few aspects. Finland's defence capability is based on ground, sea and air defence capabilities proportionate to the operating environment and on the joint capabilities supporting them, but also

on the capacity to receive international assistance.

In order to be able to prevent military crises and if necessary repel attacks, we need both spearhead capabilities based on modern technology and a broad reserve. Rapid deployment forces in high readiness equipped with effective and modern systems and consisting of troops from all three services are primarily used to prevent the escalation of a situation into an armed attack against Finland. If the situation requires, the rapid deployment forces are capable of repelling a first strike on Finland. The capability for responding to

large-scale attacks is created using territorial forces equipped with appropriate materiel from our large reserve.

The defence forces have had three main tasks. These are the military defence of Finland, supporting other authorities and participating in international military crisis management. In July 2017, we were assigned an additional task. In simplified terms, this task is "participating in international assistance". Based on the clauses regarding solidarity and mutual assistance that bind all European Union member states, this new task allows Finland to provide assistance to other states. Correspondingly, through changes to legislation relating to this new task, Finland is also able to receive international military assistance.

I would like to emphasise the importance of general conscription for Finland's military national defence. In Finland's conditions, conscription has proved to be the most cost-effective arrangement for maintaining its defence capability in both peace and wartime. Conscription allows us to produce and maintain our wartime forces, of which reservists make up almost 97 percent in manpower. General conscription securely ties the defence forces to our society and significantly contributes to our citizens' interest in Finland's defence. Four out of five Finns support maintaining the current conscription system. General conscription also provides the defence forces with an excellent pool for recruiting. This year, the National Defence University's officer training programme has had a record number of applicants, same as voluntary military service for women.

Developing Capabilities

The Defence Report recognises the fact that the defence forces need to develop the new, but also maintain and replace the old. Focal points in developing our defence are readiness, replacing outdated capabilities as well as intelligence, cyber defence and precision strike capabilities. The defence system will be developed without creating any practical impediments to a potential membership in a military alliance.

Despite the changes in the operating environment, Finland is currently not subject to any imminent military threat. However, more multiform threats that can arise more quickly and unexpectedly and may have more serious consequences, have given rise to the need to develop our readiness and regulate it flexibly as required. The Air Force and Navy have traditionally overseen and protected our territorial integrity. In our



Photo: Finnish Defence Forces

Members of the Finnish Defence Forces, Border Guard and Police in close cooperation during an exercise: Finland's model for comprehensive security, where the preparedness and cooperation of authorities is clearly regulated and interoperability is practised regularly, creates a strong foundation for responding to modern threats.

current situation we continue to develop the readiness of the Air Force and Navy. The effect of the change is greater in the Army, however, as we purposefully transform this service previously focused mainly on training into a readiness and training organisation. This entails for example building and training new troops with a higher level of readiness. We will also increase the strength of our wartime troops from 230,000 to 280,000 soldiers, in accordance with the guidelines given in the Defence Report.

The defence forces' capabilities are being developed for the long term. Limited financial resources do not, however, enable the simultaneous development of all capabilities. For this reason, the procurement of the largest and most important systems must be regulated and prioritised between the different services according to a long-term time frame. The aim is to have a balanced overall capability.

The focus of development during this decade has been the Army. The Army is developed in troop entities, with equipment and capabilities being continually developed from one decade to the next. The Army's most important capability projects are for example equipping the new wartime troops and developing the land forces' mobility, rapid reaction capability, fire power and strike force. The current further development of our artillery system, which is one of Europe's largest, can be seen in this year's K9 self-propelled howitzer purchase from South Korea.

By means of systematic development we ensure the Army's ability to fulfil its task also in the 2020s, and development work will continue in the future. The overall volume of materiel projects planned for the Army in the next decade is almost three times the size of the Navy's SQUADRON 2020 project.

On the other hand, the development of the Navy and Air Force is reflected by the procurement of systems such as vessels and aircraft. The main systems of the Navy and Air Force will be decommissioned almost simultaneously in the 2020s. For our defence, the vessel and fighter aircraft purchases that will replace outgoing capabilities at the beginning of the next decade are vital strategic projects. The Navy's Squadron 2020 will

replace seven vessels at the end of their life cycle. This project is a prerequisite for the accomplishment of maritime defence tasks after the middle of the next decade. Replacing our F/A-18 HORNETS with multirole fighters will enable our capability to defend our entire airspace and maintain our pre-emptive defence capability also in the future.

2020 will replace seven vessels at the end of their life cycle. This project is a prerequisite for the accomplishment of maritime defence tasks after the middle of the next decade. Replacing our F/A-18 HORNETS with multirole fighters will enable our capability to defend our entire airspace and maintain our pre-emptive defence capability also in the future.

The implementation of the guidelines laid out in the Defence Report requires sufficient resources. For the implementation of its guidelines, the Report presents three closely linked financing instruments that are related to readiness, strategic projects and other materiel acquisitions. Additional €50M have already been allocated for readiness development and thus ensure that we are capable of continually responding to military threats as required by the environment. The fi-

Introducing new tactical radios

Bittium Tough SDR Handheld™ & Bittium Tough SDR Vehicular™



- › Widest range of frequency bands available in the market
- › Flexibility to use different waveforms, such as ESSOR
- › Optional LTE connectivity
- › Multilayer security with national customization
- › Capability to run customized applications with application sandbox

Connectivity
to be trusted.

www.bittium.com
defense@bittium.com

Bittium



Finland has contributed to both NATO-led ISAF and RSM in Afghanistan. The photo shows Finnish soldiers on patrol in Northern Afghanistan.

financial resources needed for strategic projects cannot be allocated from the defence forces' materiel budget without causing the collapse of an entity such as the present defence system. For this reason, strategic projects must be funded using separate resources and decision-making relating to this is very important also at national level. In addition to this, the extension of additional funding of €150M for materiel acquisitions from 2021 onward ensures the development of the Army's and services' joint capabilities.

International Defence Cooperation Is Important for Finland's Defence Capability

Although Finland does not belong to any military alliance-, and cannot count on outside assistance, defence cooperation plays an important role in our country's defence capability. By means of defence cooperation we ensure our interoperability and through it our capacity to connect international assistance to our own defence system.

Finland conducts both bilateral and multilateral defence cooperation. The cooperation carried out in different instances is not a matter of rivalry. Each instance of cooperation has its own purpose and place.

It is important that Europe is able to manage its own security – guaranteeing this is the responsibility of all member states. Finland is committed to developing the Union's defence cooperation and, among other things, we support the development of the Union's permanent structured cooperation. In the development of defence, it is important to take into consideration the Union's aims as well as the needs of member states.

Finland promotes NATO's Enhanced Opportunities Partners programme and the intensification of cooperation with NATO and Finland and Sweden (29+2). Finland also maintains the possibility of applying for NATO membership. Nordic Defence Cooperation (NORDEFCO) emphasises

among other things cooperation in the fields of situational awareness, exercises and training.

Sweden holds a special position in Finland's bilateral defence cooperation. The aim of this cooperation is to strengthen the countries' defence as well as security in the Baltic Sea region. The United States is also an important partner for Finland. Here defence cooperation concerns especially materiel and exercise cooperation.

The most concrete forms of our defence cooperation are our troops in crisis management operations and international exercises. Even now, more than 500 Finnish soldiers, most of which are reservists, are working to secure and build peace in a total of eleven military crisis management operations. In addition to this, approximately 160 soldiers are standing by in detachments designated for NATO crisis management duties.

The grounds for our participation in military crisis management are clear. It is a part of Finland's foreign and security policy and international cooperation. On the other hand, crisis management operations also offer us the possibility of developing our national defence capability. In opera-

tions, both our salaried staff and reservists gain experience in demanding conditions and at many levels of command. At the same time we also gain experience with regard to the use of our equipment in field conditions, among other things.

Finland Maintains a Defence Capability and Readiness Proportionate to the Security Environment

The security situation in Finland's neighbouring areas has deteriorated. Military tensions have risen in the Baltic Sea region, and insecurity has also increased further afield. This does not mean that we expect war to break out, but rather that we must be prepared if military power is used against Finland, or if we are threatened with its use. Making sure that our own defence is strong is not sabre-rattling – it is our duty – and a stabilising factor for our security environment. Our message is clear: Finland maintains a defence capability and readiness that is proportionate to the security environment.

Our actions to develop our readiness guarantee that we are capable of responding to possible military threats aimed at Finland as required in each respective security environment and by changes to warfare also in the future. The purpose of our actions is primarily to prevent threats from turning into military conflict.

The Defence Report published this year and the guidelines it provides give the Defence Forces a clear direction for the future. Sufficient resources are a prerequisite for the implementation of the Report's guidelines and at the same time for maintaining our defence capability into the next decade. ■

Find us on facebook!

European Security & Defence



Daily News – Upcoming Events

www.facebook.com/eurodefence



DEFENCE & SECURITY INTERNATIONAL EXHIBITION

2018

EUROSATORY

11 - 15 JUNE 2018 / PARIS

THE
LAND & AIRLAND
REFERENCE



Identify your company
as a key player

GICAT

www.eurosatory.com

 **COGES**



"We are following the European directives strictly."

Photo: MoD Finland



Interview with General (ret.) Raimo Jyväsjärvi, National Armaments Director and Director General, Resource Policy Department, MoD Finland

ministration Commercial Board which gives its endorsement in all procurements with a value exceeding €4M, subject to procurement decision by the Minister of Defence. RPD is not comparable with the FMV or NDMA, which are defence procurement organisations under the respective Ministries of Defence. FMV has also certain logistics responsibilities, as does the Finnish Defence Forces Logistics Command (FD-FLC) in addition to its procurement tasks. I would rather see FMV, NDMA and FDFLC as broadly similar kinds of organisations with certain differences, while the RPD is one department in the Finnish MoD giving overall material policy guidance.

The RPD's biggest challenges are now connected to the strategic capability programmes. The Finnish Defence Forces' existing F/A-18 fleet will be replaced by 2030, and the majority of the naval ships will be replaced by 2025. Both programmes are already in very good process, but they will need further material policy and commercial guidance as well as guidance regarding industrial participation and security of supply.

Finnish capability building is based on long-term planning. National strategies like government programmes, foreign and security policy reports and defence reports lay the political foundation for defence capability planning. Based on that, Defence Command Finland (DCF) develops, together with the services, a detailed long-term development programme which is the base for national capability building and procurement. RPD coordinates the procurement process and FDFLC is the procurement authority subordinated to the DCF.

ESD: To what extent does your Department assume responsibility for the R&D share of armament programmes? Do you have your own R&D personnel?

Jyväsjärvi: RPD does not have its own R&D personnel. In the Finnish MoD, research tasks and responsibilities are concentrated within the Defence Policy Department. The MoD defines the R&D guidelines and tasks to the Finnish Defence forces. The FDF Research Institute conducts strategic level research on operational and technical matters.

ESD: Can you briefly elaborate on the role, organisation and duties of the Resource Policy Department? Is the Department comparable to other defence procurement organisations like the Swedish FMV or the Norwegian NDMA? Are there other organisations involved in defence procurement in Finland?

Jyväsjärvi: Resource Policy Department (RPD) is one of the three departments in the Finnish MoD. It is responsible for outlining defence material policy in the Finnish defence capability building process and also directs personnel and employer policy, real estate and environmental policy, as well as ICT policy within the defence administration.

RPD consists of five units having the responsibility of the above-mentioned main tasks; Materiel Unit, Strategic Projects Programme, Personnel Unit, Real Estate and Environment Unit and ICT Unit. RPD's main task is to give MoD-level guidance in these areas within the whole defence administration, and in broader terms, to secure needed resources for national defence within these specific areas, including in preparation of times of crisis.

In defence materiel procurement, RPD gives materiel policy guidance to the Finnish Defence Forces, coordinates procurements, and decides on case-by-case basis the procurement model. RPD also defines security of supply and industrial participation requirements based on national requirements. RPD runs the Defence Ad-

Photo: Finnish Defence Forces



K9 self-propelled howitzers are the latest improvement to the Finnish Defence Forces' indirect firepower.



A unique feature in Finland is the Scientific Advisory Board for Defence, which is a network of scientists and specialists representing universities, research institutes, industries and government authorities. Approximately 300 academics and other specialists in 12 committees provide their best national research knowledge in support of national security. The Board operates under the auspices of the MoD, and operates a small scale funding budget for scientific studies.

ESD: What is the Finnish policy with regard to offset and compensation requirements in the scope of defence procurement efforts?

Jyväskylä: Finland has not used compensation requirements since 2012 when the new act on public defence and security procurements came into force in Finland. We are following the European directives strictly. On a case by case basis we consider in advance if procurement has vital implications to Finnish national security and if so, we may exceptionally set an industrial participation requirement. As a small country, dependent on sea routes, we must sustain the necessary

industrial and technological competence to maintain and tailor our critical systems so that their independent use can be guaranteed in all circumstances. Direct industrial participation requirements might be set to develop defence industries' capabilities for instance in parts manufacturing, assembly, integration or development etc. for the defence equipment to be purchased. Indirect industrial participation may be required in the case when cooperation supports vital national security interests or contributes critical technologies and know-how in Finland. We have released recently two official publications on this subject: "Securing the Finnish Defence Technological and Industrial Base" and "Industrial participation in defence procurements". These can be found on our MoD webpage.

ESD: What advice can you give to a foreign defence contractor who wants to enter into a business relationship with the Finnish MoD and the Finnish Armed Forces?

Jyväskylä: Basically doing business in Finland does not differ when compared to doing so in other Nordic countries. We all can be described as easy countries to

do business with. Education and social welfare are at a high level, the decision-making process is based on objective facts and we follow a logical and defined decision-making process. We are also largely technically oriented.

Finland's geographical position and being militarily non-allied set some additional requirements to our defence solution and capability development. High dependency on sea lines of communications emphasises adequate security of supply and assured independent use at least of the strategic defence capabilities. This is good to realise when building capabilities together with the MoD and FDF.

Finland is a country of highly capable, innovative and high-tech, mainly small- and medium-sized, industries. In several niche areas we can offer high level solutions globally and also cooperate in the supply chain of the world's leading defence enterprises. Telecommunications, cyber, software technology, protective materials and technologies, small arms and ammunitions and military vehicles are some of those areas to mention.

The questions were asked by Jürgen Hensel.

OHTO LAUNCHER

- Adaptable
- Multi-functional
- Highly transportable

ROBONIC
www.robonic.fi



"We wish to maintain our operational independency in all situations."

Photo: Finnish Defence Forces



Interview with Lieutenant General Kyösti Halonen, Deputy Chief of Staff, Logistics and Armament, Finnish Defence Forces

Current annual budget for procurement is roughly €500M. It will be temporarily doubled with above-mentioned national strategic programmes. Annual budget for maintenance is roughly €500M.

ESD: We understand that in response to your request for information for the replacement of the Air Force's F-18 fleet you received proposals from five contenders. Can you elaborate on details of the requirement and the projected further schedule of the programme?

Halonen: Capability required was based on different types of scenarios and tasks and thus details are classified. Contenders were to propose a solution how to best solve each of the given tasks and scenarios. Assumption was that contenders would offer multirole fighters possibly supported with other platforms and/or capabilities. Weapon and sensor payloads were not preselected so contenders were free to propose a package that is best suited to their for their own candidate. All contend-

ers were also asked to provide a training system, maintenance and logistics support package. RFI answers were received late 2016. RFI answers have been analysed together with classified weapon and sensor system briefs. Based on this information RFQ will be out early 2018. Selection and decision will be made late 2021. There will be four decision criteria: capability, total life-cycle costs, sustainability and security of supply and of course defence policy implications. The most important criterion will be capability. HX programme has extensive numbers of interfaces with other FDF systems especially with C4I, ISTAR and joint fires. One of the policy implications is the impact on the Finnish defence industry.

ESD: Which of your current programmes are carried out in international partnerships with other national or multinational procurement organisations?

Halonen: Partly due to our distant location and also to national security policy, we wish to maintain our operational independence

ESD: What are the most important defence programmes currently executed by the Department? What – on average – is the annual budget available for defence materiel investments in Finland?

Halonen: Finnish Defence Forces' capability development programme 2017-2028 consists of three service specific development programmes and five joint development programmes. Each of these includes several separate materiel programmes or projects. Materiel programmes and projects are executed by the Logistic Command.

The two most important programmes are HX and SQ2020, which are nominated as national strategic programmes. Funding for these programmes will be above the previously accepted procurement budget. The HX will replace Finnish Air Forces' ageing F-18 fleet by early 2030. SQ2020 will replace seven Finnish Navy vessels with four corvette class vessels by mid 2020. The Navy has two other major programmes namely SQ2000MLU, upgrade of HAMINA Class PGG, and SSM2020 to replace RB-S15FIII missiles for Navy vessels and coastal batteries.

Main Army programmes include NH-90 procurement and upgrade, LEO 2A6 surplus government to government procurement from The Netherlands and K-9 government to government surplus procurement from the Republic of Korea. Joint programmes include cyber, joint fires, ammunition, joint logistics, C4I, ISTAR just to mention major ones.



PORI, the fourth ship of the HAMINA Class in the South Harbour area of Helsinki: The upgrade of the HAMINA Class is one of the major programmes of the Finnish Navy.

Photo: commons.wikimedia



in all situations. Therefore in all programmes we intend to create the capability to maintain all equipment in Finland. Security of supply and continuity of services are critical to us. This requires remarkable technology transfer, spare parts and maintenance tools for the end user and also for the defence industry. All workshop, depot and industry level maintenance for the Army and for the Navy are done by our strategic partners. Also the Air Force relies heavily on partners but maintains some capabilities in bases. NH-90 helicopter programme is the only major international partnership programme. On a smaller scale, we scale we have worked with NSPA, NORDEFCO and OCCAR. We have also made several government to government surplus procurements mainly for the Army.

ESD: Are there defence procurement efforts executed in the scope of public-private partnerships?

Hälonen: As I described above we have a concept of strategic partnership which means that certain companies have also responsibilities for readiness and crises time preparations. Those companies are involved in major programmes by setting maintenance requirements and building life-cycle support for procured materiel. In the HX programme Patria and Insta have this vital role. Similarly Patria has the

Photo: commons.wikimedia/fim Felce (Airwolfhound)



Currently, the NH-90 helicopter programme is the only major international partnership programme of the Finnish Armed Forces.

same role in the NH-90 programme. In SQ2000MLU Patria is prime contractor and Millog will be building LC support. Millog has the key support role in the SQ2020, LEO2A6 and K-9 programmes. In the ammunition area Nammo is our strategic partner and thus supports ammunition

production for most of the previously mentioned programmes as well as for our legacy weapon systems. We have some R&D programmes with private companies ongoing especially in C4I technologies. **The questions were asked by Jürgen Hensel.**

ESD Spotlight

MITTLER REPORT

New Fortnightly Newsletter

European Security & Defence is escorted by the new bi-weekly newsletter **ESD Spotlight** which is distributed by email. **ESD Spotlight** is available free of charge. You can order your subscription by sending an informal email message to esd.spotlight@mittler-report.de.

Alternatively, there is a subscription order form on the magazine's website at www.euro-sd.com.



MITTLER REPORT VERLAG GMBH Baunscheidtstraße 11 · 53113 Bonn · Germany
Fax: +49 228 35 00 871 · info@mittler-report.de · www.mittler-report.de



The Finnish Defence Industrial Base

Capabilities and Perspectives

Photo: via author

**Tuija Karanko**

In Finland, a viable and competitive domestic defence industry is a fundamental element of credible national defence. Finnish technological expertise plays an important role for the entirety of the defence system and for the security of defence equipment supplies.

With a few exceptions, most Finnish defence, aerospace and security companies are privately owned SMEs. Many of them operate also in other industrial sectors. The cumulative turnover within the defence, aerospace and security defence sector was approximately €1.4Bn. in 2016, representing an increase of 16 % if compared to the previous year. Direct employment in 2016 was some 6,100 and indirect 15,000. International markets and competitions are vital for Finnish companies. The amount of exports varies between 40 to 50% annually. Products produced by AFDA member companies are well known and used all over the world.

Finnish defence, aerospace and security companies invest significantly in R&D. In average, R&D investments constitute approximately 15% of their turnover. The Finnish industry is internationally acknowledged for producing high-quality, premium products with long life-cycle performance and for innovative methods for the utilisation and implementation of technology.

Security of Supply

Security of supply is a very broad concept in Finland. It encompasses the capacity to maintain the basic social activities and in-

frastructures that are necessary for safeguarding the population's living conditions, maintaining a functioning society, and sustaining the material preconditions for upholding national defence in all situations. The Finnish defence industry plays a crucial role in securing the military security of supply in Finland.

Finland is situated in the Northern corner of Europe. Growing internationalisation and inter-dependency has increased the importance of security of supply. The possibilities to safeguard security of supply solely by domestic means have weakened and – as we have seen in the past few years – we are highly dependent on the global economy, exports and interna-

tional cooperation.

As a non-allied country, Finland cannot build its defence planning on military assistance from abroad. We must be capable to independently repel any possible threat.

All new defence materiel must meet required multilateral standards and be interoperable. Being able to receive assistance from abroad sets requirements also for our defence industry. The companies need to sustain certain knowledge and capabilities for repairing and integrating possible new systems and sub-systems to our systems under any conditions. This knowledge-based Security of Supply is very important for us.

Photo: FN Herstal



Photo: Ex13

FN® FCU Mk3 Fire Control Unit for 40mm Grenades, co-developed by Belgian small arms manufacturer FN Herstal and its Finnish subsidiary Noptel specialising in optoelectronics

Author

Tuija Karanko is the Secretary General of the Association of the Finnish Defence and Aerospace Industries (AFDA): www.defenceindustries.fi



Photo: Robonic

Robonic Ltd Oy (a subsidiary of Safran Electronics & Defense) has signed a contract to deliver a third-generation KONTIO pneumatic launcher to the Swedish Defence Materiel Administration (FMV) for use at its Vidsele Test Range.

However, like in almost every nation, it is important to understand that the national defence forces alone cannot sustain the domestic defence industry. The industry must establish itself in an international market and seek growth from new business and services.

Finnish Capabilities

Finland is one of the world's top countries in innovation. The country is continuously ranked number one in terms of education and professionalism. This creates a good infrastructure for the defence, aerospace and security industries.

Finnish industries focus on certain niche areas. Finland is the home for global market leaders in armoured wheeled vehicles, turreted mortar systems, logistics and certain C2 systems.

Finnish companies have also great competence in mobility, ammunition and explosives, C4ISTAR, cyber and in the design of novel surface combatant ships with full 4D high-end warfare capabilities. The industry know-how is also extended to dual-use products with security solutions and civilian applications becoming increasingly important. The Governmental Resolution on Securing the Defence Industrial Base (2016) lists the critical capability areas in Finland. Those are: C4ISTAR, engagement and protection. Critical technologies and associated systems are related to those including i.e. material technologies, structural engineering and systems engineering.

The government acknowledges that within these areas it is necessary to ensure that Finland has the required technology and engineering know-how for

the systems' life-cycle management, production, research and development, planning and design as well as the capabilities to integrate, maintain and repair the systems, also in times of crises.

Partnerships

Certain Finnish companies act as strategic partners or partners of the defence forces. A major part of army, navy and air force maintenance has been outsourced to domestic companies. Strategic partnership means commitment to cooperation, developing operations together and creating competitive advantage for both parties. The idea is that the defence forces can focus on their core business, while companies take the responsibility for maintenance and other support functions

AFDA

AFDA, the Association of Finnish Defence and Aerospace Industries, is the voice of the Finnish companies operating within defence, aerospace and security.

AFDA is a non-profit organisation and it has over 110 member companies. It works in close cooperation with the Finnish Ministry of Defence, the Finnish Defence Forces and other security authorities in Finland. AFDA was founded in 1994 and is a part of The Technology Industries of Finland. Assisting member companies in their networking and export activities are amongst AFDA's priorities.

AFDA is a member in the Aerospace and Defence Industries Association of Europe (ASD). AFDA represents the Finnish defence industry in NIAG (NATO Industrial Advisory Group), in EDA and in Nordic Cooperation. ■

Photo: Bittium



Bittium is among the international leaders in the area of tactical wireless IP networks. Shown here is the company's TAC WIN Radio Head I.

Alliance Ground Surveillance

The Alliance Ground Surveillance (AGS) system will be NATO's eyes in the sky to observe what is happening on the ground. The system consists of five remotely piloted aircraft providing surveillance of large areas at any time and in any weather. NATO is procuring AGS to mitigate challenges in gathering and sharing intelligence identified in operations in Afghanistan and over Libya. As such, it will be an essential element of NATO's effort to bolster its Joint Intelligence Surveillance and Reconnaissance (JISR) capability, through a specific NATO asset. However, the effect of AGS, once put into service, will far exceed the lessons learned from these theatres. This article shows that AGS is more than a squadron of aircraft; it is a multinational Air Force flying under the banner of NATO. AGS will significantly change how the Alliance conducts intelligence operations. Embedded in the interplay with other systems, AGS will strengthen NATO's strategic role to guarantee peace and security in Europe and North America. And in addition, AGS will symbolise NATO's presence wherever deployed.

Photo: NATO



Camille Grand

NATO identified gaps in collecting and processing relevant information to rapidly produce the intelligence it needed. Taking this into account and noting today's complex security environment, the implications from identifying such critical gaps go far beyond Afghanistan or Libya. From both military and political points of view, words can only be backed up by actions if Allies are capable of conducting military missions together. In this sense, solidarity within NATO is not only a matter of political will, but also a matter of being able to operate as one in order to ensure the security of more than 900 million citizens in Europe and North America.

With its efforts to bring Allies closer together and to further enable cooperation today and in the future, NATO makes Allies more than just a sum of their parts. A fundamental cornerstone of this endeavour is the Alliance Ground Surveillance (AGS) Programme. AGS represents one of the most wide-ranging efforts to mitigate NATO's biggest challenges in the area of Joint ISR: Closing the above-mentioned gap in collecting and rapidly sharing intelligence. The impact of AGS, however, goes further than just mitigating challenges; it will have a transformative impact on the Alliance on many levels. AGS will deliver significant effects in the operational realm as well as at

Information is key on the battlefield. Effective planning and execution of operations relies on providing the right information to the right people at the right time in the right format. Nonetheless, the demand for Intelligence Surveillance and Reconnaissance (ISR) collection sensors and their associated analysts generally exceeds supply. When NATO conducts joint missions, it is therefore essential that the information gathered is effectively shared across allied forces to make the most efficient use of these scarce resources.

It was in the mountains and plains of Afghanistan and in the sky over Libya where

Author

Camille Grand has been Assistant Secretary General for Defence Investment, NATO Headquarters, since 4 October 2016.



Photo: Northrop Grumman

The air segment of AGS consists of five RQ-4B GLOBAL HAWK Block 40 remotely piloted aircraft and flight control elements.

the strategic level. Before showcasing the different effects of AGS across these dimensions, it is worth turning to the technical dimension first in order to better understand what AGS is comprised of and what capabilities it brings to NATO.

Photo: Italian Air Force

The Technical Dimension: What is AGS?

The AGS core is comprised of air, ground, and support segments. The air segment consists of five RQ-4B GLOBAL HAWK Block 40 remotely piloted aircraft and flight control elements. The fuselage of the aircraft is nearly as big as a city bus and its impressive wingspan of almost 40 metres exceeds that of an Airbus A320. The GLOBAL HAWKS can reach a maximum speed of more than 340 knots per hour and are able to fly at altitudes of up to 60,000 feet and stay airborne for more than 32 hours.

Each of the five aircraft will be equipped with a state-of-the-art, multi-platform radar technology insertion programme (MP-RTIP) ground surveillance radar sensor, enabling operations in all-weather to track moving targets, as well as an extensive suite of line-of-sight and beyond-line-of-sight, long-range, wideband data links. This air segment is accompanied by ground and support segments to provide all necessary communication capabilities and support facilities to operate AGS.

AGS will be based at Sigonella in Italy. Work is moving fast to ensure the base is ready to receive the new aircraft. We have made huge progress on the infrastructure work, delivery of ground stations, and the continued growth of NATO's AGS Force – which is, in reality, a multinational Air Force. Indeed, AGS is much more than just



AGS will be based at Sigonella Air Base in Sicily, Italy.

a squadron of GLOBAL HAWKS, but rather it is almost an international Air Force being built from the ground up. AGS will thus be NATO's first fully owned and operated Joint ISR collection asset.

AGS has made important steps since the initial contract was signed at NATO's Chicago Summit in 2012. The system has demonstrated its capabilities through multiple test flights conducted in California in the United States. The first NATO AGS GLOBAL HAWK is expected to fly next year from the US to Sigonella. The brand new nature of the

capability and the NATO-specific requirements represent a challenging endeavour and AGS is a demanding and complex programme. Industry and all NATO stakeholders are working hard to deliver an operationally suitable capability that will meet the high expectations on the programme in a timely manner.

Once the AGS Force starts to deploy the aircraft operationally, the system will enable the Alliance to perform persistent surveillance over wide areas. The system will be able to observe activities on the ground

scalable COMINT & SIGINT solutions



Explore...

...our COMINT / SIGINT Systems!

...our SIGNAL-CLASSIFIER!

...our DECODERS!

...our BORDER-CONTROL SYSTEMS!

boger electronics gmbh | www.boger-electronics.de | info@boger.de



Photo: US Army

US Army General Martin E. Dempsey, at that time Chairman of the US Joint Chiefs of Staff, during his visit to the headquarters for the NATO-led Resolute Support Mission in July 2015. The missions in Afghanistan and Libya gave a stimulus to the Alliance to improve its Joint ISR capabilities.

and provide unique data and information that analysts can feed into enhanced intelligence reports. These reports provide particular value when fused with other types of data by Allies, like signals and communication intelligence.

The Operational Dimension: AGS as a New Instrument in the Intelligence Toolbox

The unique data produced by the heavy radar sensors of these aircraft will make AGS a new instrument in NATO's Joint ISR toolbox, thereby bringing a transformative capability to the Alliance that, thus far, no nation other than the United States is able to field for operations.

Flying at high altitudes and considerable stand-off distances near areas of interest, AGS will bring Allies a number of advantages in future missions. First, the system provides data in near real time and both a Synthetic Aperture Radar (SAR), providing an overall picture, and a Ground Moving Target Indicator (GMTI), to track moving objects, to NATO decision makers. Second, AGS will be capable of observing huge areas of land and sea during both day and night in all weather. Third, a major advantage AGS will bring to NATO is its persistence in surveillance: As mentioned above, each of the five aircraft has an endurance of more than 32 hours, and the AGS Force can operate them in rotating orbits to constantly cover particular areas. This not only enables a greater understanding of what is occurring on the ground or at sea, but it represents a far more economical model

of collecting such information when compared to the alternatives of either satellites or manned aircraft.

Depending on the theatre in which the system is deployed, the sorts of information the aircraft's radar sensor will provide to NATO range from detecting ground movement, to helping identify potential IEDs, and monitoring maritime traffic. In a scenario with NATO troops deployed on the ground, AGS can be used to assist commanders with situational awareness and their management of the battle-space.

Even in counter-terrorism operations, the system could provide Allies with vital intelligence. Data collected by the high-altitude long-endurance system can be used to identify training camps or hideaways. Moreover, AGS data fused with additional intelligence feeds provided by Allies, further opens up the possibility of AGS assisting to track targets of interest linked to terrorism.

These examples involving AGS underpin the importance of interoperability within the Alliance. Without systems and data that fit together, handling and fusing information critical for operations becomes a near impossible endeavour. Establishing interoperability between the myriad of different systems utilised by Allies in joint operations is thus vital to allow the necessary and timely flow and fusing of Joint ISR data and information.

The information and data that Surveillance and Reconnaissance assets can collect help to answer questions of 'what', 'where' and 'when'. However, it is the synergy gained by fusing, for example, a Special Forces Recon-

naissance report with an aircraft communications intercept report, which generates the useful Intelligence that helps to answer the 'why' and thus helps decision makers to make more informed and timely decisions. This makes Joint ISR one of the most essential NATO capabilities. AGS, with its intelligence collection and exploitation capabilities, sits very much at the heart of it. Despite its importance, AGS is only one element in NATO's Joint ISR efforts. Since the end of missions in Afghanistan and Libya, the Alliance has striven to improve its Joint ISR capabilities in many ways. As part of these efforts, NATO and national staffs have worked together, deepening technical interconnectivity for information sharing. This helps NATO bodies and Allies in the provision and dissemination of intelligence products and is helping to lay the groundwork for integrating AGS into NATO. Last year, the NATO Response Force (NRF) benefitted from such improvements enhancing the situational awareness through heightened proficiency in collecting, processing, and exchanging intelligence across that multinational force. In a wider context, this underscores that improvements in Joint ISR help Allies to operate more effectively together and will ultimately contribute to a better informed and more watchful Alliance.

However, NATO is not just providing infrastructure to enable intelligence sharing or fielding a new sensor with AGS. In fact, the Alliance is significantly increasing its capacity to process and exploit the data collected through AGS. This means more operators and intelligence analysts from various NATO nations who work in other NATO bodies will be used to fuse and leverage information collected and to disseminate high-quality intelligence products within the Alliance. With this increase in NATO's in-house intelligence capabilities, AGS will have a transformative effect on the Alliance. The Alliance will fulfil a function that has thus far been almost exclusively completed on the national level, making NATO an even more important player in future coalition operations.

As mentioned, AGS data can be fused with other intelligence products, provided through Joint ISR contributions from Allied nations. For instance, France and the UK plan to provide significant amounts of intelligence to AGS through their national 'Contributions in Kind'. When it comes to air surveillance, data can also be derived from NATO Airborne Early Warning & Control System (AWACS).

In a scenario where AGS observes ground activities and NATO AWACS is used to monitor the airspace and conduct critical

airborne surveillance for the Alliance, fusing the information provided by both systems might be useful to provide an even more comprehensive picture. In addition to the provision of information, NATO AWACS provides essential command and control roles for operations. One recent example that is having a major impact is AWACS' battle management support to the global coalition against ISIS, where the system is supporting the de-confliction of aircraft in the region. Combining both systems can help commanders to make better decisions and effectively manage the interplay between ground forces and air support in the future.

The Strategic Dimension: AGS, AWACS and AFSC

Bearing the effects on operations in mind, it is worth zooming out and taking a look at the strategic picture. Together with NATO AWACS, AGS is not only an important element in the operational realm but a strategic enabler that can indeed assist in fulfilling long-term strategies to face various emerging threats today and in the future. For political decision making, comprehensive intelligence can help to develop future political strategies, adjust diplomatic instruments and serve as evidence to react in appropriate ways to violations or threats by either State or Non-State actors. Thus, the information collected through AGS, NATO AWACS and other sensors will give the Alliance a strategic decision advantage.

In order to maintain and further improve NATO's strategic position in a changing security environment, the Alliance has to think long-term. With the decision to develop AGS, NATO has taken a future-oriented step to mitigate challenges. The effort will improve NATO's Joint ISR capabilities, making the Alliance ready for upcoming missions both today and in the next few decades.

While AGS is a new system, NATO's AWACS E-3A aircraft have been serving the Alliance since the 1980s. At the Warsaw Summit in 2016, Heads of State and Government committed that: "NATO AWACS will continue to be modernised and extended in service until 2035." The 16 NATO Nations that fund the core NATO AWACS programme are now examining how best to conduct a final upgrade programme, which will make the fleet relevant until 2035, after which AWACS will retire. As the NATO AWACS E-3A fleet is undergoing modernisation to ensure worldwide airspace access and to further improve its surveillance capabilities for one last time, NATO has already started thinking about



Photo: NATO

NATO has started preparing for a successor to the AWACS E-3A fleet by launching the Allied Future Surveillance and Control (AFSC) project.

its successor by launching the Allied Future Surveillance and Control (AFSC) Project. At the July 2016 Warsaw Summit, Heads of State and Government agreed to refine both what is required as future surveillance capability and how it might be delivered to the Alliance.

Under AFSC, NATO is currently undertaking studies to examine how future requirements might be fulfilled. The aim, in the current phase of AFSC, is to design a capability 'blueprint' to determine what a future system might look to do. At present it is too early to tell what such a system will look like. AFSC could be anything from a replacement wide body aircraft, to a remotely piloted aircraft or a "system of systems" including airborne, ground, and space platforms linked within a command and control network in order to replace AWACS. Allies have asked the NATO staff to take a completely fresh look at what the military needs and to examine what solution options might exist, in order to provide an up-to-date airspace surveillance and control capability ready for future challenges. With the further evolution of AFSC, the system's outlook is expected to become clearer by 2022. Just like AGS, AFSC will be another milestone in the endeavour to improve the interoperability among Allies.

The Political Dimension: Sending Clear Signals

Thus far, NATO AWACS E-3A aircraft have been NATO's only operational flying unit. The fleet has not only proven to be an important military tool, but also an important political instrument. NATO AWACS has been deployed on every NATO mission since the early 1980s and has become an iconic symbol of the Alliance. Indeed, the hard power message of deploying such a capability with the NATO star on the fuselage should not be underestimated. This political messaging by NATO will be

further enhanced once AGS becomes operational. Wherever AGS will be deployed in the future, it will highlight NATO's presence and will furthermore show the watchful eyes of an Alliance of 29 nations committed to peace, security and international stability.

Although AGS is not yet ready for operations, the programme sends a clear political message: First, AGS is being acquired by 15 Allies and will be made available to the entire Alliance. All Allies agreed to contribute to the AGS capability through contributions covering the establishment of the AGS main operating base, as well as to communications and life-cycle support of the AGS fleet. Both these aspects illustrate NATO's multinational commitment to invest together in future security and defence. Second, similar to NATO AWACS crews, the AGS Force consists of specialists and operators from all NATO nations, embodying the unity of the Alliance on a daily basis. Third, AGS is a direct answer to lessons learned and sits at the heart of NATO's endeavour to improve interoperability, symbolising the Alliance's ability to mitigate challenges, to provide enhanced joint capabilities, and even to transform its way of operating in order to face future missions.

Such context demonstrates the unique character of NATO, as Allies came together in unity to agree on policies, resources and requirements to develop, acquire and operate such a highly sophisticated system within the framework of the Alliance. AGS brings a new capability to NATO that thus far no other NATO nation, other than the United States, has fielded. With AGS, with the lifetime extension and modernisation of AWACS, with the development of AFSC, and with the further evolution of Joint ISR, the Alliance is sending a clear signal to the rest of the world, that NATO is ready to face current and emerging challenges of the 21st century. ■

"We need to have the new F-110 frigates by 2023 or 2024."

Since April this year, Admiral Teodoro López Calderón (Cartagena, 1954) has led a team of 20,290 sailors and 111 ships. He is the Chief of Staff of the Spanish Navy, dubbed in the Spanish military as "the AJEMA" (Almirante Jefe del Estado Mayor de la Armada). He joined the Navy in 1973. Previous assignments included positions as the leader of a NATO maritime group and the Head of Operation Command in the Spanish Armed Forces whose main objectives were the deployment of the new training mission of the Spanish troops in the scope of the INHERENT RESOLVE mission in Iraq as well as the withdrawal from Afghanistan.

ESD: After years of budgetary reductions, what is the current situation of the Spanish Navy?

Adm. López: The cuts forced us to concentrate the efforts in support of those units demanded for the operations. This had an impact on the units that were not deployed in the scope of the operations and the level of enlistment of which was reduced for this reason. Besides, there has also been a significant reduction in personnel during the last seven years. In addition, 27 ships have been decommissioned during the last nine years and seven new ones have been acquired with a greater military value because they are adapted to current requirements. However, 20 ships have been lost that way. It is necessary to plan a renovation.

ESD: Which are the most indispensable needs for the Spanish Navy?

Adm. López: The most indispensable needs are related to the staff and the materiel. As far as the staff is concerned we have to be clear on what kind of staff we need, both in terms of quantity and quality. From the point of view of the materiel, the first priority is the new Class F110 frigates to replace our six SANTA MARIA Class (F-80) frigates which have completed more than 30 years of service. The SANTA MARIA Class frigates will lose their military value in 2019 or 2020, therefore it is necessary to have the new F-110 frigates by 2023 or 2024. For this reason, we would like to sign the construction contract with Navantia next year.

ESD: What can you tell us about the S-80 submarine project? The Spanish Navy and Navantia have much at stake in that project...



Photo: Mod Spain

Adm. López: The initial weight problem of the design phase has been solved. The S-81 submarine is under construction, we call it S-80 Plus because we had to lengthen it and give it a little more volume. We plan to have four new submarines. Now the problems that exist are those that come along with any programme with high technological content. We believe that the Spanish industry will resolve the issues. We are hopeful that the third submarine of the series will be commissioned with an air-independent propulsion (AIP) system. We will have a technologically advanced submarine in the years to come.

ESD: What is the programme schedule for the new submarines?

Adm. López: We want the first submarine to be delivered in 2022 and to be fully operational by 2023.

ESD: Due to the economic crisis, the Spanish Navy lost the aircraft carrier PRÍNCIPE DE ASTURIAS in 2013. Was there really no other choice?

Adm. López: There was no option since the economic scenarios imposed it. We have used that budget to maintain other ships.

ESD: The twelve HARRIER VTOL jets of the Spanish Navy are nearing the end of their service life. Will Spain maintain fixed wing aircraft on board of the LHD JUAN CARLOS I?

Adm. López: We believe that the HARRIERS can be kept in service until 2027. These airborne elements on board represent a very important capacity. They allow us to project our land forces in any part of the world without the need of other bases or airports in the world. It also gives us a very important deterrent capacity. The Spanish Government and politicians must decide whether they want to maintain that capacity. The Spanish Navy believes that it should be maintained because once it is lost, it will cost much effort to regenerate it in the future.

ESD: Is the Spanish Navy interested in the Lockheed Martin F-35B LIGHTNING II fighter to replace the Harrier fleet?

Adm. López: There is not much to think about: it is the only existing model. The flight deck of the LHD JUAN CARLOS I only allows us to use short take-off and vertical-landing (STOVL) fighters. The F-35B is the only choice on the market right now.

Photo: Navantia



The BAM (Buque de Acción Marítima) METEORO is the first of class of the Spanish Navy's six new 3,000-ton patrol ships, two of which are still under construction.

ESD: Is there any contact between Lockheed Martin, the Spanish Navy and the Spanish Ministry of Defence?

Adm. López: We have not established any formal contacts with Lockheed Martin. It is a decision to be taken in many years.

ESD: How many F-35s will the Spanish Navy require?

Adm. López: That will have to be assessed, but 12 aircraft would maintain our current capacity.

ESD: What can you tell us about the new phase of the Maritime Action Ship (BAM). When will the new units enter service?

Adm. López: Our four BAMs are being successful in the ATALANTA Operation, with deployments of four to five months. They are delivering the performance we expected at a much lower cost than a frigate. There are now two more BAMs under construction with improvements to the radar. We hope to obtain a second series: three BAMs more as high patrol boats and another submarine rescue ship to replace the Neptuno.

ESD: The F-105 frigate Cristóbal Colón has just completed a deployment of four months in Australia to support the Royal Australian Navy. How do you assess the operation?

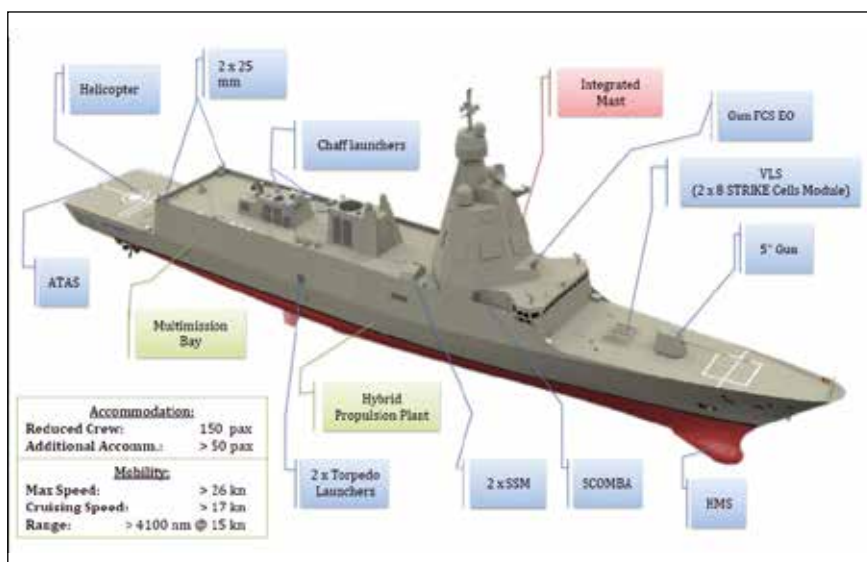
Adm. López: It has been a very favourable opportunity for us and even more favourable for the Australian Navy. It allowed us to deploy a ship at low cost. It has also been a support for the national industry.

ESD: That is true... because the state-owned shipbuilder Navantia expects to get a new contract to build nine frigates for the Royal Australian Navy...

Adm. López: As part of its tasks the Navy must support the national industry. This is a doctrine included in the National Defence Directive of 2012.

ESD: Is the EU Operation SOPHIA being effective in ending the illegal immigration mafias that act from Libya?

Adm. López: It is true that it covers an important activity to save lives at sea, but as long as the Libyan State is not capable of controlling its territory and territorial waters, it is difficult to solve the problem of the mafias of migrants in Libya. Operation SOPHIA is not effective to end the mafias because the ships are not allowed to enter the territorial waters of Libya. Nonetheless, it has been successful and people related to these human trafficking mafias are being captured as well.



Major sensor and weapon elements of the F-110 design.
The multimission bay can accommodate unmanned vehicles, special operations vessels or multipurpose containers.

ESD: Does the presence of "rescue" ships generate a pull effect?

Adm. López: I do not think there is a pull effect: it was first the thousands of people drowned in the sea, thrown in by the mafias, regardless of whether there were ships waiting for them or not. As long as Libya remains as it is now, they will continue to do so.

ESD: Spain is showing itself very active in the military deployments of NATO: the standing maritime groups, Baltic air policing in Estonia, the new mission in Latvia with six tanks. Is the 2% of GDP spending debate a fair criterion? Countries like Greece spend more than 2% but hardly contribute to missions ...

Adm. López: It can be a great criterion if it is nuanced. But evidently it is a fact of the average effort that the Alliance would need to assume part of the burden that now supports the US, which is the bottom line. Then there are countries that spend a percentage higher than 2% but do not assign it for the service of the Alliance.

ESD: Will the Brexit generate any problems related to Gibraltar from the military point of view?

Adm. López: We know there is a Brexit but we do not know the result. We are still unaware of any agreements reached by the EU and the United Kingdom. On the subject of Gibraltar, as Spain will have the last word and the Veto right, I understand that a reasonable agreement will be reached. There will be no problems on either side. We honestly do not think the Brexit will complicate the situation in Gibraltar.

ESD: How do you explain the disruptive actions by Royal Navy vessels around the Rock?

Adm. López: It is a familiar subject. The United Kingdom's interpretation of the jurisdiction of Spanish waters is different from ours. As the Treaty of Utrecht says, all the waters surrounding the Rock are not within its jurisdiction; however, they say they are. For this reason, we will have a litigation.

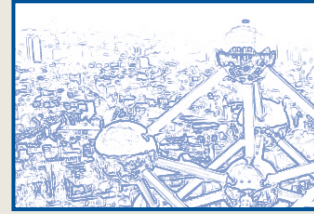
The interview was conducted by Esteban Villarejo.



Photo: Jesus Penas Suarez

After decommissioning of the Spanish Navy's fleet of twelve HARRIER VTOL aircraft (shown here), the country may consider the acquisition of the F-35's naval variant.

The Brussels Backdrop



Coping with the Rocket Man: US and EU Approaches

Joris Verbeurgt

In the course of 2017, the last relic from the Cold War has gradually replaced ISIS as the world's dominating security threat. For twenty-five years, the North Korean regime has defied the international community by threatening its neighbour South Korea and Japan with war and devastation constituted by long-range guided missiles with a nuclear payload. Since the UN Security Council Resolution 825 which urged North Korea to reconsider its withdrawal from the Nuclear Non-Proliferation Treaty in 1993, more than a dozen resolutions have passed condemning its missile and nuclear programme and calling upon the country to comply with its international obligations. The supreme leaders of North Korea, Kim Jong-il, and as from 2011 his son Kim Jong-un, have disregarded all appeals to denuclearise, abusing international mediation and talks to receive billions worth of cash and goods, including food for the starving North Korean people. In the meantime, the country has continued to expand its nuclear arsenal and to upgrade the range of its missiles.

Now Donald Trump has entered the stage as President of the United States. Already in his pre-electoral speeches on foreign policy, he had proclaimed that he would make the Pacific the United States' priority region of interest. He kept his word, and since he took over the White House, the pressure on North Korea (and its supporter China) has gradually increased. Kim Jong-un responded with heated rhetoric, massive propaganda and a show of force. On 29 August 2017, North Korea launched a Hwasong-12 ballistic missile that flew over the Japanese island of Hokkaido, the second largest isle of the Japanese archipelago, causing fear and consternation in Japan and other parts of Asia that realised to be within target range of Pyongyang. A few days later, North Korean television triumphantly announced that the country had successfully conducted a test with a hydrogen

Photo: Picture Alliance



Military Parade in Pyongyang in April 2017

bomb. More than two decades of UN resolutions, negotiations and economic sanctions had become void.

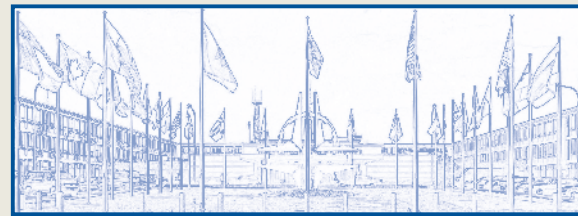
The North Korean Threat in Perspective

Besides operational long-range missiles and nuclear warheads, Pyongyang disposes of tons of chemical (mustard gas and nerve agents) and biological (cholera, the plague, typhus, yellow fever and smallpox) weapons and the devices to deliver them right on target. Kim Jong-un is the Supreme Commander of the fifth largest conventional army in the world, with 1.1 million soldiers and a reserve force of 7 million that can be mobilised in no time. North Korean Special Forces, estimated at 125,000, form a well-trained fighting machine, the largest of its kind in the world. These elite-soldiers can be deployed deep into South Korea and inflict serious damage to the lines of communication and logistics in the event of a war. Add to that the world's largest artillery force – 10,000 guns, mainly concentrated along the border with South Korea and with Seoul within range of most of the guns – and the fact that the People's

Army of North Korea is a formidable fighting force, the strength and capabilities of which should not be underestimated.

South Korean armed forces comprise some 660,000 troops. However, they are better equipped than their Northern counterparts. Especially the South Korean Air Force is technologically more advanced and superior to Pyongyang's air force. There are 28,000 American soldiers deployed in South Korea. In the waters around the Korean peninsula, the US has two aircraft carriers and a dozen other naval vessels equipped with long range missiles, including cruise missiles.

The Pentagon conducted a simulation of how a war with North Korea could look like. A military conflict on the Korean Peninsula would probably be the most bloody and costly war since Vietnam – probably since WW2. Estimations of military casualties range from 300,000 to 400,000 with at least an equal number of civil casualties – in the first ninety days of war alone. The damage a war could do to South Korea would send shockwaves through the global economy. Seoul would be devastated and bear 150,000 dead within the first 48 hours of the conflict.



US Approach

The Trump administration has come to the conclusion that the “soft approach” does not work with the regime in Pyongyang. In his own provocative style and through his preferred medium Twitter, Trump insulted North Korea and its leader Kim Jong-un. For weeks, the president of the United States and the Chairman of the Workers’ Party of Korea taunted each other. “Little Rocket Man”, “madman”, “barking dog” and “mentally deranged US dotard” are just four of the pet names the state leaders reserved for one another in this unprecedented display of public diplomacy. More serious are the mutual threats that were expressed: “fire and fury”, “suicide mission” and “merciless revenge” set the tone. In his speech to the United Nations General Assembly on 19 September, Trump warned that “The US has great strength and patience”. But he added: “If we will be forced to defend ourselves or our allies, we will have no choice but to totally destroy North Korea.” Parallel to the belligerent tone, firm actions underpin the new US policy: the USS CARL VINSON was ordered in the direction of the South-Chinese Sea in April 2017, Ameri-

Americans from visiting North Korea and in August 2017, the Countering America’s Adversaries Through Sanctions Act was put into force. On 21 September President Trump issued an executive order allowing the US to freeze assets of any companies, businesses, organisations and individuals trading in goods, services or technology with North Korea. Also any aircraft or ship entering North Korea is banned for 180 days from entering the USA. A Statement from the White House said that “Foreign financial institutions must choose between doing business with the United States or facilitating trade with North Korea or its designated supporters.” A bold warning for China that is openly disapproving of North Korea’s behaviour but is, at the same time, its main supporter behind the scene.

What about the EU?

The EU is not directly concerned by the crisis on the Korean peninsula: the distance between Europe and the Korea’s is such that it cannot be reached by any weapon system that North Korea already disposes of. Neither does the EU border to the Pacific (like the US do) and its military-strategic interests in the

High Representative for Foreign Affairs and Security Policy Federica Mogherini explained the EU viewpoint: “Strengthening economic pressure – sanctions, and keeping the door of dialogue open, encouraging a meaningful, political, diplomatic, peaceful solution to this crisis.” Mogherini added: “This is the way that the European Union has been advocating for in a very consistent manner over all the months that are behind us with all our means: through the European members of the UN Security Council, in what has been a perfectly-coordinated approach.”

On 16 October, the Foreign Affairs Council of the EU discussed the situation in the Korean peninsula. Given the persistent threat to international peace and stability posed by North Korea, the Council adopted new EU autonomous measures taking immediate effect. These include a total ban on EU investments in North Korea in all sectors (and not, as was the case previously, a ban limited to investments in the nuclear and conventional arms-related industry and the sectors of mining, refining and chemical industries, metallurgy, metalworking and aerospace). The sale of refined petroleum products and crude oil to North Korea is totally banned and the amount of personal remittances transferred to North Korea is lowered from €15,000 to €5,000. In addition, member states agreed not to renew work authorisations for North Korean nationals present on their territory, except for refugees and other persons benefiting from international protection. The ministers also agreed to actively lobby for a robust implementation of all relevant UN Security Council resolutions by all UN member states.

While the EU continues on the path of sanctions and diplomacy, the US threatens to use overwhelming force against North Korea if the country does not stop its provocations and the development of intercontinental missiles and nuclear weapons. But it keeps the door open for talks. The latter role is reserved for US Vice President Mike Pence, who repeatedly declared, amidst the bold statements of his president, that the US prefer a peaceful solution to the crisis. Will the “good cop, bad cop” tactics work on the regime in Pyongyang? Will the EU play a mediating role? The future will tell whether the stalemate will continue, progress will be made behind the scenes or whether war is imminent.



Photo: UN

On 11 September 2017 the UN Security Council adopted another resolution expanding sanctions to additional sectors of the North Korean economy in response to the DPRK’s nuclear test.

can state-of-the-art THAAD anti-missile defence systems (Terminal High Altitude Area Defense) are being deployed in South Korea, exercises are being held and the sanction regime has been strengthened: In July 2017, after the death of tourist Otto Warmbier, the US Government banned

area are limited. However, as an ally of the US and with enormous economic interests in Asia, the EU cannot stand by and merely watch. Lack of military power compels the EU to make the most of its soft power capacities. On 12 September, in a speech given at the European Parliament plenary session,

Italy's 2017 Defence Budget and the 2017-2019 Planning Document

Luca Peruzzi

Notwithstanding the 2015 Defence White Paper plans to introduce (although at a slower pace than indicated) important reforms connected to the governance, operational model, personnel policy and a step forward in technology innovation, the budget assigned to Italy's Defence in the following years is not only sufficient to support these reforms but also to maintain and further develop the national defence apparatus every year.

Italy's Defence 2017-2019 budget planning document (Documento Programmatico Pluriennale, DPP 2017-2019), released end of July at the decree of Prime Minister Paolo Gentiloni's office, enhances public financing for a total of €47.5Bn in the 2017-2032 timeframe, including €12.8Bn in extraordinary budget funding for Defence and Security provided by the Ministry of Economy and Finances (MEF). These funds inject new resources for the purpose of these missions

Based on Italy's budget law for 2017, the 2017-2019 Defence planning document has assigned to the years 2017, 2018 and 2019 a budget of respectively €20,261.8M (vs. €20Bn in 2016), €20,061.8M and €20,027.3M corresponding to 1.19%, 1.14% and 1.11% of GDP, according to the same document. The latter also include the Carabinieri's budget for internal security and homeland missions, in addition to purely military duties as a smaller fraction.

in 2016), the operations funding remains critical. The 2017 ordinary budget devoted to procurement levelled at €2.14Bn, which will support ongoing programmes, provide special funding for operations and launch new procurement programmes, the latter for a total amount of €313.2M over the 2017-2019 period.

The PM Office's extra budget funding of €12.8Bn to be distributed over the 2017-2032 period allows not only new and ongoing procurement programmes to be sustained, but also interventions in other sectors, including infrastructures, reclamations and seismic upgrading. However, due to concurrent social and infrastructure (disaster prevention) needs, the distribution over the 16 years sees a low funding contribution for the first 10-year period, concentrating most of the budget in the remaining six years. The Parliament Defence Commissions, however, asked to reverse this trend, in order to ensure a more stable flow of funding and support the Carabinieri's new systems procurement.

Thanks to the 2017-2019 planning document and the support provided by the 16 years extra budget funding, the Italian MoD will be able to launch a series of new aforementioned procurement programmes. The evolving hybrid and conventional threats characterising the theatre of operations involving Italian Armed Forces and threatening national security pushed the Italian MoD to provide new funding for Intelligence, Surveillance and Reconnaissance (ISR) missions as well as for special forces in addition to the enhancement of C4I network infrastructure protection and homeland security. In 2017, the Italian MoD will launch a five-year programme to introduce the latest NATO interoperable standards for the Identification Friend and Foe (IFF) equipment (New Generation IFF), developing new first-of-series devices between 2017 and 2018 and

Photo: Royal Australian Navy



The CARABINIERE Fregata Multi-Missione (FREMM) during a six-month tour of Southeast Asia and Australia. The procurement programme comprises 10 ships, of which six have already been delivered. It could be jeopardised by a future lack of funding.

both at the national and international level. However, these efforts are not enough to support the aim of the Italian Government to gradually increase the defence expenditures to reach the 2% of GDP. Moreover, the discontinuity in supporting defence procurements and the delay in establishing a long-period (six years) planning law as indicated by the Defence White Paper, is affecting both military and industrial systems, as well as the latter's capabilities to compete on international markets.

Some other minor functions are also part of the overall defence budget. The 2017 ordinary budget sees a slightly reduced defence function over 2016 (€13.2Bn vs. €13.4Bn) as well as the other concurrent funding tools for the defence functions. The law for international operations lowered to €997.2M (vs. €1.4Bn in 2014), while the Minister of Economic Development's funding support for procurement levelled at €2.5Bn. While the personnel expenses continue to grow (reaching almost 80% of the overall budget



Photo: Leonardo

The Italian MoD will be able to fund the acquisition of the first tranche of Leonardo's BLACK SHARK ADVANCED (BSA) heavyweight torpedoes. A contract is expected by the end of 2017.

later launching the production series for the services. Another five-year programme will deal with the protection of C4I network infrastructure with updated or new crypto equipment. The Italian MoD will continue financing the leasing of an unspecified SIGINT platform called SPYDR, reportedly being identified as a Beech 350ER equipped by L-3 Communications Integrated System. There also is the will to launch a programme to procure two Joint Airborne Multi-sensor Multi-mission Systems (JAMMS) starting in 2018. New funding has been introduced respectively for an information analysis programme called PANTERA to further develop the capabilities of the Joint Armed Forces Intelligence Centre, as well as to continue maintaining the SATCOM operational capabilities with both communications (SICRAL) and earth observation (COSMO SKYMED) satellite constellations. Particular attention has also been paid to maintaining or enhancing the operational capabilities of the Armed Forces' Special Forces (SF), with additional money for equipment that remains unspecified, save for a highlighted new air-launched Rigid Hull Inflatable Boat (RHIB) programme for the Navy's SF to ensure rapid deployment of units without local support. The Italian MoD has also funded the establishment of a Security Force Assistance (SFA) centre to train personnel initially for the Italian Army and then for other national and international armed forces. The Electronic Warfare Support (EWS) to counter IED and communication surveillance offered by the EC-27J dedicated version of Leonardo's aircraft division platform called JEDI (Jamming Electronic Defense Instrumentation) has been further expanded with financing for a more capable equipment package programme that draws on the lessons learned in theatres of operations. The security of troops abroad is also boosted with funding for additional man-portable C-IED equipment, special personal protection for amphibious troops involved in boarding missions, dual-use CBRN equipment for mili-

tary and national emergencies as well as the planned launch of a programme to develop an initial counter mini- and micro-UAV systems operational capability, which will also support homeland security.

The budget for 2017 onwards also adds funding for important operational capabilities which lacked support in the previous fiscal years. The Italian Navy will be able to procure the first tranche of Leonardo's series-production BLACK SHARK advanced



Photo: Luca Peruzzi

The Italian Army and the Italian Air Force issued a requirement for the procurement of the CAMM ER surface-to-air missile system offered by MBDA Italia. The contract is expected by the end of 2017 and will benefit the Italian Navy as well.

heavyweight torpedoes to equip U-212A submarines, having completed the development, testing, integration and qualification activities of the underwater munition. The BSA's inventory completion will be funded with the long-term planning for an overall €113M budget. It is planned for the Italian Army to launch a programme to develop a prototype of an improved ARIETE main tank with enhanced protection, surveillance, C2, mobility and logistic support in order to conduct assessments for a future decision to extend the programme to the whole fleet. The Italian Air Force will update

the Italian Target Modelling Preparation Facility (ITMPF) for the STORM SHADOW cruise missile to expand the usable satellite sources with Leonardo support and will be able to continue updating the Predator UAV fleet to maintain its operational capabilities with €19.3M in funding against a full-programme longer-period request of circa €66M. The Italian Army and Navy's NH90 programme will receive €30M in air-worthiness funding to ensure inspections, corrective activities and maintenance.

The Italian MoD's 2017-2019 missions and budget planning document also highlighted several programmes divided for main operational capabilities, which need to be funded. According to last June's Parliament hearing of General Guglielmo Luigi Miglietta, head of Italian MoD's budget planning office, the 15-year extra-budget law funding is being used to provide a cover for a number of prioritised programmes. However, no indication has been provided on the funding plans and programme schedules. Among the highlighted items, General Miglietta specified the procurement of Italian Army-assigned longer-range capable Boeing CH-

47 CHINOOK helicopters for special forces support, the development and qualification of the air-defence MBDA Italia CAMM ER missile system and a more capable version of Piaggio Aero Industries' P1HH HAMMERHEAD fixed-wing UAS. The four CH-47 ERs will have an endurance of 900 km against the 400 km range of current Boeing/Leonardo ICH-47Fs with enhanced protection, navigation and transport capabilities for special forces support missions. Both the Italian Army and Air Force have issued a requirement for the development and qualification of MBDA Italy's CAMM ER version

to replace the in-service ASPIDE/SPADA missile systems, which will reach their end of service in 2021. The €95M programme contract is expected to be assigned later this year and to last until 2021. It will also see the missile launcher's development and integration with the Italian Army's FORZA NEC C2 as well as the Rheinmetall Defence X-TAR 3D radar, and the Air Force's Medium Advanced Air Defence System (MAADS) which will use SIRIUS C2 and Leonardo's KRONOS LAND radar. According to the little information provided on the new P2HH version by Piaggio Aero Industries, the latter will offer 24-hour endurance, high transit speeds and all-weather observation capabilities, while the programme could encompass 10 systems. Among other requirements to be funded, the Italian MoD representative highlighted the development of Cyber Defence Capabilities as well as the enhancement and net-centric development of the Italian MoD communications infrastructure, the procurement of a submarine rescue and diver support ship (ARS) to replace the single ANTEO Class vessel delivered in 1980, the development and acquisition of a new multirole helicopter for both the Italian Army and Air Force, the establishment of an international 'European military school', the procurement of mini- and micro-UAVs,



Photo: Leonardo

The Italian MoD intends to acquire four CH-47F ER helicopters with extended range and new avionics suite for Special Forces operations.

and activities related to nationwide facilities' reclamation.

While the 2017 budget law registered a slight increment in the procurement area, the additional funding provided in this sector by the Ministry of Economic Development (MiSE) for the same period put at risk the development of important programmes. Thanks to the MiSE's support to Defence procurement, the Italian MoD was able to launch and sustain programmes such as the Eurofighter TYPHOON, the multirole FREMM frigates, the NH90 helicopter and VBM 8x8 FRECCIA Armoured Infantry Fighting Vehicle (AIFV), while more recently it was the case for the Naval Law procurement,

procurement of the new CIO (Iveco/Leonardo consortium) CENTAURO II armoured vehicle armed with the 120mm smoothbore gun, in addition to the first batch of 50 vehicles. The MiSE's €2,550M allocated budget for 2017, however, provides funding mainly for the period after 2017-2019. The lack of money for 2018-2021 amounts to €1.45Bn, which according to the document, will mainly impact the Eurofighter TYPHOON, NH90, TORNADO Mid-Life Update, FREMM and VBM 8x8 (for the completion of the second Brigade), if the Italian Government will not introduce corrective actions to the 2018 budget law. The aforementioned 16-year extra budget is expected to partially overcome this situation, but no indications have been provided on the devoted funding. The 2017-2019 budget planning document also encompasses a number of additional programmes, which the Italian MoD is keen to launch when and if funding will be available. Among them, the procurement programmes of a new lightweight multirole and training rotary-wing platform for respectively the Army and the Air Force, a lightweight training aircraft for the latter service, new dual-role mine countermeasures vessels (MCMV) and additional logistic support ships (LSS), the life-extension for the MBDA STORM SHADOW long-range weapon and the acquisition of both the MBDA Italia air-to-surface version of the MARTE ER anti-ship missile and the 'Mk2E evolved' weapon system, the latter reported as an evolved TESEO ship-launched anti-ship missile, the development of a new Mobile High Power radar version of Leonardo's KRONOS Land Grand for the SAMP/T mid-life update, the weapon system package for the F-35, JFACC enhancements with mobile C2, the institution of a new joint EWOS centre and a Defence Space plan. The latter encompasses special radars for surveillance against debris and weapons, the new SICRAL 3 communication satellite and a new earth observation space platform, in addition to facilities for low-orbit flights. ■

Photo: CIO



The CENTAURO II armoured vehicle produced by the Iveco-Leonardo consortium CIO will be in service with the Italian Army's digitalised medium brigades outlined by the Forza NEC programme.

self-protection equipment for airborne platforms, satellite terminals, meteorological observation network enhancement and new radar equipment, homeland defence and disaster relief capabilities. The list also specified the new common Armed Forces HQ infrastructures alongside the current Joint Armed Force Operational Command near Rome, known as 'Italy's Pentagon'

AW101 CSAR helicopter, and the M346 and M345 trainer programmes. The 2016 MiSE contribution to Defence procurement helped to launch the development and qualification of FSAF's MBDA Aster 30 Block 1NT missile for ballistic missile defence (BMD), the future combat helicopter (ESS, Elicottero Esplorazione e Scorta) to replace the AW129 platform and the development and



WE LISTEN. WE INVENT. WE DELIVER.



Looking for aerospace, defense or security solutions?

The USA Partnership Pavilion features the industry's most innovative partners, equipment, products and services — such as the Lockheed Martin C-130J Super Hercules.

Visit us at Defense & Security 2017, Dubai Airshow 2017 or online, and learn how American suppliers can help you gain a competitive advantage in any market sector, anywhere in the world.

Featured Partner



The C-130J Super Hercules is the world's most advanced tactical airlifter. Designed and developed with mission flexibility in mind, the C-130J has a unique mix of agility and performance to complete any mission, anytime, anywhere.



#USPAVILION



ORGANIZER OF THE
USA PARTNERSHIP PAVILION

DEFENSE & SECURITY 2017 — HALL 8, IMPACT EXHIBITION CENTER
WWW.KALLMAN.COM/DEFENSE-SECURITY-2017

DUBAI AIRSHOW 2017 — DWC, DUBAI AIRSHOW SITE
WWW.KALLMAN.COM/DUBAI-AIRSHOW-2017

Challenges in Thailand

David Saw

Over the past two decades Thailand has had to endure an economic crisis, extreme political uncertainty, military coups, mass public disorder and the growth of a significant insurgency problem in the south of the country. Thailand has survived all of this, but the threats to the strategic stability of the country are not diminishing, and dealing with these current and evolving challenges will be a major test for the Thai political and military leadership.

Thailand has to deal with both social and political uncertainty, along with trying to overcome all of the other obstacles that a developing economy has to face. This is a country with a population of 68.414 million, of whom 9.27 million live in the capital Bangkok, with an additional 1.814 million people in the province of Samat Prakan adjacent to Bangkok. Thus the broader Bangkok Metropolitan Area (BMA) contains more than 15% of the Thai population and is the political and economic centre of the country. It is becoming increasingly obvious that the political and economic interests of the BMA population, especially the elites and the developing middle class, are diverging from those of the rest of the country, especially the agricultural areas. Although 50.4% of the Thai population live in urban areas, it should be noted that 31.8% of the Thai labour force of 38.45 million are employed in agriculture. The divisions between urban and rural interests are already manifesting political differences that are unlikely to provide long-term stability.

Economic and Political Uncertainty

The Thai economy is dependent on international trade, with over 66% of Gross Domestic Product (GDP) being provided by exports. However, GDP growth rates in recent years have not been that good, 0.9% in 2014, 2.9% in 2015, 3.2% in 2016 and the 2017 figure is likely to be 3.3%. The problem is that Thailand needs growth rates far in excess of these figures to cope with its population issues and the need to create higher waged jobs.

Since November 1997 Thailand has had 14 different Prime Ministers. This is hardly an endorsement of Thai governmental stability. Even more disturbing is the fact that there have also been two military coups in 10 years, in September 2006 and May 2014, as well as multiple new constitutions being promulgated. The Chavalit Yong-



Photo: Stefan Kalin/Saab AB

A three-ship formation of one GRIPEN C and two GRIPEN D combat aircraft of the Royal Thai Air Force (RTAF). The RTAF acquired 12 GRIPEN CID aircraft in two separate batches with orders in 2008 and 2010. Interest has been expressed in a further batch of at least six aircraft.

chaiyudh government failed to handle the consequences of the Asian financial crisis of 1997, resigning in November of that year and being succeeded by a government led by Chuan Leekpai that would remain in power until the January elections of 2001. These elections were conducted in compliance with the democratic constitution of 1997 and were regarded as free and fair, being decisively won by the Thai Rak Thai (TRT) party of Thaksin Shinawatra. Unfortunately, rather than opening the way towards sustained democratic governance, the 2001 elections would usher in a period of immense political instability whose effects are felt to this day.

Thaksin was different, his political message was calibrated towards ordinary people and he was not seen as a corrupt self-serving conventional Thai politician. Inevitably Thaksin's populist approach made him enemies amongst existing elites who saw him as disruptive. It also made him enemies elsewhere, especially amongst those who saw him as the worst kind of demagogue,

who was also in politics to enrich himself, his family and supporters at the expense of everybody else.

Thaksin would go on to complete a full term in office and then stood in the February 2005 election, returning to power with his party winning 375 seats out of 500 in the Thai House of Representatives. This was a true mandate to govern, in many respects it was the high point of Thaksin's political career. Thaksin had become so polarising that mass protest broke out and this limited the ability of the government to achieving anything. Eventually, in February 2006, Thaksin decided to obtain a fresh mandate, scheduling a new election for April 2006. Thaksin won 460 seats and over 61% of the vote, hardly surprising as the opposition had decided to boycott the election. The Constitutional Court would nullify the April election, this would then see Thaksin propose another election in October 2006. That never happened as, on 19 September 2006, the military staged a coup and removed the Thaksin govern-

INTELLIGENCE FOR THE INTELLIGENT



European Security & Defence

- Politics
- Armed Forces
- Economy
- Technology

**ESD –
for the step
beyond thought
leadership**



EUROPEAN SECURITY & DEFENCE is a specialist magazine tracking events and developments in the defence and security arena.

One of the magazine's objectives is to describe, explain and interpret European and transatlantic security policy – which extends far beyond conventional defence with military forces – in all its complex and sophisticated correlations.

EUROPEAN SECURITY & DEFENCE provides answers to questions on international affairs, business, technology and defence/security matters. Our analysis is based on neutral and in-depth investigation.

The primary mission of **EUROPEAN SECURITY & DEFENCE**, both in print and online, and including the daughter publication **ESD SPOTLIGHT**, is to convey information and influence within the European theatre, to and from decision makers at all levels in the security and defence arenas.

➔ **Annual Subscription Rate: € 49.80 (print format; postage included)**

Annual subscription includes 8 issues, special issues and free access to the "subscribers' area" at www.euro-sd.com.

Test EUROPEAN SECURITY & DEFENCE and order a free copy now!

Mittler Report Verlag GmbH – Subscription/Reader Service

PressUp GmbH · Postfach 70 13 11 · D-22013 Hamburg

Phone: +49 40 38 66 66-319 · Fax: +49 38 66 66-299 · mittler-report@pressup.de

www.euro-sd.com

Photo: Chinese internet



The Norinco VT-4 tank has been evaluated by both Pakistan and Peru, but the Royal Thai Army (RTA) is the first export customer for the system, ordering an initial batch of 28, which is now being delivered. The RTA intends to purchase another batch of 21 VT-4 tanks.

ment from power. If the military believed that the coup would bring to an end the Thaksin era, halt political polarisation, bring about government more amenable to the Thai elite and lead to political stability, they were wrong.

Between October 2006 and August 2011, Thailand would have five different Prime Ministers. And then came the ultimate rejection of what the Thai military had tried to achieve, the election of Yingluck Shinawatra, the sister of Thaksin. Yingluck took office on 5 August 2011 and would remain in office until 7 May 2014, when she was removed by the Constitutional Court. Yingluck would later be accused of malfeasance and corruption, but in a result that suited the current government she fled Thailand in August 2017, prior to a guilty verdict being announced in absentia in September 2017.

After the fall of Yingluck a caretaker government was installed, but on 22 May 2014 the military led by Royal Thai Army (RTA) commander General Prayut Chan-o-cha launched a coup. They dissolved all of the existing political structures, introduced a new constitution that amnestied everybody involved in the coup and introduced the National Council for Peace and Order (NCPO) as the de facto government. General Prayut was elected as Prime Minister by the National Assembly in 2015 and a new constitution was passed by referendum in 2016. This creates a political environment where the emphasis is on stability and where populist politics will not be able to challenge the status quo.

The death of King Bhumibol Adulyadej, who reigned from 9 June 1946 to 13 October 2016, is without doubt the most significant event in terms of national politics in Thailand. Universally revered, King Bhumibol was the key figure who had the

ability to stop matters getting out of control in Thailand, his influence will be greatly missed. His successor, King Vajiralongkorn Bodindradebayavarangkun, will undoubt-

Photo: DSME



The launch of the HTMS TACHIN, a DW 3000F frigate, took place at the Okpo shipyard of Daewoo Shipbuilding & Marine Engineering (DSME) in January 2017, with delivery due in 2018. The Royal Thai Navy intends to acquire a second frigate of this class, which will be built in Thailand.

edly face significant challenges. However, nobody can ignore the importance of the monarchy in Thailand and its critical role in holding the country together.

Security Challenges

Thailand has an active internal security threat due to an insurgency in the three Muslim-majority provinces of Pattani, Yala and Narathiwat in Southern Thailand. This insurgency became a major concern in 2004 and since then more than 6,500 have been killed and over 12,000 injured. Thailand has also been a target of interna-

tional terrorism. In 2012 a number of Iranian-linked terrorists attempted to attack Israeli targets in Bangkok, while in August 2015 a bomb planted by Uighur separatists in central Bangkok killed 20 and wounded 125 people. This attack was allegedly in response to Thailand deporting 109 Uighur back to China in July 2015.

The character of the southern insurgency is now changing, with a new emphasis on the use of terrorist bombings. On 11/12 August 2016 insurgents planted five bombs in Hua Hin, one in Surat Thani, two in Phuket and one in Trang, total casualties were four killed and 36 wounded. This year has seen more bombings, government-linked offices in Bangkok were attacked with pipe bombs in two incidents in April and May. More seriously, two bombs were detonated outside a supermarket in Pattani on 9 May, causing 80 wounded. Then on 22 May, a pipe bomb exploded in a waiting room at a hospital in Bangkok wounding 24.

If the insurgency had remained localised

in the three southern provinces it would have been containable. The fact that the insurgents are now embracing terrorism in major tourist destinations such as Phuket and Bangkok is a truly concerning development. Tourism is a major revenue generator and source of employment in Thailand, terrorism targeting the tourism industry could have serious economic consequences.

The insurgency, economic concerns and political uncertainty make for a problematic future outlook. It is obvious that this complicated situation is already having an impact on the Thai economy, in 2015 Foreign Direct Investment (FDI) in Thailand

amounted to US\$5.7Bn, in 2016 it had declined sharply to US\$1.6Bn. FDI at this level is insufficient to fuel the growth necessary for economic advancement in Thailand.

Procurement Behaviour

The 1997 Asian economic crisis hit Thailand hard, it had major consequences for the military as all budgets were cut dramatically. This meant that procurement programmes were postponed or cancelled altogether, all capital expenditure was put on hold, meaning no spares and restricted training. Recovery from this funding shortfall would take many years and see the Thai military perceive that it was falling behind regional competitors in terms of capability. This perception of equipment inferiority has driven procurement efforts, unfortunately the Thai procurement system has proven to be less than effective in delivering suitable equipment solutions.

Over the years, the weakness of the Thai acquisition strategy has been the inability to define equipment needs and place them in the context of a long-term procurement plan. The reason behind this is that there are too many actors, both political and military, interfering in the acquisition process. Politicians and senior offices try to push through procurement programmes, but then the government falls or senior officers retire and a programme loses impetus and fades into the background. Then new programmes and new supporters emerge to battle for available funding.

Other factors also come into play, one of these is related to foreign policy and alliances. For many years the US dominated defence procurement in Thailand, there were sound economic reasons for this, with US military assistance programmes and the FMS system delivering effective solutions to the Thai military. Politically, Thailand wanted diplomatic support from the US and a close defence relationship was part of the price to be paid. These days, although the relationship with the US remains good, they are no longer first amongst equals in terms of being a key foreign policy and defence procurement relationship for Thailand.

The US accounts for 11.2% of Thai exports, but now China is just behind with 11.1% of Thai exports, with China also the largest provider of imports (20.3%) into Thailand. The Sino-Thai relationship is long-standing, but it was only at the end of the 1980s that Thailand turned to China as a source of defence equipment. The Royal Thai Army (RTA) acquired over 50 Type 69-II tanks, 30 Type 59-1 130 mm field guns and 400 Type YW531H APCs, with the APCs the only systems still in first-line service today.

The Royal Thai Navy (RTN) acquired two Type 052T NARESUAN Class frigates from China, commissioned in the mid-1990s, these were fitted with western-sourced weapons and sensors that were installed in Thailand. The two frigates have more recently gone through a life extension programme, where a new Saab combat management system and new sensors have been installed. The RTN also acquired four Type 053 CHAO PHRAYA Class frigates from China in the early 1990s, with two units receiving upgraded systems as part of a refit. The Royal Thai Air Force (RTAF) did not acquire any Chinese equipment.

Today, defence links with China remain strong, this is a reflection of China's growing economic and military power in Asia. The RTA is currently taking delivery of 28 VT-4 tanks from China, as well as having ordered 34 ZBL-09 (VN-1) wheeled armoured vehicles. The RTA will then order a batch of 11 more VT-4s, with this being followed by

systems on the YW531 chassis.

Another potential example of defence technology transfer is the TACHIN Class DW 3000F frigate from Daewoo Shipbuilding & Marine Engineering (DSME). HTMS TACHIN (FF 471) was launched on 23 January 2017 at the DSME yard at Okpo, Republic of Korea (ROK) and is due for delivery to the RTN in 2018. The 3,650 ton displacement frigate was ordered in August 2013 in a contract valued at US\$400M, with equipment including a 76 mm OTO gun, Mk 41 vertical launchers, HARPOON missiles and a PHALANX CIWS. Sensors and electronics come from favoured RTN suppliers such as Saab and Atlas Elektronik.

The intention is to build a sister ship to HTMS TACHIN in Thailand at the Mahidol Adulyadej Naval Dockyard which, along with the related Bangkok Dock Company, is a state-owned entity providing ship building and ship repair services to the RTN and commercial operators. DSME will pro-

Photo: Chinese internet



In 2011, Thailand acquired 49 Kharkhiv Morozov Machine Building Design Bureau (KMDB) Oplot-M tanks in a US\$240M contract with all tanks to be delivered by the end of 2017. One of the first Oplot-M tanks to be delivered is shown on the right, next to an M60A3, 125 of which are in service with the RTA.

a third batch of 10 tanks for a total of 49. In May 2017 the RTA placed an order valued at US\$390M for a Type S26T YUAN Class submarine, the intention is to acquire a total of three submarines through 2028. China has also been willing to transfer defence technology to Thailand. The end result has seen the Defence Technology Institute (DTI) of the Thai Ministry of Defence develop a range of Multiple Rocket Launcher (MRL) systems. The DTI-1 is a Thai version of the Chinese 302 mm calibre WS-1 system, this was followed by the DTI-1G, a 400 mm calibre system with a range of 150 km and GPS/GLONASS guidance. The most recent rocket system is the DTI-2, which is a 122 mm calibre system and will be used with Thai SR4 MRL systems and the six YW306

vide technology transfer and other assistance to make the indigenous frigate build programme a reality. The template for this effort will be the successful technology transfer/local build of the 2,000 ton displacement, 90.5-metre-long RIVER Class OPVs at Bangkok Dock conducted with BAE Systems. The lead ship HTMS KRABI (OPV 551) was launched in 2011 and commissioned in 2013, while sister ship HTMS TRANG (OPV 552) was launched in June 2017.

Over the years Thailand has looked to avoid becoming overdependent on a single supplier country; it wants a diverse supplier base and a competitive environment to meet its needs. Ideally it also wants to encourage technology transfer to allow it



Photo: Defence, Australia

Two Lockheed Martin F-16A aircraft of the Royal Thai Air Force (RTAF) in a training exercise over Australia. Under the four Peace Naresuan programmes the RTAF received 54 F-16A/B aircraft, with Singapore donating seven more F-16A/B aircraft in 2005. The RTAF intends to keep the F-16 in service through 2035.

to support its equipment, where possible built locally, and create a situation where local industry can increasingly meet Thai defence needs. In addition, the inflow of sophisticated technology will hopefully act as a catalyst to developments in other Thai industrial sectors that will make the economy more competitive and sophisticated and allow it to move up the value chain.

The RTA has certainly embraced the concept of a diverse supplier base, initially its main suppliers were the US and various European countries, with Israel being a significant player in supplying communications equipment, small arms and artillery amongst other systems. A new direction appeared in 2007 when it was announced that the RTA Light Armoured Vehicle (LAV) requirement had been won by the Kharkiv Morozov Machine Building Design Bureau (KMDB) BTR-3E1 from the Ukraine. Initially 96 vehicles were acquired, with 142 more vehicles ordered in 2011 and 2013, added to which the Royal Thai Marine Corps (RTMC) acquired 14 BTR-3E1s. Then in October 2008 the RTA ordered five Mil Mi-17-V5 helicopters from Russia, this was an unexpected move and the first major procurement from Russia.

In 2011 the RTA looked to the Ukraine once more to acquire a new tank, signing a contract, valued at some US\$240M, for 49 KMDB OPLOT-M tanks with Ukroboronprom. The first five tanks were delivered to Thailand in early 2014, with a total of 25 tanks having been shipped to Thailand by the end of 2016. The remaining 24 tanks will be delivered to Thailand before the end of 2017, completing the contract. Originally the RTA was working towards the acquisition of 200 tanks to allow it to replace obsolete US-supplied armour. However, the armed conflict in the Eastern Ukraine has obviously become a priority for the Ukrainian defence industry and this has caused difficulties for

export customers. The RTA certainly intended to purchase at least 50 more BTR-3E1 and more OPLOT-M tanks, this is now a complicated proposition in the light of the acquisition of the Chinese VT-4 tank and ZBL-09 vehicles, especially since China can

Photo: US Navy



HTMS CHAKRI NARUEBET is the flagship of the Royal Thai Navy (RTN). Ordered from Bazan in 1992, she was launched in 1996 and commissioned in 1997. The carrier originally operated ex-Spanish AV-8S MATADOR combat aircraft, but these were retired, and now the ship only operates helicopters.

offer extremely favourable financial terms to Thailand to purchase Chinese equipment. While the RTA and the RTN were content to diversify their sources of supply, that was not the case with the RTAF who had remained steadfast in selecting the US as their supplier of their first-line combat aircraft. Indeed they had not had a non-US first-line combat aircraft since the SPITFIRE FR.14 in the early 1950s. Had the 1997 financial crash not happened then the RTAF would have been operating the F/A-18C/D HORNET, but this programme was cancelled. Instead the RTAF eventually received second-hand F-16A/B aircraft from the US.

Since 1988 the RTAF has received 54 F-16A/B aircraft from the US and in 2005 seven F-16A/B from Singapore. The current F-16 fleet amounts to 54 aircraft and the intention is to upgrade the fleet to keep it in service through 2035.

The RTAF then defined a need for an F-5 replacement and for the first time looked beyond the US, evaluating a diverse range of solutions include the Sukhoi Su-30 and the GRIPEN. In 2008 and 2010, orders were placed for eight GRIPEN C and four GRIPEN D aircraft. Included in the package were two Saab 340 AEW&C aircraft with the ERIEYE AEW&C system, as well as two further Saab 340 aircraft transport, training and other applications. The RTAF has stated that it wants to add to its GRIPEN fleet at least six more aircraft, the loss of a GRIPEN C in January 2017 puts further emphasis on building up the fleet.

Like the RTN, the RTAF has turned to the ROK for equipment, ordering four T-50TH aircraft from Korea Aerospace Industries (KAI) that will eventually replace the L-39 jet

trainer fleet in the lead-in fight training role and provide a light attack capability. At this stage there has been no indication on when further T-50TH aircraft will be acquired.

There can be no doubt that Thailand is facing serious challenges. Despite this, it represents a very interesting defence marketplace. The fact that Thailand has embraced supplier diversity and is looking for technology transfer has opened this market to a much broader spectrum of suppliers and solutions. The downside is that, while defence requirements do exist, meeting them is a very complex and time-consuming process where patience is indeed a virtue. ■

Last Line of Defence

Vendors and Techniques in the Market for Aircraft Self-Protection

Georg Mader

All powered aircraft, including stealthy aircraft, have an infrared (IR) signature, often a unique or characteristic one. It provides a more or less clear target for IR-heat-seeking missiles. There are thousands of them out there, in the inventory of regular forces but some of course also at hands to non-state actors.

But while combat aircraft are designed with capable on-board EW- and countermeasure-systems, the focus of this survey is on available self-defence solutions

connected to flares and active countermeasures like directed laser-distraction of approaching seeker-heads.

For either complete systems or sub-components of both variants, there are a dozen concepts or manufacturers, the latter often are identical to the relevant 'big players' in the aviation industry. Self-protection equipment is usually optionally offered with components developed and produced by themselves, or together with such of third suppliers. On the market there are also solutions offered for which two manufacturers bundle their components or sensors. Subsequently, there are different packages and product- or marketing-names out there, often by renowned or established manufacturers, while these can sometimes only be system-integrators as well. That results in a certain level of confusion.

Passive IR Missile Approach Warning

US market-leader Northrop Grumman points out that from the Vietnam War up to Gulf War II ('Desert Storm'), only 20% of various aircraft were shot down by radar guided missiles while IR seekers have by far been the biggest threat. Or else: 75% of all US aircraft losses were incurred without a radar warning receiver ever altered and 90% of losses (fixed-wing aircraft and helicopters, military and civilian) caused by ground fire fell to IR missiles. Therefore sensors like passive missile approach warners are now an essential component of all such solutions. These approx. 10cm long sensors are working with insensitivity in the optical range ('solar blind') and are recognising all aspects of the ultraviolet signature of a launched missile, with a considerable high error-resistance. These are, usually in four locations around the airframe with priority to the rear, more or less 'discreetly' mounted on aircraft or helicopters. That requires only small modifications or installations. Also offered laser-based warners are reacting within the laser-light spectrum

of laser-guided missiles or laser-based proximity fuses.

Examples of such detectors or warners for example are the Airbus AN/AAR-60 MILDS, BAE Systems' AN/ALQ-156, MBDA's DDM, Saab's MAW-300 or ELTA's EL/M-2160.

"Hot rods"

If with all that technical awareness a launch has been registered in the direction of the aircraft, countermeasures are of course necessary resp. essential. The system is usually displayed on a separate small screen in the cockpit, indicating where the threat comes from. Simpler or older shoulder-launched MANPADs – still common in third world theatres, like the reportedly 20.000 SA-7 to SA-24s proliferated from Col. Qaddafi's arsenals – are giving only a short window of a few minutes of seeker lock-on, due to limited battery-cooling. Sometimes they can be dodged by aggressive counter-maneuvring, but that rarely is a viable option for larger multi-engine platforms. Therefore countermeasures are often mandatory in precaution, such as the well known picturesque flare-fireworks in TV-images from crisis-regions. Those phosphorus/magnesium decoy flares – many folks still view them as air show-features – are ejected-out singly or in bursts of 25 to 45 meters/sec. and burn for two to four seconds.

But that is only one side of a coin which is not the central subject of this article. Only so much: As the more modern infrared seekers tend to have spectral sensitivity tailored to more closely match the emissions of airplanes while, as so-called CCM or counter-countermeasures, rejecting other sources, the modernised decoy flares have their emission spectrum optimised to also match the signature of the airplane or better its engines and engine exhaust. In addition to spectral discrimination, the CCMs can include trajectory discrimination and detection of size of the radiation source. Latest generation of weapons like the FIM-92 Stinger are using a dual IR and UV seeker



Photo: Mader

AN/ALQ-157 IR countermeasures sensor on a Royal Navy's AW-101 MERLIN

against such threats for governmental operated multi-engine force multipliers, other state-aircraft and – like in Israel – even civil cargo-aircraft and airliners. Capable defence against such threats can be separated into two families, which often are used in combination: Passive sensors like ultraviolet/laser-based missile-approach warners

Author

Georg Mader is a defence correspondent and freelance aerospace journalist based in Vienna, Austria, and a regular contributor to ESD.



Photo: Mader

ALQ-144 modulated IRCM jammer

head which, according to conversations the author had with EW-specialists, allows for a redundant tracking solution and effectively negating the impact of modern decoy flares. While later R&D in flare technology has given us an IR-signature on the same wavelength as hot engine exhaust, modern flares still produce a notably and largely immutably different UV-signature than an aircraft engine burning kerosene-fuel.

The market for their dispensers is quite extensive, to be named are MBDA's SAPPHIRE or E- SPIRIT, Saab's BOP-L, Terma's MCP (Denmark), Thales' VICON series, or BAE- Systems' AN/ALE-40, ALE-45 and ALE-47. In the suppliers arena of add-on solutions there are some combinations with anti-radar foil 'chaffs', but more common are IR-jammers to complement the flares. Leading here is BAE-Systems with the AN/ALQ-157, with about 900 units in worldwide use and the helicopter-tailored sensor ALQ-144 (type 'disco light' ball) with about 3,000 units in service.

Directed Countermeasures

In recent years, triggered by helicopter losses in Iraq and Afghanistan with a peak in 2009, weight has been shifted to the introduction of systems against ground-based threats which are supporting or replacing the described passive warning and pyrotechnic countermeasures by such directly and actively aimed at the threat. Such Directional (or Directed) Infrared Countermeasures (DIRCM) also have the benefits that the platforms are not exposed at night by precautionary flare-fireworks and that their crews are not dazzled. Also flight-planning for force multipliers and state-aircraft is eased, in relation to the handling of what is classified as pyrotechnics on many civil or mixed-used airports.

A big player in this increasingly dominant area is BAE Systems (United States). They

call their DIRCM-product Advanced Threat Infrared Countermeasures (ATIRCM) and its latest sensor set consists of the passive components of the AN/AAR-57 Common Missile Warning System (CMWS) and two active control- or steerable cylindrical AN/ALQ-212 (V) laser-jammers, a control unit and the countermeasures-dispenser. The



Photo: Mader

The LAIRCM system from Northrop Grumman is a laser-based countermeasures system that protects large fixed-wing transports and small rotary-wing aircraft from an infrared missile attack by automatically detecting a missile launch, determining if it is a threat, and activating a high-intensity countermeasure system to track and defeat the threat.

US Army began to install the combination in 83 Boeing CH-47 CHINOOK in 2009. Today it is standard in all helicopters going abroad, including the Boeing AH-64 APACHE and Sikorsky UH-60 BLACK HAWKS. US Marine Corps Aviation Director Gen. Davis explained to the author: "We can fly again in areas of Afghanistan with even the big CH-53 birds that previously were no go-areas due MANPAD danger, thanks to the new defence systems." Since March 2015, FMS has unlocked export of such components to foreign governments for military and VIP aircraft. Thanks to more than 1,500 passive CMWS-sets in operation worldwide, BAE Systems has a good

footprint on the market for retrofitting to ATIRCM standards and, depending on the regional threat situation, also for commercial aircraft.

Northrop Grumman Corporation has developed the cylindrically shaped rotating sensor AAQ-24 NEMESIS for its Large Aircraft Infrared Countermeasures System (LAIRCM or AAQ-24V) in 2001. As the name indicates, it is designed for large(r) aircraft and helicopters and since at least 2011 it flies on many US-made platforms. Like the VC-25s (AIR FORCE ONE), several of the USAF C-17As, various C-130s, KC-135Rs, KC-10Cs and C-5 airlifters and tankers as well as the USN ASW P-8A POSEIDON. It also is earmarked for the future KC-46A (B767) tankers or the Marine Corps CH-53K and the ASW future P-8 POSEIDON. In the British RAF several types are using AAQ-24 NEMESIS for the LAIRCM use, like the eight C-17As, the ROYAL FLIGHT VIP-platforms BAE-146 CC2 – and –C3 of 32nd Sqn, or the A30MRTT VOYAGERS. LAIRCM can also be found in NATO's E-3 AWACS fleet and Australia has acquired

the system for A330MRTT, C-17A, C-130J and the 737-based AEW&C WEDGETAIL. The characteristic swivelling drums are installed in 500 military and state-run aircraft worldwide, including 50 different types of fixed- and rotary wing aircraft. Among them reportedly in the 'Flugbereitschaft' A340s, but the exact type is not officially confirmed. But one can expect a similar mix of sensors as on the VC-25 AIR FORCE ONE of the US President who will also get two new and likely even better equipped B747-8s.

An example of a – albeit much later – counterpart to the US LAIRCM is MUSIC, a successful collaboration of ELBIT (Israel) and



The Inertial Measurement Unit STIM300 in 1:1-scale

sensoror
sales@sensoror.com

Position yourself.

With more than 60 thousand gyros installed since 2010, the list of applications that rely on STIM every day is evergrowing:

Mobile mapping | 3D Lidar systems | Road surface analysis | Autonomous vehicles | Camera turrets | Remote weapon stations | High resolution airborne surveillance systems | Laser guided bombs | Short range missiles | Phased array scanning airborne radar systems | Medical precision surgery equipment | Airborne Lidar system | Multibeam underwater sonars | Satellite attitude control | High altitude sounding rockets | Automotive vehicle testing | Humanoids | Industrial production robots | Mobile phone calibration & test equipment | Vehicle navigation | Sporting event wire operated cameras | Movie industry action cameras | Satellite earth observation cameras | Space craft docking navigation | Meteorite landing and explorations systems | Aircraft flight control systems | Underwater vessel control | Military target accusations systems | Mortar aiming systems | Direct infrared counter measurement | Missile launch platforms | Pipeline inspection | UAV's | Electronic warfare systems | Satellite launch vehicles

When reaching for the ultimate performance level, they all trust STIM300.

It's a straight choice

Weight 55 grams | Size 35cm3 | 0.3°/h Bias instability



Photo: via author

J-MUSIC on an Israeli B707T

Italy's Elettronica SpA. The core of what is an entire family of MUSIC (Multi-Spectral Infrared Countermeasures) is the ELT572 all-direction jammer based on laser-diode technology in the IR wavelength range, reportedly even protecting against missiles homing in from above. The 25kg system against IR threats consists of a system processor, missile-warners against IR, UV and radar (RWR), a thermal imaging camera, a turret for seeker-head tracking and an active laser to overload, blind or distract them. MUSIC was introduced in a dozen countries and last year had a backlog of 110 systems for 20 different platforms. Reportedly earmarked for or in 2017 to undergo such an upgrade are the Italian C-27J, C-130J and AW-101, the upcoming 30 new Brazilian KC-390 airlifters and – including RWRs – the two B777 for the Indian government. MUSIC was also tested in Germany on an Airbus C295M airlifter and was quoted superior against simulated threat from the surface by the WTD-91 at Meppen. As indicated in a brochure at Paris-Airshow, it also would be ready to integrate the (former) Cassidian-supplied AN/AAR-60 warners used in the German CH-53Gs, the TIGER and NH-90. Similarly compatible also with SAABs MAW-300 and ELISRA's (ELBIT) PAWS-2 system for a wide variety of platforms like B-737, B-737-700 BBJ, B-747, B-767 Tanker, B-777, C-130B, C-130H, C-130J, CN-235 or Russian platforms like Il-76 or Antonovs.

The mentioned Elettronica Germany has, just like 'Brite Cloud' by SELEX SE (now LEONARDO Electronics) in the Saab GRIP-EN, positioned itself into the dominant European project EF-2000 EUROFIGHTER and, although the TYPHOON's onboard integrated EUROSASS-systems are not in focus here, secures that at the Rhine, an increase in R&D and production of technically sophisticated components is secured, also for the supplier-based industry. Because some of these DIRCM solutions

for some platforms are too heavy and also too expensive for many nations – not only in crisis-regions since 2009, the US Army has requested answers to what is called a simpler Common Infrared Counter Measures (CIRCM) system. Responding to this request, BAE Systems/USA offers a miniaturized version of the already mentioned ATIRCM, which should come with a weight between 15kg and 55kg. Also along this lower edge, Raytheon offers its packages SCORPION and QUIET EYE, designed around the IR-seeker of their AIM-9X air-to-air missile. These are tailored for helicopters and small COIN-aircraft.

Civil Systems

Since 1973, according to SIPRI and intelligence services like the CIA, around 30 civilian registered cargo-, passenger- and state-aircraft were downed by shoulder-launched MANPADs, claiming about 1,000 lives. That category of weapons is always in high demand by militant- and non-state groups, as recently explained by SA-7, SA-14 or even SA-24 (twin) that vanished from Libyan stocks down to Mali and as far as Afghanistan. A few years ago, an Il-76 was detained in Bangkok with 35 tons of North Korean weapons, among them many MANPADs. Destination reportedly was Teheran. Meanwhile Iran produces own variants like MISAGH-1 and -2 just like Sudan. In recent years, all of these are reasons for manufacturers to come up with civil versions of military self-defence systems for the reason that it ultimately are civilian pilots of large lifters and helicopters, who remain much more vulnerable than pilots of fast manoeuvring combat aircraft. They cannot turn hard into an approaching missile or climb it out even if the threat is detected.

Leader in these add-on solutions again appears to be Israel's Elbit and its C-MUSIC™. The adapted version is intended for civilian/

commercial aircraft and is part of the so-called SKYSHIELD programme by the Israeli Ministry of Transport which started in June 2009 and has urged and funded a system to protect Israeli passenger aircraft from attacks like the one on a B757 at Mombasa. After several years of testing, in 2014 it was made mandatory to all 38 aircraft of El Al to get the 190kg system, later extended to all 110 aircraft of other Israeli operators. That was a considerable burden, since we talk about a unit price of around US\$1M, which meant around 10% of the annual profit of ELBIT. A quick solution derivative for large cargo- and passenger liners, also available for vintage platforms like Boeing 707s or DC-8s of which quite a number are still used in the third world, is J-MUSIC, announced in Farnborough in 2012 and presented in Singapore last year.

The system should also be integrated into the German AF A400Ms, at least a contract for integration was signed at the ILA in 2014. Its three components produced by the Israeli manufacturer are integrated by Diehl BGT into a 360°-protection layout. In a confidential report to the Bundestag (parliament) the German MoD reportedly has addressed a "risk that the particular self-defence system for the A400M might become available much later than contractually agreed for 2016 and therefore the up to 46-year-old C-160* TRANSALLS would have to be used much longer than planned." According to the Luftwaffe however, at least one fully equipped A400M was meanwhile delivered.

For a part of the German C-160 fleet, an upgrade was funded for operations abroad, following the downing of an Italian G.222 transport by a SAM on approach to Sarajevo in September 1992. The chosen sensor was the AN/AAR-54(V) by Northrop Grumman, operated by a tactical system officer (TSO) at the seat of the board navigator/radio-operator.

Completing the MUSIC family since 2013 is the only 19kg, very compact, mini MUSIC which uses four infrared sensors and a high-frequency laser and is specifically targeting the segment of combat- and troop-transport helicopters.

Northrop Grumman's add-on solution Guardian™ is based on the already mentioned AAQ-24 NEMESIS and dates back to an initiative of the US Department of Homeland Security for the National Guard and the Civil Reserve Fleet. In 2017, it is presented as based on LAIRCM BLOCK 30, in open architecture with the latest processors and detectors and the VIPER-laser as it's DIRCM component. According to the manufacturer, the pod or container will be ideal for a large variety of civil- but also military-platforms. Coming into action would only need a few seconds and no inputs or actions by the crew. GUARDIAN™ is very similar to MUSIC, also with the unit-costs of between €1M and €2M. There however was – as unveiled by Aviation Week – no order by a US airline so far, despite the costs of only some US\$ per ticket. US shareholder-slaved airlines apparently see no domestic threat, even in the light of the described threat by the same journal, how MANPADs could be smuggled into the US and used by Mexican cartels.

A European – while passive – solution for so-called VIP/Head-of State and governmental operated high-end executive aircraft was developed by SAAB as the CAMPS (Civil Aircraft Missile Protection System). The clever Swedes have explicitly developed it as fully compatible with the Wassenaar-agreement because it is not listed as reportable military product in this way. The 35kg system – including MAW-300 detectors and the control unit in the cockpit – allows the operator a flexible flight-planning – also with regard to the often overlooked factor that some countries do not want pure military systems present at their (civil) airports. CAMPS is already installed in the executive version of the B737, the BBJ. Of course the basically passive nature can nevertheless also be retrofitted by SAAB into the more military and also countermeasures containing CIDAS (Compact Integrated Defensive Aids Suite) and even into the radar warning IDAS (not to be confused with Diehl/tkMS' submarine-launched anti-helicopter missile!). Together this family of self-protection systems already had some commercial success in Europe, Asia, Africa and the Middle East. It is included on helicopters like PUMA/ COUGAR/ SUPER-PUMA, ROOIVALK, A-109, SUPER-LYNX 300, HAL's (India) DHRUV and its armed version RUDRA, CH-47 CHINOOK, NH-90 or Mi-17, but also turboprops like C-130,

SAAB-2000 AEW&C or ERIEYE or DASH-8. Supplier of the IDAS laser- and RWRs is SAAB Avitronics/South Africa. The exotic subsystem bolted onto the Malaysian AF's SU-30MKM, since Israeli components were out of question for this Asian-Muslim nation (like on India's Su-30MKI).

Israel has always been very innovative in civil/military so-called dual use-solutions. Not surprisingly, another vendor from Israel is BIRD Aerosystems. Its family of Airborne Missile Protection System (AMPS) is based on collaboration with Airbus Defense & Space (former Cassidian/EADS). It comes in four different versions – including AMPS-MLR with radar warning – and is already certified by leading aircraft manufacturers, including Airbus Helicopters,

the Austrian operator Wucher Helicopters was utilised and that civil run BELL-205 was selected by RUAG as what they called "the ideal certification type for a widespread but elderly platform".

Test Your Sensors – on the Ground!

Real or hot functional tests of self-protection systems are complex to stage within (first world) airspaces and of course expensive. Therefore RUAG came up with a very innovative tester for SP-sensors, its handheld MISSIM. With that yellow handheld device, one can carry out a quick review of the reactions and effectiveness of one's protection systems/warners. Weighing just



Photo: Mader

The Civil Aircraft Missile Protection System (CAMPS) from Saab

the Russian MIL design bureau and Rosvertol, etc. AMPS carries the label combat proven (as in Iraq, Libya and Afghanistan) and can be found in over 2,000 platforms. Known are the helicopters A-129, AB-205, AB-212, AB-412, AH-1, BELL-407, BK-117, CH-47, CH-53, PUMA/ COUGAR/ SUPER-PUMA, (now) H-135, H-145, H-155, H-225, EH-101, Mi-17, Mi-8, NH-90, TIGER, S-70s (UH-60s), S-92, SH-3D, SH-60, UH-1, but also aircraft like A-340, B-200, B-350ER, C-130-series, C-160, C-27J, CN-235/295 and P-3C ORION.

Especially for helicopters since 2012, RUAG Aviation from Switzerland developed the Integrated Self-Protection System (ISSYS) which is tailored to provide safety for civilian helicopters and their crews by flares and chaff-decoys when their machines are operated in areas of conflict or are sent to individual missions in crisis-regions. The system is marketed jointly with Rotorcraft Services Group and is designed to be built in on short notice, any alteration of certification is not necessary. That saves costs and time. For the related tests of ISSYS – both on the ground and in the air – a helicopter of

1.6kg, it is portable to be carried aboard even smaller helicopters and can be used at stop-overs, for example before a sensitive area is entered. The electronic handgun can simulate 255 hostile fire indication-threats by radar-, missile-, guided and handheld weapons from a distance of one to 20 meters. In early 2016, RUAG Aviation Products delivered 10 MISSIMs to the German Federal Office for equipment, Information Technology and In-Service Support of the Bundeswehr (BAAINBw). Another and interesting product is the handheld ATS-100 by LEONARDO-DRS.

Another system to later equip helicopters was presented in 2015 by Orbital ATK, a genuine space-industry company from Virginia. They call their brainchild HAPS (Helicopter Active Protection System), but contrary to others it uses an active, manoeuvring kinetic kill-vehicle. Main focus is – unlike most other vendors – the defence or protection against non-emitting short-range rocket-grenades (RPG), which have claimed quite a number of hovering US rotary-platforms in Iraq. Activation and reaction of HAPS' arrows should take place



Photo Mader

SAAB's IDAS-3 on an Indian HAL-RUDRA

within a fraction of a second, while the impact- or detonation point should be far away enough to clear the helicopter from the RPGs fragment circle.

Radar Warning...

So far we have read a lot about the – ever more likely – threat by an IR-guided weapon. Nevertheless, in many offered solutions there also is a radar warning receiver (RWR) included, designed to register a wide variety of signals to compare it with thousands such fingerprints stored in a – hopefully continuously filled – threat library. The quality of protection one can expect from such a device is directly proportional to the efforts a far-sighted operator addresses i.e. spends to SIGINT- and ELINT-databases. To obtain a suspicious or hostile signal is normally based on the correlation of four RWR-sensors, for the majority working in the 2 to 18 GHz spectrum. Examples for such

equipment are the SKY GUARDIAN-2000 by SELEX (now LEONARDO Electronics), BAE Systems USA's AN/ALR-56, Raytheon's AN/ALR-67 or Elettronica's ELT 156-158. But like the strictly passive components of C-MUSIC or LAIRCM, RWRs would hardly help the crew and passengers of a non-agile commercial aircraft much like MH-17s B777 over Eastern Ukraine to survive. More likely, it signals the crew that they would die soon...

...and Radar-Jamming

If that is no option and is to be prevented by an increased level of protection – technically and financially almost anything is possible – this then calls for active attempts to jam the hostile radar lock-on. Such solutions are available but expensive. Often these are based on external and/or conformal pod-solutions. There again is Northrop Grumman with the AN/ALQ-131(V), AN/

ALQ-135(V) and -136, ITT/ALQ-1 NG-36 or -165, the SELEX (LEONARDO) SKY SHADOW, ELTA's EL/L-8212/22 or Elettronica's ELT/553 and ELT/555. Further optional systems are, BAE Systems' AN/ALQ-178 or -214, SAAB's already mentioned IDAS, SPECTRA by THALES.

Last but not least we should look not only at Western inventions. We are definitely not alone out there and other powers are progressing in this segment as well. Noteworthy is the latest known Russian sensor, the L370 VITEBSK (President-S) by the Russian Institute АО-НИИ 'Экран' (ERKAN) from Samara. It already has had its combat debut on board the Russian assault-helicopter Ka-52 ALLIGATOR in Syria. The combined radar- and laser warner system plus jammers was seen last January on a Mi-8AMTSh as well, also in Syria. This spring, the author noticed a similar configuration attached to a Mi-17 airframe at Kala/Azerbaijan.

Another non-Western and increasingly upgrading player are the Chinese forces, resp. the Chinese state-run research institutes that are supplying the PLAAF (Air Force), PLAN (Navy) and PLANAF (Naval Airforce) with sophisticated systems. These can be compared to systems designed to break hostile radar-lock and to jam enemy target-acquisition attempts. One example considerably larger than most of what is described above, are two jamming pods on the latest version of the XAC (Xian Aircraft Corporation) H-6 bomber (itself a grandchild of the late 1950s Soviet Tu-16 BADGER), the H-6KH. It was photographed by Japanese JSDF F-15s only in late August, showing two additional wing pylons with KG800 and KG600 jamming pods. The latter were also frequently seen on PLANF JH-7A and PLAAF J-10B tactical aircraft since 2014. ■



Mark your diary: Brussels, 23/24 January 2018
14th NATO Life Cycle Management Conference

LCM as a Joint Effort - Perspectives and Objectives for NATO, Major Industries and SMEs

MITTLER
REPORT

Chaired by: Thomas E. Pedersen and J. Bo Leimand (ret), Danish Defence Acquisition and Logistics Organisation (DALO)

The annual NATO LCM Conference will continue to consider the lessons learned and achievements made in areas such as Quality Assurance, Life Cycle Costing, Configuration Management, Acquisition Practices, Material Maintainability et al. as a basis for new and innovative, even disruptive approaches and perspectives which will be introduced in respective presentations. The event will again be organised in cooperation with the NATO Life Cycle Management Group (AC/327) and with the support of the NATO Industrial Advisory Group (NIAG) and the German CALS Forum. The conference will be combined with a small exhibition to showcase respective capabilities and will take place at the Parker Hotel Brussels Airport (formerly: Golden Tulip) on 23/24 January 2018.

Contributing Organisations: NSPA, SSM (Turkish MoD), NETMA, FFI, UK MoD, Airbus Defence & Space, Leonardo, QinetiQ, Ukroboronprom (tbc), KPMG, T-Systems, Systecon et.al.

More Information: Mittler Report Verlag, Jürgen Hensel, Phone: +49 228-35008-76, Email: juergen.hensel@mittler-report.de, www.mittler-report.de

KC-46 PEGASUS Status Report

Sidney E. Dean

As of September 2017, developmental testing of the KC-46A PEGASUS was approximately 65 percent complete. The KC-46 programme office continues to assert confidence that the tanker will achieve its key and technical performance capabilities.

Technical difficulties encountered between 2013 and 2016 have been resolved. The same holds for the cost-overruns which once plagued the programme. The non-partisan Government Accountability Office (GAO) released a report on 24 March of this year, stating that the KC-46 programme is meeting cost and performance targets with fewer engineering changes than expected. The GAO found that the estimated total acquisition cost has dropped by fourteen percent (\$7.3Bn) since the initial estimate made in February 2011; while the ongoing Engineering and Manufacturing Development phase is still at least \$1Bn over budget, those costs will be absorbed by Boeing under the terms of the fixed-price/incentive-fee contract. On the negative side, the schedule for delivery and operational capability of aircraft continues to shift into the future. Additionally, some new technical problems have recently emerged.

Engineering Manufacturing and Design

The KC-46 is based on the Boeing type 767-200ER passenger jet. The derivative type 767-2C designed under the KC-46 programme is the baseline non-military transport aircraft. It features an enhanced flight deck, a cargo door and floor, a refuelling system and body tanks, and tanker system provisions. The addition of aerial refuelling components and military avionics transforms the civilian 767-2C into the military KC-46 tanker. The KC-46 can refuel aircraft through either an extendable ("telescoping") rigid boom or the hose-and-drogue system, enabling it to service all US, allied

and coalition military aircraft compatible with international aerial refuelling procedures. The boom and a hose-and-drogue system are both located below the aft fuselage. In addition, wing aerial refuelling pods (WARPs) equipped with hose-and-drogue can be carried under both wings, enabling

LRIP and Advanced Testing

Low-rate initial production (LRIP) was approved immediately after the KC-46 programme passed Milestone C, with USAF ordering the first two lots of production aircraft, covering seven and twelve aircraft respectively. The order for the third LRIP lot of 15 planes plus spare parts and WARPs was placed in January, raising the number of KC-46 on order to 34.

Flight testing continues during the Production and Deployment phase. In addition to the four original test and evaluation prototypes (two each 767-2C and two KC-46A),

Photo: John Parker, Boeing.



The KC-46 PEGASUS tanker refuels an F/A-18 aircraft using its hose and drogue system for the first time on 10 February 2016. Boeing and Air Force aircrews successfully made contact with and refuelled the fighter aircraft during the four-hour flight over Washington state.

the KC-46 to refuel two aircraft at one time. The engineering and manufacturing development contract (EMD) was awarded to Boeing in February 2011. Resolving various technical issues – including rewiring the electrical system and redesigning the refuelling boom – delayed not only development but also the testing schedule. Milestone C was reached in August 2016, one year past schedule. Milestone C review determines whether an acquisition project has met all exit criteria of the EMD phase and is ready to proceed into the Production and Deployment phase. Specifically for the KC-46 project, the prototypes had to pass fuel to five representative types of aircraft, including fighter and transport planes, and utilising both the telescoping boom and the hose-and-drogue method.

the first two planes produced under LRIP are also being used for flight and system testing. Through June of this year the KC-46 test airframes had accomplished 1,700 hours of flight time and conducted 1,200 "refuelling contacts" with F-16, F/A-18, AV-8B, C-17, A-10, and KC-10 aircraft; The KC-46 has itself been refuelled in flight by the KC-10. As testing progresses it also becomes more challenging, taking place at high-and-low altitudes as well as high-and-low speeds and under a variety of weather conditions. Additional types of receiver aircraft are also being introduced.

Despite the various technical difficulties, USAF is satisfied that the aircraft is meeting or exceeding all performance requirements. For example, in testing the aircraft demonstrates somewhat better fuel econ-

Author

Sidney E. Dean is President of Transatlantic Euro-American Multimedia LLC. and a regular contributor to ESD.



Photo: USAF

Airmen and civilians got to test out the Air Force's newest refuelling tanker, the KC-46, outside the Pentagon during a visit from Boeing's simulator team on 4 September 2013. Visitors had the opportunity to fly the simulator and operate the refuelling boom.

omy than required. Empty weight is nearly 600 pounds below the operational target. This summer the plane successfully completed hot-weather testing in Arizona. A major risk factor was eliminated in July of this year when the KC-46 successfully passed Electro-Magnetic Pulse (EMP) testing. The evaluation was conducted at the electromagnetic pulse laboratory on Naval Air Station Patuxent (Maryland) and at the Benfield Anechoic Facility at Edwards Air Force Base (California). The tests confirmed the functionality of the shielding and hardening technologies incorporated into the plane, that was proven immune both to EMP effects caused by nuclear detonation, and to other potentially harmful electromagnetic fields.

Certification Worries

Developmental flight testing was supposed to be completed by the end of this year, but this appears increasingly unlikely. Speaking to the press during the Air Force Association's 2017 Air & Space Conference in Maryland on 19 September, General Carton Everhart said: "We're running into a crunch period (and) we may not be able to get all those test points done by end of year. We've adjusting the schedule to make sure we get all our points done....sliding it out to the right." The general, who leads USAF's Air Mobility Command, was unable to say how far the testing schedule might shift. "I'm looking at three or four different schedules. I really am, because it depends on who you talk to."

One particular point of concern centres on the WARP system. Boeing spokesman Charles Ramsay denied performance issues with the developmental hose-and-drogue system, but said in May that qualification and certification were taking longer than anticipated. According to the GAO report from May, this is partly a procedural problem. Boeing and its WARP supplier un-

derestimated the level of design drawing details they would need to present for the review process. Additionally, sub-tier suppliers had not complied in a timely manner with the WARP supplier's request for the necessary design documentation. Completion of the full testing cycle is required before the KC-46 can be certified for operational flight. The plane will require three different certifications, two of them from the US civil aviation authority FAA (Federal Aviation Administration): an amended FAA type certification for the 767-2C baseline freighter with tanker-system provisions, validating the reconfigured aircraft's airworthiness; and a supplemental type certificate for the full KC-46 tanker. Boeing is trying to accelerate this process by pursuing both certifications simultaneously rather than sequentially, as originally planned. "We still have a significant amount of work in front of us to complete certification testing and other activities," said Boeing spokeswoman Caroline Hutcheson on 19 September. "It's a day-by-day process to meet certification requirements." Airworthiness certification by USAF will follow both FAA certifications. After full certifica-

tion is achieved, the plane will enter the Initial Operational Test & Evaluation phase conducted directly by the Pentagon's testing directorate.

Current Problems

For the Air Force the question is not if but when the KC-46 achieves full certification. Brigadier General Donna Shipton, USAF Tankers Directorate programme executive officer, said on 11 September that Boeing has made "steady progress, just slower than planned" to complete Federal Aviation Administration certifications and flight tests. However, as of September the programme faces three (relatively new) category one deficiencies which could delay certification. Boeing's current priority must be eliminating these serious flaws.

The most serious concern is "Undetected Contact Outside the Receptacle" (UCOTR). The term COTR refers to failure of the boom to line up precisely with the refuelling receptacle of the receiving aircraft. When this happens, the boom can bump or scrape that plane. On stealth aircraft, damage to even a small section of the radar-absorbent coating can negate that airplane's stealth capability (the KC-46 has not yet been tested with low-observable aircraft). On any receiving plane more serious structural damage is also possible, potentially endangering the flight crew. Damage to the refuelling boom is also possible. While COTR occurs with all aerial tankers, "we do think it, potentially, is occurring at a higher rate" during KC-46 testing, General Shipton said on 22 September. "Potentially" is the critical word in this context, as the scrapes are not being registered by the KC-46 boom operators (hence Undetected COTR). Instead, they are detected through post-mission review of boom-camera video as well as inspection of the receiv-

Photo: Boeing



Takeoff of a KC-46 from Boeing's proprietary Paine Field near Everett, Washington.



Photo: US Air Force

The Benfield Anechoic Facility is the largest anechoic chamber in the world. It provides electromagnetic and radio frequency-resistance testing and can accommodate most current aircraft. The anechoic facility provides a controlled electromagnetic environment and is shielded against radio frequency interference.

ing aircraft. Boeing and the Air Force have been investigating the extent and cause of this problem since it was noted in spring, with no clear result to date. Operator error has so far been ruled out, according to Air Force spokeswoman Ann Stefanek.

USAF will conduct targeted testing in October-November to determine the cause of the UCOTR, and to establish a baseline for comparison with other tanker types. A risk analysis will also be conducted to determine how great a concern COTR actually is. Based on the results of these studies, USAF will determine whether to accept the tanker as is or require a solution to the COTR problem. "We have to have a full understanding of the issue, and we won't know that until the testing is complete later this year," General Shipton said. Until then USAF cannot determine whether it would accept aircraft deliveries without resolution of the COTR problem, she said. Depending on the technical complexity, requiring Boeing to develop a fix could push aircraft delivery beyond the spring 2018 timeframe.

The second category one deficiency is "un-commanded boom extension." On several occasions the boom has re-extended after disconnecting from a fuel receptacle while fuel was still flowing through the boom. To date this has only manifested during ground tests. USAF is analysing the data from these incidents and expects to make a decision on the deficiency report in October.

The third problem, "non-compliance of high-frequency transmit inhibit during aerial refuelling," is hypothetical. HF radios must remain off during aerial refuelling to prevent electricity arcing between the boom and receiver aircraft. According to a USAF press release dated 22 September, "there is currently insufficient test data to verify that when radios are commanded off, they remain off, even after various failure modes. The Air Force is conducting qualification data review and Boeing is planning failure

modes and effects testing in October. Assuming positive results, the Air Force expects to close the deficiency report".

Delivery and Beyond

A total of thirty KC-46A are currently under production at Boeing's plant in Everett, Washington. When they will be completed and delivered is the subject of speculation.



Photo: NAVAIR

During tests on the EMP pad at Naval Air Station Patuxent River, the programme's second low-rate initial production KC-46 received pulses from a large coil/transformer situated above the aircraft. This outdoor simulation was designed to test and evaluate the KC-46's EMP protection while in flight.

Target dates have been moved back repeatedly in tandem with the development and testing delays. The current formal agreement would have Boeing deliver the first planes to the Air Force in December, and complete delivery of the first 18 units during the spring of 2018. The first nine WARP sets would be delivered by October 2018, enabling the first operational squadron to declare initial operational capability (IOC) that same month. The Air Force no longer considers this realistic. In June of this year USAF's annual schedule risk assessment report forecast that delivery of the first operational aircraft would move from December

2017 to late spring 2018. On 19 September General Everhart expressed confidence in the new spring deadline. However, he conceded that the most recently discovered malfunctions could force Boeing to postpone deliveries further, putting the October 2018 availability into question. At that time Boeing was still insisting that it could meet the December target date for the first aircraft. Over and above this, Boeing maintains that – once deliveries begin – the firm can accelerate the production schedule so that the October fulfilment date will be met.

While USAF is eager to field the new planes and reduce its current tanker shortfall, General Everhart warns against a rush to IOC. "I don't need an aircraft right now," he told reports at the AFA convention. "I need the right aircraft when it's ready." The full rate production (FRP) decision is expected in August 2019 (26 months later than originally planned). Once FRP begins, USAF expects to acquire fifteen units per year through the late 2020s. The complete acquisition goal encompasses 179 units. This will replace one-third of USAF's current KC-135 tanker fleet. Eventually USAF wants to acquire 479 new tankers to re-

place the entire KC-10 and KC-135 fleets, but it is uncertain whether the remaining procurement will encompass the KC-46 or a brand new design. Speaking in spring, General Everhart described the KC-46 as a good product which should probably be procured beyond 179 units, to replace the entire KC-35 fleet of 414 tankers. Sticking with the KC-46 for the entire replacement programme rather than introducing a second aircraft type would simplify logistics and avoid the problems associated with new system development, but could miss the opportunity to incorporate the most modern materials and design concepts. ■

Fighter Pilot Training

William Carter

In the past, pilots graduating from basic flight training were selected for fighters if they showed above-average skills in aircraft handling, on the basis that in a fighter you needed to out-maneuvre your opponent. In fact, pilots needed more than that, in particular gunnery skills and the ability to anticipate what an enemy is going to do.

Before the advent of guided weapons, the best pilots in gun aiming were often those who were accustomed to shooting birds such as pheasants and were used to aiming their guns ahead of a moving target. Organised air combat training was minimal and consisted of crew-room

pilots now had to manoeuvre to place the enemy in the GW envelope, hopefully somewhere in the middle where the "Probability of kill" (Pk) is high, rather than near the edge where the Pk is low. With long-range Air-to-Air Missiles (AAM) such as AIM-7 SPARROW, AIM-54 PHOENIX and

at long range to prevent the enemy from being able to start a high-G close-range battle. However, an enemy will get through sometimes and if the fighter is not itself manoeuvrable, it becomes the proverbial "sitting duck" in an aerial dog-fight. It is noticeable that other fighter designs, such as EUROFIGHTER TYPHOON, the US F-15 EAGLE, F-16 FALCON, F-18 HORNET, F-22 RAPTOR and F-35 JSF, are in the highly manoeuvrable category.

Air ranges were developed for combat training such as the North Sea range between the UK and Germany, the Decimomannu ranges in the Mediterranean off southern Sardinia, and the Nellis ranges in Nevada. At first, these used radar tracking. Combat training was co-ordinated by Exercise Control, enabling a detailed de-brief to be made on a variety of scenarios that could be practised – and practised again if necessary. In Europe, between the late 1960s and the early 2000s, NATO fighter squadrons would deploy to "Decchi" for combat training, and at times the airfield had the highest number of takeoffs and landings per day in Europe. One feature of these instrumented air exercises was that the outspoken "crew room cowboy" was often shown to be not as good as he claimed, and the quieter, more calculating pilot was sometimes shown to be the true "ace". With the advent of satellite-based GPS navigation in the mid-1980s and the consequent ability to transmit an accurate position to the ground for exercise purposes, tracking by ground radars is no longer required. Nowadays, continuous recording of GPS positions of aircraft by Exercise Control enables complex air combat training to take place anywhere in airspace that is free of civil traffic.

In the USA, the RED FLAG series of exercises were developed, starting in 1975 in an effort to improve the air combat figures from the Vietnam conflict, which have been reported as an overall kill-ratio of about 2.2 between US and Russian-built aircraft and weapons, in some phases of the war reducing to 1:1 such as during the final US offensives that brought the war to an end. These ratios were considered low at the time, bearing in mind the relative sophistication of US weapon systems compared to those used by North Vietnamese forces. RED FLAG exercises are flown from Nellis Air Force Base on the NE side



Photo: Austin Redman

Simulated F-16 mission training

briefings and flying as "number 2" to an experienced pilot before operating without supervision. If a pilot survived 10 missions he would probably have enough experience to survive many more, but the attrition in those first 10 air combat missions during World War II was high. With the advent of Guided Weapons (GW),

equivalents, it was initially thought that there was less possibility of a high-G close-range battle. Indeed, aircraft were developed such as the European TORNADO ADV and US F-14 TOMCAT that were not particularly manoeuvrable but were able to carry many long range AAM. The theory was that they would achieve sufficient kills

of Las Vegas, and this base now has more military schools and squadrons than any other USAF base. An important element of the RED FLAG concept is to use real aircraft as enemy "Red Air". Currently Red Forces consist of F-15 and F-16 aircraft from a number of "Aggressor Squadrons" permanently based at Nellis. Ground defence, radar and GPS jamming are provided by other Squadrons. A key co-ordinating element is the RED FLAG Measurement and Debriefing System (RFMDS), a computer network for real-time exercise monitoring and post-flight debrief.

The above illustrates the complexity of modern systems for fighter pilot training in real aircraft. However, these systems require major resources to maintain, and time to prepare a challenging exercise and bring the appropriate forces together not only to fly the exercise but also to take part in the in-depth debrief.

The Potential of Simulation

Each aircraft type has a simulator, and nowadays such devices are very capable. Originally, aircraft simulators were for procedural training such as checks, practice in Instrument Flying (IF), and dealing with emergencies such as failures of engines and

other aircraft systems. They were not liked by fighter pilots who always preferred to fly "the bird" rather than sit in "the box" and be bombarded with emergencies. However,

current fighter simulators are quite different, with wide-angle high-fidelity visual systems that can be used for low flying, aerobatics, practising for air shows and, of

Photo: L-3



Latest generation F/A-18 Tactical Operational Flight Trainer (TOFT) integrated with L-3 Link's SimuSphere visual system display



INNOVATIVE PARTNER FOR ARMED FORCES

With our comprehensive services and solutions we support the processes and capabilities of the armed forces and increase system reliability and efficiency – in all dimensions:

- ▶ Air
- ▶ Land
- ▶ Sea
- ▶ Cyber/IT

DEDICATED TO SOLUTIONS

WWW.ESG.EU



The graphic engines often come from the gaming sector, like the Sea Harrier Flight Simulator.

course, their real role of realistic combat training. Such simulators are even liked by fighter pilots, particularly young ones who have been brought up on computer games and expect a high-quality training aid with good visual fidelity. When such simulators are connected together in a network, we have a powerful training tool for combat conditions of all sorts.

Networking of simulators for multi-role training was started in the late 1990s by a team led by General Richard Hawley, then Commander of USAF Air Combat Command. This was so that aircraft in what he called a "force package" could have their simulators networked so that crews could be trained at home base rather than having to deploy. The US Distributed Mission Training (DMT) system was born and now it is straightforward to connect simulators for combined training, as long as the simulator is fitted with the network link. Nowadays, similar protocols can be used to include live aircraft in an exercise, so a mix of live and virtual training is possible, if this is required. In addition to RED FLAG there is now also the VIRTUAL FLAG series of simulator exercises, in which, for instance, instead of Australian fighters flying all the way to Nellis, their simulators back at home base can be networked into a multi-nation VIRTUAL FLAG exercise.

Once such a training network is established, it can be used for activities that are not possible in the aircraft itself. Conditions too hazardous to be practised in the real aircraft can be simulated and enemy action can be programmed in different ways so that responses can be first trialled and then optimised. In sum, the possibilities using networked training devices are endless. A further point is cost. Simulation is much less expensive than live flying, with cost ratios between 1:10 and 1:30, depending

on the type of aircraft involved and the sophistication of the simulator. Furthermore, when exploited to its fullest, the use of simulation may be able to extend the operational life of the live equipment by taking some of the training load, particularly in types of flying that fatigue the airframe, such as high-G combat.

Training For High-G

The one activity that the most sophisticated fighter simulator will not replicate is to produce the G-loadings that are experienced in air combat. However, pilots can wear their own anti-G suits in the simulator, and the simulator computer and an air pump can be used to inflate the G-suit to produce the same tactile cues as experienced in the aircraft, in response to computed G in the simulator. As G loadings approach 9, the limit for most high-G fighter aircraft, the simulator visual system can be used to produce effects such as tunnel-vision, followed by grey-out where the scene becomes black-and-white, and finally black-out where the scene disappears but the pilot is still just conscious before finally becoming fully unconscious.

For real high-G training, man-rated centrifuges are available from companies such as Austria Metall Systemtechnik and Environmental Tectonics in the USA. These can be fitted with cockpits and visual systems so that a realistic environment is experienced by the pilot, and training runs up to 9G or over can be carried out in a safe environment. In the real world, fighter aircraft have been lost to G-LOC (G-induced Loss-of-Consciousness). This condition is insidious, because after G is reduced the pilot still experiences several seconds of disorientation during which loss-of-control or impact with the ground can occur – hence the de-

sirability of centrifuge training before flight in a high-G fighter, with refresher training perhaps once per year.

It seems appropriate to finish with a summary of a recent symposium on training on the F-35 JOINT STRIKE FIGHTER. This pulls together the various threads mentioned above and puts them in the context of the most complex fighter aircraft yet produced.

F-35 Symposium at ITEC 2017

During this year's International Training and Equipment Conference and exhibition (ITEC) in Rotterdam, on 18 May there was a day-long symposium on the F-35 LIGHTNING II JOINT STRIKE FIGHTER. Currently in early production, the F-35 is to be operated by some 12 countries. As well as the USA, these include Australia, Canada, Denmark, Israel, Italy, Japan, The Netherlands, Norway, South Korea, Turkey, and the United Kingdom, and six nations have received their first aircraft.

The F-35 conference was billed as "A Cultural Shift in Training and Integration" and the first speaker was Air Commodore Robert Adang, Royal Netherlands Air Force (RNLAf), Deputy Director of the European Air Group (EAG – www.euroairgroup.org). This is headquartered in the UK and includes the Air Forces of Belgium, France, Germany, Italy, Netherlands, Spain and the UK, plus other partner and associated Nations. The logic is that we almost always fight in coalitions of nations, so interoperability of equipment between friendly nations is absolutely vital. An example is a €1M project to achieve interoperability between the simulators of member nations. Future air power will be information-centric, Adang said, and the fifth-generation F-35 is designed for the information environment and can be regarded as an

Photo: via author

"Information-Dominance Fighter". The old concept of Air Superiority can now be regarded as Information Superiority. In the future, the F-35 will constitute 18% of European fighter aircraft, and we need to integrate the other 82% so that they can inter-operate effectively. Using simulation, when simulators are networked for multi-national training, one does not need 100% realistic data on the aircraft and its weapons. A lower standard is acceptable because the networked exercise is more important than total realism of data in areas that are not vital to the exercise. This reflects almost identically the position of Lieutenant General (ret'd) Karlheinz Vier-eck, who was Deputy Chief of Staff Joint Force Training in NATO Allied Command Transformation (ACT) and said at an earlier ITEC in Cologne that in multi-national exercises, the multi-national aspect is more important than always insisting on the use of sensitive high-classification data that will limit the number of countries that can be involved.

David Scott is VP Business Development for Lockheed Martin Training in Orlando. He said that the F-35 cockpit displays had what he called "Sensor Fusion", in which a single Tactical Information Display is produced instead of the several different displays in earlier fighters. Also, automatic systems had been developed for carrier landings in the C version, and he quoted a success rate of 125 out of 125 into the wire without any "bolters". In the B version, which can hover, a single button switches to hover mode, and, unlike in the Harrier, automation allows easy control in the hover.

Some 90,000 hours have already been flown on 300 aircraft, and over 400 pilots have flown the F-35. After full deployment there will be 24 training centres worldwide, with 10 in the USA, 7 in Europe, 3 in Japan and 2 each in Australia and Israel. Lockheed Martin in Orlando manufactures the F-35 Full Mission Simulator with a dome-based visual, and Scott commented that, regarding simulator networking, the US Air Force Distributed Mission Operations (DMO) system and US Navy and Marine equivalents are in use, together with connections to the UK at Marham, the principal UK F-35 land base. More networking of F-35 training aids will follow.

Next, Lesley Jacobs and Edzard Boland from the TNO and NLR institutes in The Netherlands spoke on F-35 training in The Netherlands. Both full mission simulators and training aids embedded in the aircraft will be used, with networking between training aids. The live/synthetic balance was expected to start at about 60/40 in favour of live flying, but as force training

stabilises and experience is gained, the ratio will probably reverse to about 40/60, leaving mission simulators to take the main training load.

US Air Force Lieutenant Colonel Troy Havener spoke on integrated F-35 operations and pointed out that, that (what he called) a war of necessity" could be a surprise. Therefore we must be able to integrate smoothly with other nations in order to respond quickly and with efficiency. Live training cannot meet today's need, he said, and simulation must be (1) available, (2) current with the aircraft fit (3) of adequate

tween different systems must be as good as technically possible. One solution for training is a fast-jet centre in which there is a progression from Fighter Lead-In Training (FLIT) to training with other aircraft, then adding Red Air, finally progressing to the addition of the forces of other nations. Such a training centre should always be led by the military, he said, but can be supported and enabled by industry. Industry can even finance such centres and an example is the CAE-run helicopter training centre at RAF Benson in the UK that provides training from basic up to war gaming



Photo: CAE

CH-147F CHINOOK simulators of the Royal Canadian Air Force

fidelity for the training task, and (4) capable of being networked with simulators at other units for multi-aircraft training. He suggested that adequate data fidelity plus networking was better than modelling sensitive national data within just one simulator or at just one unit, the same point made by Air Commodore Adang. He pointed out that the US Distributed Mission Operations (DMO) system was available and network links like this should be used, and he suggested that using common security levels across networks is "easy", whereas being able to use differing security levels in an multi-national exercise without compromising security was a "Nirvana" to be aimed for. His ideal was integrated operational training including strike, air defence, recce, surveillance, and, of course, realistic enemy action.

Air Commodore David Waddington now works for the CAE company and pointed out that if the threat is urgent and you have to go into combat, information sharing be-

in a secure complex inside an operational Air Force station. CAE Benson has a Tactical Control Centre (TCC) for coordination of exercises, with external network links so that other aircraft types can be involved. Another example is the CAE training centre at Dothan, Alabama, which trains US Air Force and Army fixed-wing pilots. Finally, he announced a Working Group that will discuss training co-operation between industry and the military, to be held at the Royal Aeronautical Society in London in October.

Summary

This has been a quick overview of some aspects of fighter pilot training. It can be said that the potential for highly realistic training for many different combat scenarios has never been higher, thanks mainly to the availability of network links between the different training elements described above. ■

Securing Strategic Sites

Tamir Eshel

Facing escalating-, non-traditional threats, security and defence forces are revisiting security and preparedness concepts and strategies to adapt to new realities, dissolving boundaries that defined legacy security layers.

Traditional security defined specific regions for site protection – the site perimeter, defined by a physical obstacle (walls, fence, watchtowers and gates), that created a safe area inside the perimeter, and areas of interest beyond the perimeter that could provide early warning if certain conditions were met. Inside the perimeter,

insider threat attacks that pass traditional defences and compromise the protected area. Contemporary defences are also ill prepared to meet overwhelming attacks – from vehicle-borne attacks like ramming, or vehicle-borne suicide attacks to cyber threats. Both could be used exclusively or in synch with other attacks.



Photo: Airobotics

The Airobotics OPTIMUS autonomous drone and its "airbase"

certain areas could be further defined as high-security areas, employing additional physical obstacles, surveillance and access control means. Since adversaries were often inferior – in terms of numbers, intelligence and equipment, deterrence was based on the assumption that the adversary, as motivated as they may be, would avoid attack fearing penalty, overwhelming power or risk of death.

Such deterrence is still valid against conventional criminal threats, but is relatively ineffective against motivated terrorists launching cross-perimeter attacks by suicide bombers, rockets, mortars, drones, or

When assessing site vulnerability, attack scenarios should be considered not only based on the risk assessment of potential damage, but also the unpredicted – desperate refugees running over border crossing, or religious extremist terrorists that seek to gain media attention beyond normal proportions. Such incidents, for example, extended blackouts, water contamination, transportation or public services disruptions could quickly exacerbate out of proportion and have serious consequences to national security, as events in Latin America, the Middle East and Eastern Europe demonstrated in recent years.

Perimeter Protection

Considering the evolving threats traditional perimeter security should no longer be limited to the physical dimension, but complemented by sensors, automation and intelligence to augment and enhance the effectiveness and deliver threat warning as early as possible, even in challenging scenarios where perimeters or border lines pass through densely wooded area, jungle or crowded urban areas.

For most applications, the smart fence is still a mandatory security element that establishes both physical obstacle and an important 'tripwire' that would differentiate between innocent and suspicious activity. Beefed up with close-circuit television (CCTV) cameras and vibration detectors, smart fences provide a good solution for intrusion detection. When increased security is mandatory, video motion detection (VMD) using TV and infrared cameras, passive infrared sensors, motion detection radars and touch sensors are also used to detect tampering attempts. Each sensing method has its own advantages and weaknesses, but the fusion of several sensing methods through Physical Security Information Management (PSIM) systems can establish a comprehensive network that constitutes a credible security system with minimal rate of false alarms.

In applications that require users to establish high security with covert means a physical barrier is often replaced by a deeper 'sterile zone' created by covert sensors. These include highly sensitive seismic motion detectors, laser radars, passive infrared sensors and VMD. Enforcing access control in certain areas enables site security and safe zones through surveillance automation.

A smart, physical obstacle is not sufficient to provide security and it should be backed by efficient reaction by security guards or other means to escalate the response. Technology innovations are applicable here as well, utilising unmanned systems to augment or replace human intervention.

Robotic Guards

ROBOGUARD is an automated scout robot developed by Magal S3. It runs along secured fences, ensuring perimeter integrity and can respond promptly to intrusion alerts. ROBOGUARD consists of an



**SMART. SEALED.
SECURED.**

See us at
MILIPOL 2017
Booth D-60

**Advanced Security
Solutions for All
Scenarios**

RAFAEL 
SMART AND TO THE POINT ●

www.rafael.co.il

Photo: Noam Eshel



The AMSTAF ground robot from Automotive Robotic Industries (ARI) can be used for perimeter patrol missions.

Photo: Elbit Systems



Elbit Systems' Homeland Security - Incident Command Team Training System (HLS-ICTTS) simulates complex emergency scenarios.

autonomous unit travelling on a monorail and carrying several sensors. On routine patrol mode it travels autonomously, scanning and searching for perimeter anomalies or nearby suspected objects. As it runs closely to the fence, ROBOGUARD provides a detailed examination of the fence under all weather and visibility conditions. In response mode, ROBOGUARD rushes to a location where a suspected intrusion has happened, acting as a first responder. To maximise response rates, a network of ROBOGUARDS is deployed along the perimeter line. Earlier this year Magal delivered the first serial production batch of ROBOGUARDS to an Israeli Government agency that has become its lead customer. Different types of robots such as the AMSTAF from ARI are designed to patrol long borders. This intelligent vehicle carries a mission payload comprising sensors and effectors preparing the robot to deal with

most security alerts, react to real event as a first responder and delay intruders until the arrival of security forces.

Drones can also be used as response elements, as they can rapidly deploy over relatively large areas regardless of terrain. Ai-robotics is a developer of the first certified, autonomous, automated drone system. Deployed from specially designed docking stations placed within the secured perimeter, drones are dispatched on patrol automatically, monitored Beyond Visual Line of Sight (BVLOS) from the control centre. The drone provides the control centre with real-time insight into security and emergency situations, providing better situational awareness for decision support.

The fully automatic platform autonomously deploys and lands the drone and collects aerial data to be processed and analysed. Real-time aerial video and photos are delivered directly to personnel on the ground,

enabling more informed decision-making in times of emergency situations or during routine patrols.

Defence in Depth

Security systems designed to face contemporary threats are required to look beyond the perimeter, using sensors and technologies that can detect changes and inform intelligence officers about an evolving threat or alert the site's security of an imminent threat. Common sensors use traditional technologies such as electro-optical, radar and electronic surveillance, with a 'twist' of new technology using automatic processing and application of 'machine learning' to analyse routine data and spot anomalies that would indicate potential risks.

Dedicated sensors are required to cover vulnerable areas, such as forested areas impenetrable by radar or electro-optical sensors. To overcome such issues specialised foliage penetrating radars are used to enable penetration of few tens of meters inside a forest. Other solutions could employ ground based seismic sensors that would report on human activity in that area. To avoid false alarms by animal activity certain algorithms are used.

Enhancing the functionality of CCTV is also enabled by video analytic services, such as those provided by Agent Vi that enhances the safety and security of a protected site performing automatic detection of possible security breaches across perimeters and inner circles in distributed sites. At the core of Agent Vi's technology is its patented software architecture for distributed video analytics, called "Image Processing over IP networks" (IPoIP). This architecture distributes the video analytics task between the edge device (an IP camera or encoder) and a server (which may be located on-premise or in the cloud). Agent Vi has developed high-performance computer vision algorithms which include advanced machine learning capabilities for real-time event detection, video search and business intelligence applications. These algorithms perform with high precision due to their ability to accurately separate and classify various targets and objects detected in the scene, so that people, vehicles and static objects are classified and events detected according to the user's requirement. As a result, Agent Vi's solutions feature high probability of detection and low false alarm rates.

Protecting the Inner Zone

While the site perimeter zone attracts the highest attention, gates, communications and utility portals are the most vulnerable

elements in the security system, as their goal is letting traffic in and out of the gates. Main gates are often beefed up with obstacles and barriers to stop heavy trucks from ramming in, or prevent vehicle-borne suicide attacks (SVBIED) from hitting the check post.

Mifram Security, specialised in barriers and checkpoints is addressing this demand with a comprehensive range of products that includes fixed, deployable and mobile barriers, capable of stopping vehicles in temporary installations or gateways, even where permanent measures are not available. They also provide protected guard posts designed to intercept suspected vehicles while securing the guards.

When high throughput and high level of security are required, automated processing can be used to minimise traffic disruption. These can include pre-screening of vehicles and pedestrians, based on license plate recognition, specific vehicle profiling, and matching of vehicle and human biometric data. For individuals, cross-checking of biometric and document identification could establish an automated security processing, to establish high confidence of detection in a short time.

Since no security system is impenetrable, high security sites also enforce security measures inside the protected zone. Surveillance systems similar to those placed along the perimeter could also monitor activity inside the site, using elevated sensors in aerostats and drones, existing CCTV or WiFi communications services to track individuals or vehicles and verify each entity adheres to permitted access and functions. Identifying an insider threat is one of the toughest security tasks that can be achieved through the implementation of comprehensive, integrated PSIM. On top of the analysis of local activity, security officials could also employ artificial intelligence (AI) and cognitive computing to reach deep-insights for investigation, vetting and other security related activities. Such tools are provided by VoyagerAnalytics developed by VoyagerLabs, an AI engine that combines expert systems with deep-learning algorithms, to extract dynamic, real-time, and tailored insights into human behaviour by analysing massive amounts of publicly available unstructured data. By analysing content, connection and concepts it spots individuals, groups or topics that might present a security threat.

By their essence as security systems that act as a buffer between the protected organisation and the outer world, these systems are vulnerable to cyber attack. Even when using protected, robust networks, security systems are often vulnerable to attack, sim-



Photo: via author

SKYSTAR 110 light aerostat from RT provides elevated, persistent surveillance over a large area.

ply since they are installed outdoors and physically accessible to electronic attack. Cyber Security Event Management (SIEM) such as the OCTUPUS provides a converged physical and cyber security solution providing security details a real-time overview of security threats along with optimal standard operating procedures (SOP), to respond to unfolding events that may include physical and cyber events. Such systems collect data on user activity, from physical, cyber and safety and sensor systems, to detect and report anomalies. By fusing data from different sources such systems provide ear-

ly warning to incidents without sacrificing the organisation's operational agility. Unmanned systems, automation, AI, deep learning systems and cyber security are only few of the exciting new technologies now available to enhance site security. However, as security systems are evolving, they also become more complex to integrate, maintain and operate. To enable users to continue and operate such complex systems, the market could address this challenge with semi-automated solutions that integrate artificial intelligence to assist human operators in decision support. ■

Calming the Storm

Equipment for Riot Control

Doug Richardson

A video clip published on the internet during the recent DSEI 2017 defence exhibition in London claimed to show police brutality against protestors demonstrating against the event. But in practice, all that it showed were protestors being forcibly removed from the road leading to the exhibition grounds.

Viewers who expected to see batons, teargas, or rubber bullets being used would have been disappointed by scenes that seemed almost as ritualised as a Japanese Noh play – protestors trying to block access to the exhibition by sitting and lying on the road, only to be hauled to their feet and frogmarched away by the police.

Photo: Doug Richardson



LRAD Corporation's hand-portable LRAD 100X sound system easily outperforms bullhorns or vehicle PA systems, says the company. It offers high-quality sound at high volumes.

But not all protests are conducted in such a low-key manner. Individuals prepared to use violence in pursuit of their aims can create a dangerous public disturbance against authority, property or people, and invol-

Author

Following an earlier career in engineering, **Doug Richardson** is a defence journalist specialising in topics such as aircraft, missiles, and military electronics.

ing theft, vandalism, and destruction of property. Police and military forces need to be trained and equipped to deal with such riots by confronting such behaviour, protecting lives and property whose security is threatened.

DSEI gave "European Security & Defence" a chance to talk to some of the companies that produce the hardware needed for riot control, and most (but not all) of the equipment featured in this report represents a selection of those being promoted at the exhibition.

Anti-riot forces have traditionally used handheld ('bullhorn') or vehicle-mounted public address (PA) systems to communicate with demonstrators or rioters, but these suffer from low quality and limited range. A more effective approach is to use a high-powered communication system able to deliver clearly-intelligible messages at long range.

LRAD Corporation offers systems able to deliver high-quality live or pre-recorded sound messages, or to deliver a loud disruptive noise intended to curb hostile behaviour. Its smallest product is the hand-portable LRAD 100X, a 6.8 kg unit powered by an 8-hour lithium iron phosphate rechargeable battery and able to deliver sound levels up to 30 db louder than is possible with bullhorns or vehicle PA systems.

Designed for use on tripods or mounted on vehicles, the LRAD 450XL is a larger system, weighing 16.6 kg without accessories. It can be connected to any audio device with a headphone jack, while a USB cable allows downloading of pre-recorded audio files to the unit's MP3 player. It has a maximum range of up to 1,700 m in ideal conditions. An operational range of up to 500 m is possible in the presence of more than 88 dB of background noise.

Glock Audio used DSEI to promote two new lightweight acoustic systems – the LSA-X ultra-compact acoustic hailing manpack, and the CDL-136 drone-mounted loud-

Photo: Imperial Armour



Imperial Armour's ballistic helmet, face-guard, body armour, knee and knuckle protectors, gloves, riot shield, and baton would probably deter all but the most persistent of opponents.

speaker. Designed for mobile applications, the LSA-X weighs less than 5.8 kg and is designed to transmit high-quality speech over ranges of 500-1,000 m. It is powered by a lithium rechargeable battery and has a remote-control facility that allows it to be used from a concealed position or while on the move. The CDL-136 weighs 2.8 kg and was displayed on a quadcopter drone. It has a 20-minute operating time and is

Imperial Armour was promoting what it described as the South African Standard Anti-Riot Suit, the Delux anti-Riot Suit, and a Full Anti-Riot Set. Features of these included a helmet fitted with an anti-petrol polycarbonate visor, knee protectors, and knuckle protector gloves.

The Turkish company QVS offers a ballistic vest able to resist 9mm and .44 Magnum rounds. Optional additional pieces provide

timidate a crowd. Lines of officers tapping their batons on their shields can be quite frightening to unarmed civilians, particularly if the anti-riot force is advancing. Electrified batons and stun guns able to deliver immobilising, low-energy pulsed electric shocks have long been used for riot control, but the same concept is also used in longer-range weapons. The classic conducted electrical weapon (CEW) used

Photo: Milkor



Photo: PepperBall

Photo left: Despite the availability of multi-shot and rapid-firing anti-riot weapons, there is still a market for the more traditional single-shot weapon such as Milkor's 37/38mm STOPPER. Photo right: PepperBall's shoulder-fired TAC-SF can fire anti-riot projectiles in single-shot, three-round burst, or full-automatic modes.

designed to transmit high-quality speech over a range of 100-400 m.

Personnel tasked with riot control typically wear protective equipment, such as ballistic helmets, face visors, and body armour. These need to cope with the anticipated threat, while allowing the wearer enough mobility to perform his duties. While it is tempting to specify that the armour must provide protection from .44 Magnum rounds, several US studies conducted during the 1990s suggest that the most common weapon causing police deaths was the 0.38 calibre handgun.

The range of body armour offered by the UK company Jack Ellis includes three products that were singled out in response to our enquiries. The Enforcer zip-front quilted body armour weighs between 2.39-3.23 kg depending on size and level of protection. While the lightest variant is designed to counter knife and spike attacks, blunt trauma, and fragmentation, the heaviest version (UK HG2 KR2 SP2) offers protection from 9mm, .375 Magnum, and .44 Magnum projectiles. The Defender series was being promoted in versions for police and press use and consists of a base unit incorporating front, side, and back soft armour, but front and rear pockets (and optional side pockets) can house armour plates. Peacekeeper was a model initially designed to meet the requirements of humanitarian customers, but it also has police and military users. Additional auxiliary components provide protection for the shoulder, collar, lower intestines, and groin.

protection for the crotch, neck, throat and shoulders, while pockets at the front and back can accommodate plates, should a higher level of protection be required.

Riot shields are usually sized to cover an average-sized man from the top of the head to the knees. Normally made from transparent high-impact polycarbonate, a material that can be penetrated by low-velocity handgun and shotgun projectile, they can be used defensively to protect the user from thrown projectiles, and the splash from improvised weapons such as a Molotov cocktail. In the offensive role, they can be used to push back rioters.

For more severe threat environments, a bullet-proof ballistic shield may be needed. The Czech company OCZ has developed hand-held versions in a range of sizes ranging from the 400 x 500mm CZ 4M Police to the 1,000 x 530mm CZ 4M Panther. For situations where the highest level of ballistic protection is required, the 21 kg CZ 4M Attack is intended to cope with rifle rounds such as 7.62x51mm AP, 5.56x45mm SS109, and 7.62x54mm LPS Dragunov. Too heavy to be hand carried, it is mounted on a four-wheeled base and has a ballistic glass viewing port.

A baton or truncheon is one of the most basic weapons for crowd control or the dispersal of rioters. Available in straight, side-handle, and extendable forms, it normally takes the form of a club of less than arm's length, and it can be used defensively to block an attack or offensively to strike the arms or legs of the targeted individual. Batons and shields can also be used to in-

at range is the Axon (formerly Taser International) Taser. This uses compressed gas to launch two small dart-like electrodes designed to penetrate clothing. Both electrodes remain connected to the main unit by trailing wires used to deliver a pulsed dose of electrical energy intended to disrupt voluntary control of muscles by means of neuromuscular incapacitation (NMI).

First fielded in 2011, the TASER X2 Defender incorporates dual lasers, which show the user exactly where the electrodes will strike. It can also create a preliminary warning arc that may intimidate the target and remove the need to fire. The X2 also introduced a "back up shot" feature which allows the user to fire a second shot without having to reload.

Axon has also developed a long-range wireless electro-shock projectile called XREP (eXtended Range Electro-muscular Projectile). Designed to be fired from a 12-gauge shotgun, it contains a small high-voltage battery used to generate the pulsed energy required for NMI. An XREP projectile has a maximum effective range of almost 30 m.

Tear gas is a widely-used anti-riot incapacitant. It is typically composed of the chemical compounds chloroacetophenone (CN) and chlorobenzylidenemalononitrile (CS). These irritate the mucous membranes of the eyes, nose, mouth, and lungs, and can cause crying, sneezing, coughing, difficulty breathing, or even nausea and vomiting. But the effects are usually short-lived, allowing recovery within 30 minutes of exposure to the agent ending.

Pepper spray (more correctly known as capicum spray) is another lachrymatory agent. Its effects include causing the eyes to close, thus creating a temporary blindness. PAVA (pelargonic acid vanillylamide) is a synthetic capsaicinoid used as an incapacitant. Significantly more potent than CS, it primarily affects the eyes, causing closure and a severe pain reported to be greater than that caused by CS.

Anti-riot weapons typically use 37mm, 38mm, or 40mm rounds. They can be single-shot weapons (typically of break-open configuration) or multi-shot (typically of the revolver type). The munitions can be inert rounds intended for direct impact, or can carry a payload of washable or indelible paint, or an irritant such as CS.

As their name suggests, rubber bullets (sometimes termed rubber baton rounds) are rubber or rubber-coated projectiles intended to provide a non-lethal method of riot control. They can be fired from dedicated riot guns or fired from standard firearms in place of metal projectiles, and they are intended to stun or otherwise temporarily incapacitate their target, giving law enforcement officers a chance to subdue and arrest that person.

Normally fired from a 12-gauge shotgun, a bean bag round consists of a small fabric bag filled with lead shot. This spreads out in flight and distributes its impact over an area of about 6 square centimetres of the target. Super Socks look more like cloth socks than the traditional square bean bags. Often sewed or tied off in the middle, they may incorporate a rear-positioned streamer intended to stabilise their flight. Sponge rounds use projectiles made of a spongy material and can be fired from long range with increased accuracy and consistency.

All forms of direct-impact projectile rapidly lose velocity, so their capacity to create serious injury is diminished at ranges of 3 m

or more. According to a US Department of Justice study published in 2004, almost 10 percent of munitions fired at 3 m or less cause broken bones, the most common serious injury that could result from being hit by an impact munition.

Anti-riot weapons traditionally used a propellant such as smokeless powder to provide the projectile with the required impetus, but many more recent designs rely on compressed air or compressed gas. The Fabrique Nationale d'Herstal (FNH) FN 303 has become a classic weapon of this type. Constructed primarily of polymer, it weighs 2.2 kg and uses compressed air to propel projectiles out to a range of around 100 m. Its 15-round detachable drum magazine has a clear polymer back plate to provide a simple identification of the number of rounds remaining. The weapon is designed to produce a muzzle velocity of 86-91 m/sec, delivering a projectile intended to create a sufficiently dissuasive level of pain to temporarily neutralise a suspect up to a range of 50 m yet with minimum risk of causing a penetrating injury or collateral damage. Projectiles can be of the pure impact type or can include a secondary payload such as an irritant, or washable or indelible paint.

Originally an engineering project group within the US defence contractor Jaycor, PepperBall is now a division of United Tactical Systems (UTS). It currently markets a number of weapons that use high-pressure gas to eject anti-riot projectiles.

The VKS shoulder-fired launcher was designed to have the same look, feel and fire-control system as the AR-15/M-4 carbine. It can be switched from a mode that uses a magazine with a capacity of either 10 or 15 rounds, or a hopper with a capacity of 180 rounds. The gas pressure is provided either by a 13-cubic-inch tank in the butt-stock, or via an air line to an external tank. With VXR-series projectiles, it has an effective accurate range of 35 – 45 m.

By the end of 2017, the company plans to offer two new products – the shoulder-fired TAC-SF, and the TCP, a smaller weapon shaped like a handgun. The TAC-SF can be set to fire in semi-automatic, three-round burst, or full-automatic modes, with muzzle velocities of 85-100 m/sec. It is powered by a 30-cubic-inch 3,000 psi gas bottle underslung beneath the barrel and fires ammunition stored in a 180-round EL-2 hopper mounted above the weapon. Its total weight complete with the gas bottle and hopper is 2.85 kg.

Sized to fit into a moulded duty holster that can be comfortably carried on a standard duty belt, the 0.77 kg TCP has a semi-automatic action that uses CO₂ or nitrogen to launch round or VXR-shaped projectiles stored in a six-round magazine. Round projectiles are accurate to a range of 20 m, says the company, while VXR-shaped projectiles are accurate out to 50 m.

PepperBall's range of 0.68 x 0.72 VXR shaped projectiles include VXR (filled with



BCB International's FRAMM rifle stock allows firearms officers wearing a ballistic helmet with the visor lowered to use their weapon from any firing position.

Photo: BCB International



Photo: Streit Group

Rioters who try to seize the Streit Group's 4x4 Riot Control Vehicle will be faced with a smooth exterior offering no handholds and protected by a system able to release tear gas around the vehicle.



Photo: IAG

The RHINO ARMORED Crowd Control Vehicle is one of International Armored Group's range of riot-control vehicles. It can accommodate a crew of 2+10 and features gun ports and a turret with mounts for a 7.62mm or 0.5-inch calibre machine gun.



Photo: Katmerciler

A positive pressure system incorporated in Katmerciler's Toplumsal Olaylara Müdahale Aracı (TOMA) Riot Control Vehicle should ensure that riot-control agents such as tear gas do not leak into its interior.

inert powder and used as direct-impact rounds or for training), VXR CS, VXR CS/PAVA (armed with 1.25% CS/1.25% PAVA), and VXR Live-X (carrying 2.5 g of 0.25% PAVA). They weigh 3.5 g, hold a 2.5 g payload, and are colour-coded to indicate type. For example, the VXR inert powder round is purple, while the VXR Live-X is red.

Wearing a ballistic helmet with the visor fully lowered can make it difficult to aim a firearm such as a riot gun, so BCB International developed its FRAMM rifle stock. Launched as a new product at DSEI, it offers nine position settings that can be used to conform to a wide range of body and ballistic visor shapes. It is intended to allow firearms officers to use their weapon from any firing position.

A wide range of specialised vehicles has been developed for use by anti-riot forces. Typically, these will be armoured against small-arms fire and be able to transport a small group of anti-riot personnel. Some are equipped with a water cannon able to shoot a high-velocity stream of water intended to repel unruly crowds. Most modern water cannons are also capable of adding dye or even tear gas to the stream. A growing problem faced by police attempting to keep order at left-wing protests (or at counter-protests held in response to right-wing rallies) is what has become known as the 'Black Bloc' – militant individuals prone to use militant and often illegal tactics such as smashing windows, setting cars or other vehicles alight, and hurling projectiles at police, but who dress for anonymity (in black clothing, for example), and with their faces concealed by scarves or balaclava helmets. Spraying such people with a powerful jet of dyed water might allow them to be subsequently identified, even if they have abandoned their now dye-stained black garb.

The Streit Group's 4x4 Riot Control Vehicle is armed with two water cannons fed from a 6,000-litre water tank and able to release water infused with dyes, foams, and other additives. It has a smooth exterior intended to prevent rioters from mounting it, and it incorporates a tear gas duct system able to spray irritant around the vehicle in order to force rioters to retire to a safe distance. International Armored Group (IAG) markets its Armored Anti-Riot Truck as a way of moving a 2+10 man team into an area of concern. The vehicle incorporates gun ports and a turret that can be armed with a 7.62 mm or 0.5-inch machine gun. 76mm grenade launcher pods are reloadable from within the vehicle, and a front-mounted detachable hydraulic ram can be used to displace road blocks. The company's

Armored Water Cannon is available in 4x4 and 6x6 forms, and it has a throw range of up to 65 m. A water spray system is provided in order to protect the vehicle's roof, sides, tire shield, and underbody. Katmerciler's Toplumsal Olaylara Müdahale Aracı (TOMA) Riot Control Vehicle is armed with a water cannon, vehicle-top and underside sprays, and a bulldozer blade. Its cab is protected by a positive pressure system. The vehicle can carry 5,000 litres of water, 80 litres of foam, and 60 litres of dye.

Pakistan's Heavy Industries Taxila company based its PROTECTOR armoured security vehicle on a Toyota Land Cruiser chassis, adding lightweight composite armour to create a 4,700 kg vehicle that combines B7 level protection (the ability to cope with rifle-fired armour-piercing rounds) for a 2+6 crew with the manoeuvrability needed to operate in urban environments.

Penman's METRAS 4 x 4 has an all-in weight of 11,000 kg including a 3,300 - 4,126 kg payload. Suitable for roles including public order and border patrol, it provides STANAG 4569 L2 KE - 2A/2B protection for its 2+6 crew, but L3 protection can be provided by an appliqué field fit.

If the goal of protestors or rioters is to enter an area or facility of interest to them, perimeter security becomes important. Carefully positioned physical barriers can keep unwanted visitors out and allow security personnel to focus their activities onto entrances and known weak points. When DSEI moved to its current location at London's Excel Centre in 2001, protestors realised that there were only two ways into the site, and concluded that by blocking these they could prevent exhibitors and visitors from entering. What they failed to realise was that the limited number of entrances would increase the effectiveness of the police and security staff in maintaining legitimate access to the exhibition.

Interlocked crowd control barriers act as a physical and psychological barrier. Often used for crowd management at public events including political rallies and demonstrations, if locked together they cannot easily be toppled or broken through. However, their limited height will allow determined demonstrators or rioters to climb over.

A chain-link fence in which thick wire forms a characteristic diamond pattern is a widely-used security measure. Such fences are normally permanent, but temporary fencing consisting of free-standing self-supporting panels of chain-link, steel or wire, can be used to create a suitable barrier around the perimeter of a defended area. Concertina wire – barbed wire or razor wire formed in large coils which can

be expanded like a concertina – packs flat for ease of transport, but can be deployed from the back of a vehicle or trailer at a rate of about a kilometre per hour to form an obstacle.

Barricades set up across streets and the cry "To the barricades" have their place in left-wing folklore, but today's security and anti-riot forces can deploy such barriers with greater speed than would-be revolutionaries could ever hope to achieve. For example, the RIOT tactical vehicle marketed since 2010 by the Slovakian company Bozena can be used to create near-instant barricades. Based on a small wheeled vehicle with movable arms similar to those on a front loader, it carries

width from 4.5 m to 7.5 m – wide enough to block some city streets. Several could combine to block a wider thoroughfare.

The vehicle is also equipped with a small shielded platform that can be elevated to a height of 4.7 m. This can carry two people and can be fitted with payloads including spotlights, teargas dispensers, or a water cannon fed by a towed tank.

From his position in the vehicle's armoured compartment, the operator can use a video link to monitor what is happening on the other side of the shield. If anti-riot forces need to get past the barrier, the latter can quickly be lifted into the air. Faced with opposition barricades, the Bozena can use a front-mounted dozer

Photo: Bozena



Anti-riot forces can shelter behind the built-in barrier carried by the Bozena RIOT Tactical Vehicle while using its viewing ports and weapon ports.

a 4.5 m-wide shield armoured to resist 7.62x51mm projectiles.

The shield includes eight bullet-proof windows that allow visual observation and monitoring of the crowd situation and has firing ports suitable for anti-riot guns or other weapons. It can be extended in

blade attachment to push large obstacles out of the way. It all adds up to a high-technology approach that would have been unthinkable to Victor Hugo when he penned his account of 19th century barricades and anti-riot policing in the novel 'Les Misérables'.

CBRN Training and Simulation

Current Standards and Trends

Dan Kaszeta

Chemical, biological, radiological, and nuclear (CBRN) situations and environments can be caused by acts of warfare, accidents, or terrorism. CBRN operating environments pose distinct training and simulation challenges.

South Korean Army soldiers in a CBRN training exercise at a US Air Force base in South Korea.



Photo: Public domain image, US Air Force

Survival in CBRN environments requires use of equipment and procedures for protection, decontamination, medical care, detection and identification. Most of these procedures and pieces of equipment are not used very much, or even at all, in non-CBRN situations. Likewise, the normal tasks of fighting wars must not cease in CBRN

scenarios, so there is the added challenge of conducting non-CBRN tasks and using non-CBRN equipment under the demanding conditions of CBRN environments.

CBRN training is not a field where we have seen revolutionary developments in the last few years. Rather, we see occasional developments and often years of neglect as CBRN scenarios take a lower priority than the crisis of the day, which for the last two decades has generally been conventional warfare in places like Iraq and Afghanistan. As a result, the state of CBRN training varies widely from country to country, and within

militaries, from unit to unit, often at the mercy of commander's decisions to allocate training time and resources.

A trend worth mentioning is that of outsourcing. Early in this correspondent's career, there was very little outsourced or contracted CBRN training. However, numerous companies large and small have entered this field. One of particular prominence is Hotzone Solutions, a Netherlands-based company drawing on extensive expertise from former Organisation for the Prohibition of Chemical Weapons staff. In addition, the various manufacturers of CBRN

Author

Dan Kaszeta is Managing Director at Strongpoint Security Ltd.

equipment provide a higher degree of training on their products than in the past. Both recent and long-term technical developments have made CBRN training easier to conduct. Many of these developments occurred for other reasons and have had important, even if sometimes indirect, benefits for CBRN training. There have been gradual improvements in respirators and protective clothing. Weight, field of vision,

ism in protective equipment is easy; the suit and mask feel exactly the same in clean air as in toxic air. Likewise, decontamination is much the same, whether you are cleaning off harmless dust or radioactive particles. The hardest issues with realism are in detection and identification. But this is also the area where the most interesting developments in CBRN training and simulation have occurred.

In previous decades, CBRN detection equipment was often restricted to highly trained CBRN specialists and was complex to operate, requiring extensive operator training. The overall trend in chemical and radiological detection equipment has been a very strong movement towards lighter, easier to operate, and (often) less expensive equipment. Biological detection lags behind in many ways, and it is less affected by these trends. Chemical and radiological instrumentation is generally more rugged and resistant to abuse now than it was in the past. Fewer chemical detectors contain radioactive sources, which drove intensive security and accountability paperwork that often left the detectors locked in a vault when units trained. The general idea in many militaries now is to proliferate detection equipment far and wide in the combat forces, not just to specialist CBRN teams and units. The largest example of this trend is the US Joint Chemical Agent Detector (JCAD), produced by Smiths Detection in both the USA and UK. It is estimated that almost 100,000 JCADs have been fielded by the US military in a major step-change over previous fielding plans.

These trends in detection development have had generally positive effects on training. On the one hand, infantrymen and artillery crews have new items of equipment to use and train on, as detectors migrate out of specialised units into infantry platoons and onto tanks and other armoured vehicles. More importantly, however, the newer detectors are often very easy to use. It takes less than an hour to make someone proficient in the use of the JCAD, and a simple five-minute orientation can get a user up and running with the basic functions of the detector.

Another technical trend in instrumentation has been great improvements in simulation of CBRN detection and identification. Using simulants i.e. (chemicals that have a similar signature to the agent in question) has long been a method of confidence testing and training with detection instruments. For example, the chemical methyl salicylate has long been a simulant for Sulphur Mustard, as it presents a similar signature to many types of chemical warfare detectors. It is worth noting that Hotzone Solutions (men-

tioned above) has fielded a set of chemical warfare simulants so well crafted that they will fool nearly every instrument on the market, so much so that customers are advised to be cautious storing and travelling with them lest they cause false alarms. Using simulants over wide areas, however, is neither economically nor environmentally acceptable. Their use within confined spaces may also present challenges. A significant trend over previous years has been towards virtual simulation, by electronic means, of chemical or radiological materials. Biological detection remains a slower than real-time process, so there is less work done in this arena. As radio waves travel in a similar way to gamma rays, use of small radio transmitters to simulate radiation hotspots is not new, but the early systems were cumbersome and difficult to use. Advances in electronics and digital communication make it far easier to set up simulated contamination zones and provide realistic detection readings on instruments. GPS coordinates can be tied to specific instrument measurements to simulate large areas of contamination.

The industry pioneer in this "virtual detection" world is a UK company called Argon Electronics. They produce a wide variety of simulators that physically mimic actual detectors from many of the major instrument manufacturers, including Thermo Fisher, Canberra, Smiths Detection, Proengin, and Environics. For example, their simulated Smiths Detection LCD 3.3 detector feels, looks, and behaves just like the actual product, and it gives realistic readings. Their PlumeSIM™ technology is a training system to simulate Live and Virtual wide-area hazards and is capable of integration with systems such as eSIM's Steel Beasts Pro and SAAB's Gamer. Argon has established a reputation as the leader in this particular niche, and their products are in use around the world. Argon has rivals in this sector, including the UK-based Safe Training Systems, which primarily does radiation detection simulation. They appear to have less market penetration in the military market. Others are active in this sector. A relatively new Dutch company, Prometech, takes a different approach to this problem. Their CBRN Response Simulator applies software that uses off-the-shelf smartphones and tablets to mimic the displays on various detection instruments, an approach Argon has taken with PlumeSIM-SMART. While there are obvious sacrifices in realism using this approach, it also allows for training without the actual instruments involved and does not require hardware purchases. USA-based HazSim uses a technical approach that is roughly in between



Photo courtesy of Argon Electronics and UK MoD

LCD/JCAD simulator training at the UK Defence CBRN Centre

breathing resistance, and heat burden have all been reduced in recent generations of protection technology. Many protective suits have a longer service lifetime and can be reused. Many can be laundered. The days when chemical suits needed to be saved for wartime and not used for training should be gone for good. This means that CBRN training and exercises can be conducted with the actual gear that one is expected to wear to war. Improved clothing means less heat stress and better visibility for the soldiers or emergency services personnel involved, leading to fewer accidents and injuries. Given the same environmental conditions, training can be conducted for longer with less physical stress on the participants.

Realism is always a problem in CBRN training, but one of varying difficulty, depending on which aspect of the CBRN operational environment one is trying to simulate. Real-

the Argon and Prometech approaches: HazSim fields a generic detector-like device that simulates a gas monitor, which can be programmed as part of a wireless network. However, this product appears geared towards emergency services users rather than military CBRN customers. These are relatively new approaches that merit further observation. Such approaches could easily be adapted into military environments were there to be sufficient demand.

teaching emergency services personnel. The US Army moved its CBRN training to Fort Leonard Wood, in Missouri, in the late 1990s and built a new CDTF there, which trains thousands every year, from across all of the military services and allied partners. The USA does not have a monopoly on live agent training. Canada has the ability to use small amounts of actual chemical warfare agents at their Experimental Proving Ground at CFB Suffield, in Al-

important aspect of simulation that has relevance to training. Part of CBRN response, in both military and civil settings, is to understand the behaviour of CBRN materials in actual scenarios. Since CBRN training rarely, if ever, actually releases CBRN materials in real-world scenarios, then there is a clear need to model such releases. Large efforts, often internal to government agencies and laboratories, are being expended to improve the ac-



Photo: US Army Public Domain Image

Training with actual VX nerve agent at the US Army's Chemical Defense Training Facility in 2013

Saab, in Sweden, has developed simulation capabilities that use its Automated Warning and Reporting System for inputs. This is more a virtual tool for command post exercises, but is useful nonetheless. Bruhn Newtech, well known for sensor integration and software for warning and reporting, has products that are as useful in exercise settings as they are in real world scenarios.

Regardless of the advances of simulants and electronic simulations, there is a role for training with actual CBRN materials, as long as it is done safely and in a controlled and secured environment. The use of small, licensed radiation sources is relatively easily done by government agencies and authorised users. However, use of actual chemical warfare materials is much harder to achieve. The USA has long been a pioneer in this arena, having set up its Chemical Defense Training Facility (CDTF) at Fort McClellan, Alabama, in the 1980s, using Sarin and VX to train US military personnel. That original facility still soldiers on, despite the closure of Fort McClellan,

berta. The Czech Republic has their well-respected facility in Vyškov, which is used by various NATO members, and it uses a wider variety of chemical warfare agents than the US facilities. Notably, Hotzone Solutions has access to this facility for countries and agencies that need to outsource their live-agent CBRN training. This goes a long way towards helping nations get access to this level of training without the serious difficulty of establishing such facilities themselves. It should also be noted that numerous fire training facilities around the world use chemicals such as chlorine and ammonia for hazardous materials technician training, and such training facilities are occasionally underutilised by military CBRN responders.

Another area of effort that is worth mentioning is that there have been significant improvements in computer modelling of CBRN situations. Once the domain of manual calculations, pencils, and templates, computer modelling of CBRN is now standard in most places. This is an

curacy and capability of these models. Many of the best products in this category are government-produced software packages, such as the US military's Hazard Prediction and Assessment Capability (HPAC), which has evolved over twenty years. CATS, CAMEO and ALOHA are also US government software products with widespread uptake, and all have been used in various training exercises. Literally hundreds of software packages, both well known and obscure, exist in this market. An exhaustive listing of them is beyond the scope of this article.

As a final note, it is important to reiterate that none of this new technology has benefit if units and commanders do not emphasise CBRN training. If CBRN training is neglected or is a belated afterthought, as has often been the case, then the above-mentioned technologies and products cannot bring any value. The best CBRN training is that which actually happens and is not just a bullet point on the annual training report. ■

Technology Driving Increased Simulation Fidelity

Trevor Nash

The use of virtual simulation to replace live training has been underway for a number of years. The challenge in trying to balance the virtual domain with that of the live domain has generated much heated debate but modern training syllabi view the growing use of virtual training as the way forward.

According to Dan Brockway, VP Marketing at VT MAK, virtual simulation can be described as, "The use of simulation to immerse a person in a 3D synthetic environment to engage in learning experiences. The principle of virtual simulation is to use first-person interactive scenarios and environments that reflect real-life situations to train, experiment, and study."

Expanding upon the training aspects of virtual simulation, Brockway said, "Virtual simulation is preferable to live training in cases where it is too expensive or too dangerous to practise with live people and equipment. Virtual simulation also affords the possibility to create training scenarios that would be difficult or impossible to set up in the real world."

Clearly beneficial, how does the military evaluate the correct balance between the two training domains?

"The UK took a little bit of a punt on 50/50 quite a few years ago," former Royal Air Force F-35 Lightning commander Air Commodore Harvey Smyth said recently. "That was for many reasons, some of which were financial. But since then we've done a lot of analysis to underpin that. I charged the team: 'Do not be skewed by 50/50. Do the work objectively, and then let me know what it pans out to be.' And, near as dammit, it came out at 50/50."

But the RAF is not unusual in adopting a 50:50 live-virtual split. Others, notably for type training, devote over 85% to virtual training in the full mission simulator and other lower order training devices. A case in point is the Royal Australian Air Force's 33 Squadron at RAAF Base Amberley that trains crews for the KC-30A MRTT aircraft. This approach is also mirrored at RAAF Base

Photo: Northrop Grumman



In December 2016, a demonstration for the first time successfully proved distributed simulation capability by connecting a RAAF KC-30A Multi-Role Tanker Transport simulator with a C-17A Globemaster III simulator at RAAF Base Amberley and a Northrop Grumman test laboratory located in Orlando, Florida.

Richmond for C-130J training conducted by 285 Squadron.

Looking in more detail at 33 Squadron, type training for the KC-30A currently includes 70 hours in the simulator and just three flights in the actual aircraft. This model is likely to change and become more radical in the future as the RAAF looks to adopt a zero-flight time approach and conduct all type training in the simulator.

In the US, which accounts for over 65% of the world's spending on military simulation and training products and services, the US Navy's Simulation Master plan calls for an increase in virtual training. For example, MH-60R virtual training is set to grow from a baseline of 39% in 2012 to 48% by 2020 and the EA-18G from 20% to 34%.

The reasons behind this move towards more reliance on virtual training within the simulators may be considered under the three headings of economic, operational and technical. After briefly considering the

economic and operational aspects of virtual training, this feature will concentrate on the technical drivers affecting improved fidelity and its associated realism within modern virtual training devices.

In terms of economics, virtual training is patently cheaper. For example, to fly a Block 50 F-16 for one hour costs between \$7,500 and \$24,000 depending on what is amortised. According to Rockwell Collins, the operation of a full mission simulator would cost around \$900 per hour.

The increased safety of using simulators also impacts economics. Crashing a simulator costs nothing but crashing a F-16 has serious consequences.

Another cost factor arises when conducting large-scale exercises that require all elements of a composite air group to be brought together. Bringing together specialist capabilities such as air to air tankers, airborne early warning, strike, suppression of enemy air defence and air defence air-

Author

Trevor Nash is the Editor of "Military Training & Simulation News" (MTSN) and provides simulation and training consultancy services to industry and government organisations.

craft for training exercises is expensive and wasteful of resources as the aircraft may have to be taken away from operational tasks. There is also the question of airframe fatigue and costly maintenance to consider. This, in part, is why exercises such as Coalition Virtual Flag have become so popular.

"The benefits of conducting this training in a virtual environment include enormous cost savings over live-fly, enhanced security, greater participation through distributed training networks, a larger scope of operations, greater ability to reproduce contested-degraded-operationally limited effects, expanded multi-domain play through space and cyberspace, and significant inclusion of coalition and joint players," explained Colonel Geoffrey Weiss, Commander 552nd Air Control Wing, USAF at Kirtland AFB.

Turning to operational aspects, the latest generation of combat aircraft, such as the F-35, are "driving new training methodologies and changing the whole ball game," said Dave Scott, Lockheed Martin Rotary and Mission Systems VP Business Development. "This is due to the extreme range of the aircraft's sensors and weapons and the inability of current live ranges to cope with the performance envelopes of such aircraft."

Scott added that there are also security issues with potentially hostile nations "being able to monitor the aircraft during live training". Together, these are leading to the greater use of virtual training for such aircraft.

Before looking at the technical aspects of virtual simulation, most notably visual and motion systems, it is worth considering how virtual simulation is used across the air, land and sea domains.

An analysis of sales of simulation systems and services over the past five years in respect to monetary value indicates that around 66% are used for aviation, 16% for joint training, 9% for land and 6% for naval training. The remaining 3% are unspecified. It is little wonder therefore that the portfolios of the major simulation and training companies such as CAE, Lockheed Martin, Rockwell Collins, Thales and Rheinmetall Defence Electronics are heavily weighted towards the air sector and as such, this sector will form the focus of this feature.

Perhaps the major part of Brockway's "virtual immersion" process is created by the visual system; this comprises the image generator, its associated database and the visual display that includes the screen and projector system. Historically, visual systems have been very much proprietary designs, but with the adoption of PC-based



Photo: DoD Australia

C-130J Full-Flight Mission Simulator during Exercise Coalition Virtual Flag 2015

architectures and commercially available graphics cards, modern systems have a much smaller footprint, are more reliable and generate extremely realistic images.

One area where visual systems have not really advanced is in terms of standardised databases that allow a database to be transportable and used on different image generators. In the US, CAE has developed the common database (CDB) that enables all such databases to run on CAE's MEDALLION 6000 image generators. Although this is of benefit to users that have such hardware, CDB does have its detractors.

For example, co-founder and President of visualisation specialists MetaVR, W. Garth Smith said that, "The portable source initiative or US Navy PSI, is for us the most practical [database standard] as it denotes source data in very heavily supported commercial formats often times by companies whose sole focus is not in the DoD space such as ESRI. As we see it, CDB is used by the originator as a gatekeeper to access content by [those] originators. As the source is not included, you are beholden to process their format, in other words, it is their interpretation of the data."

MetaVR provides the VRSG image generator that is used in a number of programmes throughout the world.

MEDALLION 6000 is an extremely popular image generation system and may be considered as one of the top-end and top-selling offerings, which also include the Rockwell Collins EP-8100 and the Flight-Safety International VITAL 1100. As well as military applications, these image generators are also used for commercial airline training applications and may be certificated to Federal Aviation Administration Level D standards. These certification standards are often applied to military multi-engine aircraft, examples being the RAAF's C-130J and KC-30A simulators mentioned above.

One visualisation company to gain traction since being acquired by Havelsan in 2016 is Quantum3D. The company's latest success is in Turkey where it is to supply its IDX 8000 image generator and MANTIS database generation software for use on the TAI T-625 OZGUN flight simulator.

"Helicopter simulation is one of the most demanding applications from a visual system perspective," commented Brian Overy, Quantum3D's Vice President of Business Development and Sales. "We are excited to be a part of this programme with TAI, and this only adds to the momentum of success we've been seeing recently as the emerging visual platform of choice in the rotary-wing segment."

The choice in the image generation market is extensive. The widespread availability of increasingly powerful graphics processing units (GPU) from companies such as NVIDIA and computer processing units (CPU) available from the likes of Xeon as well as easy-to-use database creation software that is supplied by companies such as Presagis means that integrators can, in theory at least, create their own visual solutions. Another trend is the development of games technologies for use as discrete image generators; a case in point being Bohemia Interactive Simulations VBS IG and the company's soon-to-be-launched VBS Blue IG.

Like many of the higher-end image generation systems, VBS Blue IG provides a rendition of the whole world that enables the user to gain flexibility both for training and mission rehearsal.

As discussed earlier, visualisation also includes the provision of display systems and, just as for image generation, major technological improvements have been underway in this sector as well. Cathode Ray Tube (CRT) technology has been eclipsed by digital light processing, liquid crystal on silicon,

light emitting diode and laser technologies to provide customers with a wide array of choices.

So-called 4K resolution projectors are now widely available from companies such as Barco, Sony, JVC and Canon. In the US, for example, Boeing is working with JVC on its Constant Resolution Visual System (CRVS). The system is currently being used on a number of simulators, including the F-15, F-16 and F-22.

"Boeing has been in the business of developing visual display systems for air superiority fighter simulators since the days of domes and terrain boards," said Rick Roth, Boeing's manager of visual systems. "The CRVS is a logical successor in the evolution from domes to the highly successful VIDS product line. Customer demand for lower life-cycle cost and increasing optical resolution led to the introduction of the CRVS in 2008. The company continues to develop CRVS variants to address a spectrum of customer cost and performance requirements. We have a motion-based variant in work that has grabbed the attention of some in the low flyer community. The CRVS was designed with an inherent upgrade path to increased optical resolution and brightness, with 20/20 being a development priority. In the meantime we are excited to offer the CRVS in a new baseline configuration that is capable of 20/25 resolution, an improvement over the current 20/40 resolution system with no increase in our catalogue price."

One of the most well-known projector suppliers is Barco. In 2015, Barco divested its Defence and Aerospace division to Esterline, resulting in the establishment of another player in the already crowded displays market. Today, Barco supplies projection systems to Esterline and markets its own F-series projectors that were acquired when Barco bought Norwegian company projectiondesign.

Barco's top-of-the-range projector for simulation is its laser-phosphor F70. The 4K resolution projector has been specifically designed for the simulation market and this, said the company's VP Simulation, Dave Fluegeman, has clear advantages.

"The F70 is not a general projector that has been re-purposed for simulation," he explained. "Unlike many general purpose projectors offered to the simulation market today, the F70 was built specifically for the market. This not only means it has a number of specific features to answer the market's specific requirements-including



Photo: TAI

Quantum3D's IDX 8000 image generator is used for the TAI T-625 OZGUN flight simulator.

smear reduction, dual input WQXGA 120 Hz and optional IR goggle stimulation – but also that special measures have been taken to make the projector as rugged as possible in order to withstand the harsh treatments on a motion platform."



Photo: Barco

The F70-4K8 from Barco is a laser phosphor projector with up to 4K UHD resolution.

The other area where technology is helping to improve the fidelity of training simulators centres on motion and haptic feedback. Like the surpassing of CRT technology in the visual display sector, hydraulic-based motion platforms have been superseded by electro-mechanical solutions in the motion sector.

One of the major players in this sector is E2M. The company was founded in 2007 by former lead engineers from FCS Control Systems. At that time, there was only one provider of level D electric motion systems, Moog. E2M entered the market in 2009 with a new generation of electric motion systems that offered, said the company, "simulator integrators a better solution for their motion needs".

Customers of E2M include CAE, Elbit, Rheinmetall Defence Electronics, Indra, ST Electronics and AMST.

"The clear requirements from the market are realistic motion cues, durability, reli-

ability and good support," said Ton Stam, E2M's International Account Manager. "E2M has responded with leading edge human perception based cueing technology, ultra-durable and reliable systems and first-class diagnostics combined with true 24/7 global support. A major development in motion technology is the simplification of the electro-mechanical actuator and electronics. Without complex hydraulic/nitrogen and pneumatic integrated weight compensation systems, the actuator consists of a minimum amount of parts. Using exclusively COTS electronics, the maintainability of the system further improves. Other advances are in the software field; human perception based motion cueing algorithms are currently being developed to increase the realism of the simulation and optimise the use of the available workspace. As motion systems have become more of a commodity item, reliability, cost of ownership and after sales support have become increasingly important for both simulator integrators and end users. E2M has focused on these areas since the start of the company 10 years ago."

In conclusion then, the virtual simulation market is very active at the present time as military budgets continue to be strained and the pressures to replace live training with virtual training continue. Although the so-called live-virtual debate was prevalent a decade ago, the argument seems now to have been won with more and more training now taking place in the virtual simulator.

Such devices continue to offer increasing levels of fidelity, primarily in the areas of visualisation and motion cueing, and this trend is set to continue. As to the future, augmented reality – blending 3D hardware with virtual images – will enhance training still further however, such technology, and its use in relevant training applications, is still in its infancy. ■

Danish Defence Industry 2017

Jørgen Bo Leimand

Some people would consider describing the Danish defence industry an easy task as there are not too many companies in this field. However, when it comes to the process of being involved in defence programmes in Denmark, either as a domestic or a foreign supplier, the description of this process is quite complex and some might fall into a trap and some do. Lately, even Boeing was dissatisfied with the fighter selection process and is now preparing a case in the Danish legal system.

Denmark has never had a large defence industry (it currently ranks as the smallest of the four Nordic countries), and therefore the decline of defence equipment associated with the end of the Cold War did not have a major impact on Danish industry. In 1997, for example, the total Dan-

of the Confederation of Danish Industry. The smaller companies (small and medium-sized enterprises (SMEs)) are also member of The Center for Defence, Space and Security (CenSec). However, some companies are members of both organisations. This might be due to the

manufacturers of naval defence equipment have formed an umbrella organisation, Naval Team Denmark, which also includes, as associate members, a number of foreign suppliers to the Royal Danish Navy. Again you might notice that members of FAD and CenSec are



Photo: wikipedia

The Danish Standard Flex Concept comprises a combination of standard platforms and different exchangeable weapon and system modules to match different missions or roles. Since the 1990s it has been used in all new classes of ships built for the Royal Danish Navy such as the IVER HUITFELDT Class frigates.

ish defence industry output totalled only US\$166.6M, with US\$103M in exports, and the defence industry employed only 1,300 people. Danish defence companies are generally small and look to find success as niche suppliers.

There are approximately 100 companies and consultants involved in the defence industry, mainly focused on high-technology equipment and built to blueprint. The major companies are members of The Association of Defense Manufacturers in Denmark (FAD), which is a member-based organisation under the aegis

fact that FAD is more politically oriented in relation to industry politics while CenSec tries to stimulate innovations for the SMEs. This can also be seen in different visions. FAD is focused on acting as the point of contact for all foreign defence equipment suppliers who seek to do business with Danish defence and aerospace companies. Meanwhile, CenSec is focused on developing business networks among SMEs within the defence, space and security industry as well as adjacent high-tech industries.

In addition to those two organisations,

also members of Naval Team Denmark as they do not want to miss a business opportunity.

Naval Team Denmark was formed as a response to the international interest caused by the innovative and trend-setting Standard Flex modular concept and its application in the fourteen Standard Flex 300 units. In the course of time, focus has also been on many other advanced naval systems offered by Naval Team Denmark members, systems that are not directly linked to the application to the Standard Flex concept but have proved competi-

tive and applicable to other types of naval ships. However, it is noteworthy, that the modular idea is still reflected in several naval ships and might be used in new development programmes.

Industrial Cooperation

Whenever the Danish Armed Forces procure new defence equipment, the Danish Business Authority may oblige foreign suppliers to collaborate with Danish companies in the area of defence, in order to secure Denmark's essential security interests. This is called industrial cooperation. This term might be better understood if

National Defence Industrial Strategy. This strategy states; "As a small country, Denmark is dependent on the procurement of competitive defence equipment on the European and North American markets. However, it is necessary for Denmark to have at our disposal certain competitive industrial competencies and capabilities in the field of defence in Denmark which are strategically important for the protection of Denmark's essential security interests." The strategy includes descriptions of how in times of crisis Denmark must be independently capable of maintaining key systems, equipment and materiel. In other words – security of supplies.

specific assessment and must be related to the specific procurement or corresponding defence equipment. Industrial cooperation can involve both the procurement of subcontracted work provided by Danish companies and development projects conducted by Danish companies.

The Danish Business Authority verifies that foreign suppliers comply with the International Cooperation Contract (ICC), and the Danish Business Authority pre-approves development projects between suppliers and Danish companies before these projects are initiated.

Industrial cooperation is based on "Guidelines for Industrial Cooperation in Denmark", the "National Defence Industrial Strategy" and the "Agreement on the Administration of Industrial Cooperation". The Danish industry is to be consulted in key matters of principle.

The JOINT STRIKE FIGHTER

On 28 May 2002 the US and Denmark signed an Agreement on the JOINT STRIKE FIGHTER. For Danish industry participation is of great importance. The Danish defence industry may be small in size as mentioned above, but they are great in performance and great in quality. They know very well that they will have to be competitive and to excel to get their share of the work. The opportunity to get access to valuable business opportunities and to further develop business relations with American industry, sharing knowledge and technology will strengthen the industry in both countries. This has certainly been acknowledged by Danish industry and it has been demonstrated by their contribution to the financing of participation in the development phase which is in itself an exciting cooperation between the Danish armed forces and Danish defence industry. Denmark has recently decided to acquire 22 JOINT STRIKE FIGHTERS. By this decision, Danish Defence Industry enters into a new era like the one when Denmark back in 1975 selected the F-16 for the Royal Danish Air Force. At that time defence industry had more or less to start from scratch. Today the defence industry is at a very high level of competences in respect to technology and workmanship.

Reflections

When the offsets programme started after the acquisition of the F-16 fighter aircrafts around 12 companies were involved in those programs and only a couple of those survived. Mainly, because they started their own development of defence



Photo: ESD archive

F-35 test support by a Royal Danish Air Force F-16BM

the term "off-set" is used. For years there was a long debate about using this term and as a compromise it is now called industrial cooperation. Whatever you call it, it is an expensive exercise for the taxpayers as this obligation in some cases might imply a 10 per cent or more increase to the price tag. However, it has for many years been an acceptable mechanism as the politicians can tell the voters that they will receive something in return when expensive defence equipment is bought. With that said, the Danish Business Authority manages industrial cooperation in close collaboration with the Ministry of Defence, which assesses national security interests, and with the Defence Acquisition and Logistics Organization (DALO), which is responsible for issuing calls for tender and procuring defence equipment. The official purpose of industrial cooperation is to ensure that the Danish industry has the competencies and capabilities, which are required for the protection of Denmark's essential security interests. These security interests are described in the

Danish companies in the field of defence manufacturing have to collaborate with foreign suppliers of defence equipment in order to maintain and develop the required competencies and capabilities. For this reason, the Danish Business Authority can require foreign suppliers of defence equipment to enter into industrial cooperation.

This will apply if the Danish Ministry of Defence, in assessing a specific procurement, deems industrial cooperation necessary for the protection of Denmark's essential security interests and if the Danish Business Authority assess that such an obligation will not distort the competition on the civil markets. This is of importance in order to adhere to the EU regulations.

The Danish Business Authority stipulates the terms of the industrial cooperation obligation in a contract between the foreign supplier and the Danish Business Authority. The industrial cooperation must concern defence equipment within specific strategic technology areas, as stipulated by the Danish Ministry of Defence based on a

equipment and did not use the offset programmes as cash cows.

Some of the companies died a “learning curve” death as they had to compete with companies who had already been producing the offered equipment for some time. It was not enough to bid low and then survive on engineering change proposals.

Today you see SMEs entering the defence market but they do it based on an in-house expertise which they can offer to system houses looking for skilled subcontractors. This is an intelligent way of doing business as the defence market is quite volatile and dependant on political decisions.

The Danish Prime Minister has put forward the idea that the Danish defence industry could benefit from the so-called EU defence fund also known as the European Defence Action Plan (EDAP). Although Denmark is outside the EU defence agreement this should not be binding for the industry. This could be an important message for the Danish SMEs as a particular emphasis is put on helping SMEs, which in many Member States remain the backbone of the national defence, to gain access to finance. Representing the most vulnerable part of the defence supply chain, SMEs constantly require fresh capital for new investments but mostly do not benefit from the necessary funding to further scale up, which ultimately hinders

them to successfully integrate into the defence supply chains.

The Way Forward – an Example

I use CenSec as the example for a way forward. CenSec is the prime cluster for SMEs in the Danish defence industry. CenSec stays abreast of the latest development in the industry, new opportunities and the latest research help the members navigate the large number of rules and regulations that have to be taken into account when joining this line of business. One of CenSec’s main objectives is to help the industry to explore new opportunities and in the process perhaps gain new business partners and thereby new ideas, as new ideas are formed when people meet and network.

Now CenSec is focused on the business opportunities that are waiting to be discovered within the areas of dual-use technology. Dual-use is about getting the best from the civilian and the military industries using the same technology for different purposes.

For a long time it has not been possible to sell technology made for the military in a civilian context as it was considered trade distorting because the military products had an advantage due to the offset-agreements. Lately, however, the tides have changed,

and dual-use has become “the new brand” of the defence industry as the European Commission launched it as a new business model in 2013. The business model aims to bring together civilian and military solutions, so that the same technology can be used for more than one purpose. The idea is not new – technology made for the military (and vice versa) is already in use in the civilian market. The new deal is, that it is something worth striving for instead of something that just happens by chance.

Conclusion

On purpose I have abstained from promoting one Danish company over the other. It might be their own responsibility, making themselves known and offering their skills to those foreign companies who want to do business in Denmark. When you look at the laws and directives, which govern this specific area it is well understood that some companies stay away as they postulate that it is 80 percent hard work and 20 percent turnover. I will close this article with Dwight D. Eisenhower’s famous words: “In the councils of government, we must guard against the acquisition of unwarranted influence, whether sought or unsought, by the military-industrial complex.” ■

New Brochure

MITTLER REPORT



Defence Technology Review 3/2017

Defence Technology for German Land Forces

Content:

- Mission and Capabilities
- Combat Vehicles
- Tactical Vehicles
- Infantry
- Effect
- Support

Published in cooperation with the
Association of the German Army

108 pages, English, **€14.80** (incl. VAT, plus shipping)



MITTLER REPORT VERLAG GMBH Baunscheidtstraße 11 · 53113 Bonn, Germany
Fax: +49 228 35 00 871 · info@mittler-report.de · www.mittler-report-shop.de

Danish Cooperation Led to International Success

Danish-based IT company Systematic has delivered command and control solutions to the Danish armed forces for more than 30 years. This remarkable collaboration became the first step on the road to similar success in the international market, most recently with sales to the US Army.

Photos: Systematic



Michael Holm, founder and CEO of Systematic

Systematic started entirely as an IT company in the Danish language and in Denmark, but has since developed into a major international enterprise. Systematic has sold command and control solutions to the Danish armed forces since 1985 – and what really started as a small-scale consultancy assignment has become a company with a staff soon to number 900.

According to Systematic founder and CEO Michael Holm, it has been an exciting journey in which the key words have always been quality and creativity.

“Right from the beginning, our working relationship with the different branches of the Danish armed forces has been on the basis of an open business strategy, emphasising close cooperation in the development and testing of systems. It’s a really good way to work. The solutions get better and our customers get the products they really need,” explains Michael Holm, continuing: “A close relationship with the customer means we get a detailed, in-depth understanding of the whole organisation’s practical needs and requirements, from

■ IRIS

The IRIS Suite has revolutionised military messaging and interoperability in modern defence forces with its range of off-the-shelf software products. The software suite is combat proven and has become the de facto standard in NATO member nations for interoperability and military messaging using agreed international Message Text Format (MTF) standards. IRIS has been in service for more than 30 years, and is used by more than 100,000 military operators in over 40 nations as part of numerous Command & Control (C²) and Military Messaging Handling Systems (MMHS).

the individual soldier on deployment to the commander back at headquarters. That’s why we work closely with many of our



SitaWare Edge is an Android based battle management system for the dismounted commander at the tactical edge. Designed for operational simplicity it provides the commander with fast and clear Friendly Force Tracking (FFT) picture, shared tactical situation and latest intelligence overlays thereby enhancing force protection.

defence customers on ideas, development and testing, as well as hiring employees with military backgrounds to work in the Systematic development department.”

Purchased by the US Army

Systematic supplies the IRIS military messaging solution and the SitaWare command and control solution to the Danish armed forces. IRIS is a solution that is currently in use in about 50 countries, including all the NATO states. SitaWare is a command and control system that gives soldiers at all tactical levels better situational awareness, easier collaboration, better security and more effective communication. The solution is currently in use by 26 countries, and in the spring of 2017 the US Army also signed up for SitaWare.

Cooperation within a smaller home market, like that in Denmark, brings with it a lot of valuable lessons. Michael Holm says “Quality is a key word when delivering command and control systems to a military organisation such as an army. Regardless of the size of the country or the defence budget, the solutions must work under mission-critical conditions – you simply cannot compromise on quality. In this context, cooperation with a smaller home market and other countries with limited defence budgets can often be of benefit to the larger markets. Small markets and budgets are often forced into less expensive, more creative solutions. This results in price-sensitive, high-quality solutions – which both the home market and larger international markets can benefit from. Smaller nations often face the same tactical, logistical and management challenges as the larger nations with bigger defence budgets – they are just forced to think in terms of alternative ways to tackle those same challenges. And this all contributes to moulding new, highly creative solutions.”

Standardisation + Simplicity = Scalability

Being cost-conscious is an ongoing principle at Systematic. Both IRIS and SitaWare are therefore highly focused, high-quality, efficient and user-friendly product ranges whose purpose is to provide essential as-

■ SitaWare

SitaWare is a unique command and control system currently in use in more than 25 countries. The system provides soldiers at all tactical levels with a series of powerful C2 tools, helping warfighters to achieve better situational awareness as well as greater operational security. SitaWare is a fully developed, ready-for-use product. SitaWare enables units from multiple nations to work together on joint missions, because it can exchange information with other countries' C2 systems, using recognised international standards for information exchange. SitaWare features open architecture that makes it possible to integrate a wide range of existing systems and specialised technologies, as well as making it easy to adapt SitaWare to specific requirements.

sistance to the soldier at all levels. At the same time, compliance with international standards is always high on the agenda. "Combining standards-compliance and simplicity gives you scalability. This is the



SitaWare Frontline is a breakthrough in battle control software that offers clarity, simplicity and high performance that addresses real world command and control challenges at the front line. It has been designed by and for front line commanders in tough environments, where a clear operational view with rapid updates of Friendly Force Tracking (FFT) is absolutely essential and has been built with deployment and in-theatre management in mind.

International standards are a constant focus in Systematic development work; for example, the Multilateral Interoperability Program (MIP) international standard is incorporated into SitaWare, and ADatP-3, US-MTF and other standards feature in the IRIS product suite. Artillery Systems Cooperation Activities (ASCA) are incorporated into the new SitaWare digital fire support module – which was actually developed in

– even in areas with no Internet access or mobile phone signal, giving troops a better overview of their own positions, along with greater safety and security.

"Software that provides soldiers with better safety and security has been among Systematic's core products for many years, and we're pleased that we're continuing to take big steps in this field, both here in Denmark and internationally. Security is essential to any military unit, and at Systematic our ultimate goal is to deliver software that makes a positive difference for any soldier," concludes Michael Holm.



SitaWare Headquarters is a powerful and scalable C4I system that offers an accessible, easy-to-use yet comprehensive toolset that can significantly increase operational flexibility and reduce deployment time while providing extensive interoperability capabilities.

formula for the best IT solutions on the market, and pivotal for Systematic products. Cooperation between countries is of increasing importance in all this, and this means IT solutions must be configured so that they can communicate with each other."

cooperation with the Danish armed forces, and which the Danish army has adopted. Another field of activity developed in cooperation with Danish soldiers is SitaWare Frontline. This software allows soldiers in vehicles to communicate easily and quickly

■ About Systematic

Systematic A/S, established in 1985, develops software and system solutions to customers in both the public and private sector. Today, the company is the largest privately owned software company in Denmark, with solutions sold to customers in 50+ countries. More than 500,000 people worldwide now use Systematic solutions and services. The company has almost 900 employees and is headquartered in Aarhus, Denmark, with offices in Copenhagen, Australia, Finland, France, Germany, New Zealand, Romania, Singapore, Sweden, the United Arab Emirates, the United Kingdom and the United States.



KADEX 2018

V INTERNATIONAL
EXHIBITION OF WEAPONS
SYSTEMS AND MILITARY
EQUIPMENT

23-26 May 2018, Astana
Republic of Kazakhstan

Organizers:



office@astana-expo.com
office@kadex.kz

+7 7172 524 233
www.kadex.kz



Urgency in the Middle East

Regional Air Forces Are Re-equipping

Alan Warnes

Right now, there is a lot of political uncertainty in the Middle East. Iran, Islamic fundamentalists and Yemen all pose big questions for governments and their air forces in the region. Lessons are being learnt and big ticket procurement deals are trying to face up to current and future issues.

The threat of Islamic fundamentalists, largely from Islamic State (IS) and al Qaeda, and their affiliates has made many states very nervous. They do not want Syria and Iraq-like scenarios unfolding in their backyards.

More Cooperation

Air Forces know they must be inter-operable, under a single central command. The Gulf Co-operation Council (GCC), made up of KSA, the UAE, Oman, Qatar,

if Iran complies with the January 2016 Joint Comprehensive Plan of Action (JCPOA), underwritten by the UN Security Council, and its nuclear capabilities are declared as peaceful. Iran will be able to modernise its tired inventory and China, with Russia,



Photo: Ministry of Foreign Affairs, Germany

In July 2015 the P5+1 states (China, France, Russian, the United Kingdom, the United States plus Germany), the European Union and Iran agreed on the Joint Comprehensive Plan of Action (JCPOA) on the Iranian nuclear programme.

This led to the Kingdom of Saudi Arabia (KSA), the UAE, Jordan, Kuwait and Bahrain working alongside Western militaries starting to attack IS in Syria in December 2015. At the same time, KSA led a local coalition into Yemen. After the Yemeni government was ousted in September 2014 the coalition started a campaign of air strikes against the Iranian-backed Houthi forces, starting in April 2015. Once again, this included jets from KSA, the UAE, Bahrain and Kuwait, as well as Morocco and even Sudan.

Author

Alan Warnes was the Editor of *AirForces Monthly* from 1998-2010 and is now a freelance journalist based in the UK.

Kuwait and Bahrain recognise this, and it is their goal to model themselves on the NATO structure. However, as one leading Air Force Chief in the region told ESD "There is working together and there is being inter-operable, where you have the same tactics, and where the personnel have same standard operating procedures."

Progress has been slow and political fallout with Qatar in June 2017 threatens to break the alliance: Qatar has been accused of having close links with Iran and for funding terrorism, which it denies. After the jihadists and Yemen comes the big problem of Iran, and not just because of state-sponsored terrorism; there is now a real prospect of Iran re-arming with modern, more sophisticated systems after decades of sanctions come to an end. This will come about by October 2023 at the latest,

would be more than willing to sell in what could be some big purchases.

So, it is against this backdrop that regional air forces are re-equipping. Not surprisingly, KSA, with the biggest military of all, leads the way.

Fighters

Interoperability with their close US allies is the biggest factor, and means the bulk of the budget will go to the USA. As with most of the deals announced by Uncle Sam, they "allow for greater interoperability with US forces, providing benefits for training and possible future coalition operations in support of shared regional security objectives." That sums the situation up, even if the UK, Italy and the French have managed to pick up a small share by selling Eurofighter TY-PHOONS, HAWKS and RAFALES to their

traditional allies in the region. While the type of fighters the six GCC countries are buying might differ, one important piece of

this year, “instead, we are concentrating our efforts on sustaining the aircraft until 2030/40.”

that Russia planned to develop a fifth-generation light fighter, based on the MiG-29, with the UAE.

Meanwhile, the Royal Bahraini Air Force (RBAF) looks set to acquire 19 Lockheed Martin F-16V Block 70 fighters, after a DSCA announcement on 8 September 2017. The deal is valued at an estimated US\$2.785Bn, with the APG-83 AESA radar being the jewel in the aircraft’s crown, along with a new modular mission system which will see the cockpit go all-digital with three multi-function displays (MFDs). State Department approval was also announced for the upgrade of the RBAF’s current fleet of 16 F-16C Block 40 and four F-16D Block 40 aircraft to the F-16V configuration, at an estimated cost of US\$1.082Bn. Bahrain has been looking to acquire new fighter aircraft for some years to replace its ageing F-5E/F TIGER II fighters and supplement the existing F-16C/D Block 40 aircraft. The Eurofighter TYPHOON had also been a candidate for the requirement.

The Kuwait Air Force (KAF) has not let the grass grow under its feet either. On 5 April 2016, the Kuwaiti Ministry of Defence signed a deal with Italy’s Finmeccanica (now Leonardo) for 28 Eurofighter TYPHOONS, covering 22 single-seat and six twin-seat aircraft. The inter-governmental agreement between the two also includes the training of an initial eight KAF instructor pilots, together with ground personnel, in co-operation with the Italian Air Force’s TYPHOON Operational Conversion Unit at Grosseto. Part of the contract is an upgrade of the ground-based infrastructure at Al Salem Air Base in Kuwait, where the

Photo: RSAF



Eurofighter TYPHOON of the Royal Saudi Air Force

equipment they will all share is the airborne electronically scanned array (AESA) radar, with all its advantages.

The Royal Saudi Air Force has a fighter force currently made up of TYPHOONS, TORNADOS and F-15S STRIKE EAGLES. However, this is being boosted considerably, due to a US\$29Bn purchase of 84 brand new F-15SA EAGLES and the upgrade of the 68 surviving F-15S STRIKE EAGLES. The aircraft will be equipped with the Raytheon APG-63(v)3 AESA radar, Lockheed Martin Low Altitude Navigation and Targeting Infrared for Night (LANTIRN) TIGER-EYE Navigation Pods, and Lockheed Martin AN/AAS-42 Infrared Search and Track (IRST) Systems to track aircraft providing any kind of infrared glow, from fuselage, engine and systems, while the pilots will use Joint Helmet Mounted Cueing Systems (JHMCS). There will also be a UTC Aerospace DB-110 reconnaissance pod capability and a host of cutting-edge weapons including AIM-9X air to air missiles, AGM-84 SLAM-ER and JDAM/GBU bombs.

While the first few F-15S STRIKE EAGLES have been upgraded in Boeing’s St Louis facility, the remaining jets are receiving attention at AlSalam Aerospace Industries, at Riyadh International Airport.

With these 152 cutting edge fighters, coupled with the 72 Eurofighter TYPHOON aircraft the RSAF will have a capable fighter force ready to take on any challenge.

The UAE Air Force and Air Defence (UAEAF&AD) meanwhile battles on with its 77 F-16E/Fs fighters which have been in service since 2004. They have been used extensively over the years, and play a major part in the UAEAF&AD’s Yemen operations. There appear to be no upgrade or acquisitions in sight, with a Lockheed Martin spokesman telling the author earlier

While the UAE has been looking towards a replacement for its fleet of 62 MIRAGE 2000-9 aircraft for several years, it seems to have turned to the Russians for a solution. During Abu Dhabi’s last International Defence Exhibition (IDEX 2017), Rostec Chief Executive, Sergei Chemezov told reporters that work would start on developing a light fighter with the UAE next year. Both countries have apparently reached an initial agreement on the next steps of the ambitious programme, which would continue UAE’s quest for technology transfers throughout its defence industry. The numbers being considered was not announced, but later, on April 20, Russian trade minister Denis Manturov said the talks involved the possible acquisition of “several dozen” of the type. Chemezov also stated at IDEX

Photo: Lockheed Martin



77 F-16E/Fs fighters are in service with the UAE Air Force and Air Defence (UAEAF&AD).

KAF TYPHOONS will be based. The order, worth up to €8Bn, will see the Italian-built fighters equipped with the latest Tranche 3 (P3EB) standard and the new CAPTOR E-Scan AESA radar. Integration of the BRIMSTONE 2 air-to-ground weapon, METEOR

Force (QEAF), moving from an inventory of nine MIRAGE 2000-5 to 24 RAFALEs and 36 Boeing F-15QAs. Clearly, a significant threat is envisaged. In May 2015, the Qatari Government signed a €6.2Bn deal for 18 single-seat and six twin-seat RAFALEs, with

UAE. It is cleared to fire HELLFIRE missiles, Roketsan CIRIT 2.75in laser-guided rockets, GBU-12 500lb (227kg) and GBU-58 250lb (114kg) PAVEWAY II laser guided bombs. ARCHANGEL comes equipped with the L3 Wescam MX-15D electro-optical/infrared (EO/IR) imaging and designating turrets and Denmark's Terma provides the modular aircraft self-protection equipment (MASE).

A new contender to the ARCHANGEL, is L3's AT802L LONGSWORD which was displayed at Paris Air Show in June for the first time. Fitted onto its ten hardpoints under both wings was a HELLFIRE precision attack missile, LAU 19 launcher capable of firing 2.75in laser guided rockets, 500lb GBU-12 laser guided bombs and Dillon 30 calibre gunpods on both wings. Two Mk 82 500lb general purpose bombs were positioned on two of the three centre pylons. Also fitted is a MX-15D HD EO/IR turret with laser designator.

The Yemen conflict has highlighted several weaknesses in the coalition's progress and many of the lessons learnt are now being addressed. One is satellite communications for helicopters operating a long way from the operations centre: with the radio often not having the required range, the UAE has fitted satellite communications on its NorthStar Aviation Bell 407MRH Multi Role Helicopters that are being used in Yemen, where to date one has been lost. At IDEX 2017 an example was seen modified with a SATCOM system on top of both weapon pylons. Hughes' Defence and Intelligence System Division (DISD) had recently won a contract with NorthStar to supply its Helo-Sat system, essentially a 360 degree Beyond Line of Sight (BLOS) SATCOM capability, that can transmit HD video. A spokesman told ESD: "It will allow the helicopter to send imagery recorded with its FLIR STAR SAFIRE 260 EO/IR system (or 380HD which is the current UAE requirement) back to the Ground Commander from up to 500 miles (800kms) away," adding "It gives the helicopter an ISTAR (Intelligence Surveillance Tracking and Reconnaissance) capability." These kinds of technologies are now common on many helicopters and fixed wing aircraft in the region, as the ISTAR capability is a top requirement for most in the fight against terrorism - it is not just about fighters and bombs. This is why so many countries are investing in the Beechcraft King Air 350ER which is one of the most common ISTAR aircraft in the region. Fighters and ISR aircraft working together, by data-linking imagery or information, is the way the world is moving and recent acquisitions in the Middle East underline this trend. ■



IOMAX delivered 24 ARCHANGEL Border Patrol Aircraft (BPA) to the UAE between July 2015 and March 2017.

Beyond Visual Range Air to Air Missile (BVRAAM) and STORM SHADOW cruise missile will be standard on P3EB, although the weapons being acquired by Kuwait have not been announced. However, unlike the RAF and Italian Air Force examples, the KAF aircraft will be fitted with SNIPER advanced targeting pods rather than LITENING. The KAF TYPHOONS will be assembled at Leonardo's production line at Turin-Caselle, with deliveries planned between 2019 and 2023.

A second major fighter deal for the KAF is the acquisition of 40 Boeing F/A-18E/F SUPER HORNET aircraft, at an estimated cost of US\$10.1Bn. The order, which was announced on 17 November 2016, will comprise 32 single-seat F/A-18Es and eight twin-seat F/A-18D SUPER HORNETS, equipped with Northrop Grumman AN/APG-79 AESA radars. They will initially work alongside the KAF's ageing legacy F/A-18C/D HORNETs before eventually replacing them.

Unlike the other five GCC nations, the Royal Air Force of Oman (RAFO) acquired its new fighter fleet prior to 2015/6. Eurofighter TYPHOON aircraft are now being delivered, having been purchased on 21 December 2012. They join 25 F-16C/D Block 50 fighters that were acquired in two batches, with deliveries completed in 2008 and 2014.

The biggest planned expansion of any local air force is that of the Qatar Emiri Air

Force (QEAF), moving from an inventory of nine MIRAGE 2000-5 to 24 RAFALEs and 36 Boeing F-15QAs. Clearly, a significant threat is envisaged. In May 2015, the Qatari Government signed a €6.2Bn deal for 18 single-seat and six twin-seat RAFALEs, with delivery expected in 2018. While these will be equipped with the RBE2 AESA radar, other sensor fits will include the Elbit TARGO II helmet-mounted cueing system and the Lockheed Martin AN/AAQ-33 SNIPER Advanced Targeting Pod, which will also be carried by the QEAF aircraft, the first RAFALE customer to order the pod. This contract was followed up on June 14 this year, with an announcement that the QEAF would acquire 36 Boeing F-15QA (Qatar Advanced) STRIKE EAGLE aircraft, a variant of the F-15E tailored to Qatari requirements. The US\$12Bn deal will also include US-based lead-in-fighter-training for the F-15QA.

Irregular Warfare

Away from the conventional air power, there is a growing requirement for irregular warfare assets in the shape of slow moving close air/counter-insurgency support aircraft. It is seeing crop dusters like the AIR TRACTOR and THRUSH COMMANDER being converted into bunker busters, and this is a trend set to continue. The UAE has purchased 24 ARCHANGEL Border Patrol Aircraft (BPA) from Florida based IOMAX. Based on the THRUSH S2R-660 agricultural aircraft, the company delivered the ARCHANGEL between July 2015 and March 2017 to complete the 48 armed Intelligence Surveillance Reconnaissance (ISR) platforms ordered by the

"We continue to invest in the finest technical minds to develop new solutions"

Photo: Revision



Interview with Alex Hooper, Vice President Global Sales & Business Development, Revision Military

Advanced laser protective solutions: Revision has the technical and operational capabilities to develop custom laser protective lenses that not only protect against specific laser threats, but also maintain superior ballistic protection.

Snow Glare Lens: Based upon user feedback, Revision developed a Snow Glare Lens, specifically designed to prevent snow blindness in extreme conditions.

ESD: What are the other core competences and business fields of your company?

Hooper: Beyond eyewear, Revision has continued to rapidly innovate in other soldier integration areas, to include helmets and head systems, power management and tactical communication headsets.

- **Helmets and Head Systems**

Revision developed Batlskin® to provide improved head and facial protection against blast, fragmentation, blunt impact and ballistic threats. Built around an ultra-lightweight polyethylene ballistic shell, these helmets offer enhanced integration capabilities with existing and future head-borne devices, and the lack of parasitic weight optimises the balance between lethality, protection, and mobility. Revision's pioneering mandible attachment completed the head system loop, providing total face and head ballistic protection. In fall of 2015, Revision Military started supplying UK soldiers with a new head sub-systems kit as part of the Virtus programme. The custom head protection solution, known as the BATLSKIN COBRA PLUS, is the lightest, most adaptable system ever made, providing premium head and face protection. Additionally, Revision continues to disrupt the market with custom helmet solutions built to customer specifications. With vast technical capabilities with materials and manufacturing methods, Revision has the distinct ability to develop a helmet solution to match specific weight and threat targets. This has led to advanced helmet contracts with

the Danish Army, UK Army and most recently, the US Army where Revision was selected as the supplier of the new ACH Generation II helmet, offering a solution 24% lighter than the legacy ACH.

- **Power Management**

In February 2014, Revision entered another new and exciting arena – Power Management. Advanced, electronic battlefield equipment – networked radios, night-vision systems, GPS, smart phones, and laptops – has the potential to bolster situational awareness and enhance communication for units operating in unstable environments. Revision is intent on improving the functioning and reliability of these devices in the field with a comprehensive Power Management solution – NervCentr™. This project comes with the challenge of sustaining power for these devices for long durations without adding weight and unnecessary intricacy. The need for integrated power management systems that provide flexible storage and adaptability to a wide range of mission scenarios is widespread and growing, especially with increases in mobile-ready tech and wearable tech. Boosted energy storage, delivery, harvesting, and sharing is the next frontier for future soldier solutions.

- **Tactical Communications Systems**

The SenSys ComCentr2™ Tactical Headset System marks Revision's entry into the communications and hearing protection market. This headset combines technological advancements in tactical communication and hearing systems, and improves command, control and communication. The system's Active Noise Reduction (ANR) feature reduces distracting high volume, low frequency noise to protect hearing, prevent fatigue and improve communication. ANR goes beyond simple noise limiting and active hearing protection offered by currently fielded headsets. With four microphones (two forward facing and two

ESD: Revision has a well-established relationship to the German Bundeswehr. Can you describe this success story?

Hooper: Revision has had an especially influential relationship with German Armed Forces over the years. In 2008, German troops deployed in Afghanistan encountered increased threats to the eyes and face in the field. This was identified as a critical vulnerability in need of a solution. As German forces sought an intervention, they discovered that not all protective eyewear is made equal. The durability, reliability, and proven protection of Revision's eyewear stood unmatched. Revision was awarded a protective eyewear contract to meet this pressing demand. The performance of Revision's eyewear has only strengthened this relationship over time, and, to date, Revision has delivered over 248,000 pieces of protective eyewear to the German Army. Revision has been proud to equip the German Army since 2010, when we first started delivering our durable, proven protective eyewear. We were selected based upon extensive German Army requirements and extensive user trials. In 2016, we were chosen to remain the incumbent eyewear provider. We are dedicated not only to providing the German Army with the best protective eyewear, but also continuing to innovate new eyewear solutions for the German soldier. These include:

rear facing) instead of the traditional two microphones, the system offers 360° situational awareness enabling true directional sound: The system's 3D spatial communications feature enables users to hear vital communications as they would in the real world. Sophisticated 3D audio processing allows for natural feeling speech as if someone was standing to the user's left or right, reducing cognitive burden and improving intelligibility. Being a digital headset instead of a traditional analogue system, the ComCentr2 increases speech intelligibility, improves comms signal and reduces potential failures and latency. The system's software can be upgraded and customised based on the user profile, offering an upgrade path and mitigating product obsolescence. Electronics in ear cups allow full audio enhancement even when the wearer dons only the headset without control unit as a standalone device. The ComCentr2 headset is USB compatible, enabling the headset to connect with devices such as smartphones and computers.

As a company, Revision has expanded in both scope and reach by adding new innovations in a variety of markets and providing equipment to a growing contingent of NATO countries. German forces'



Revision's BATLSKIN CAIMAN™ Head System suite has been designed to incorporate additional technologies and capabilities, as shown here with the new SenSys ComCentr2 Tactical Headset System and Ballistic Protection Eyewear.

tant for the modern soldier.

ESD: Can you name reference customers for the individual areas?

Hooper: Revision's reference customers are the US Special Operations Command, Canadian Special Operations Command, UK Army, US Army, US Marine Corps, US

tozol. We have a state-of-the-art helmet manufacturing facility that we recently expanded and upgraded with the latest equipment to make ultra-lightweight polyethylene helmets. We continue to invest in the finest technical minds to develop new solutions and advance our capability.

ESD: To what extent do head protection systems and energy management fit together?

Hooper: With the digitisation with NVGs, requirement and desire to reduce weight, and the requirement to ensure that the soldier's equipment must be as capable as possible, it is a natural fit for the head systems and power management to work together. As we move closer to the vision of a fully integrated soldier, we must evaluate how we can utilise the helmet to enhance this capability. We have started the exploration of a powered helmet platform to allow for plug and play for a variety of devices to provide a whole new level of capability for a product that otherwise would be an additional weight burden.

ESD: What are your options for further developing these technologies?

Hooper: It's clear there is an increasing requirement for advanced battlefield com-

Photos: Revision



Revision's BATLSKIN CAIMAN™ Head System suite – a Ballistic System (left), a Carbon Bump System (middle), and a Carbon Bump System with Ballistic Appliqué – are lightweight and scaleable, and they are tailored for the intense demands of Special Operations missions.

protective appeals were certainly not an anomaly in the global market; this demand has proven to be uniform. With a recent expansion to the UK, Revision is set to elevate and deepen its European presence, progress its capabilities and knowledge-base, and advance the effectiveness of protective equipment in the modern battlefield. Revision sees the soldier as a system, and each technological advancement has integration as the primary goal – the integration of power, protection and communications are exceedingly impor-

Air Force, the Danish Military, the Dutch Military and the German Army.

ESD: What distinguishes revision head protection systems in comparison to systems of the broad competitive environment?

Hooper: We will relentlessly work with our customers to understand requirements, and deliver a protection solution that meets their needs, as opposed to selling an off-the-shelf product. We achieve this with a dedication and expertise in material science, manufacturing methods, and testing pro-

munication, and the ability to provide what is currently delivered in an NVG or on a mobile phone into an HUD. This further emphasises the potential for integrated soldier protective solution that can provide a spectacle with more function, a helmet that offers a platform for enhanced soldier capability. Revision has integration expertise and is constantly looking to partner with companies with compelling and technological expertise that we can integrate.

The interview was conducted by Waldemar Geiger.

Business Perspectives for European Defence Industry in Latin America

Harry Campbell

For the European defence industry exports are imperative. The years of domestic demand being able to sustain the industry are long gone.

Aside effect of this is ongoing industrial consolidation, both in a national and multinational context. There is another factor that has to be taken into account as well, that is the increasing level of international competition in the industrial sector. It is not just about US and European companies any more, sophisticated defence requirements can be met by a large number of international companies. With no apparent shortage of defence companies capable of meeting any con-

article is to discover how Latin America fell from grace as a defence market and how it might be on the verge of emerging once more as a key defence market for European companies.

Historical Experience

There was a time when nobody in Europe would doubt the size of the Latin American defence marketplace. The experience of Dassault with its MIRAGE series of fight-

IIIEV/DV and then 25 MIRAGE 5/MIRAGE 50.

Latin America was also a major submarine market for Germany with Howaldtswerke Deutsche Werft (HDW), now part of thyssenkrupp Marine Systems (TKMS), selling to seven different countries. Argentina took two Type 209/1100 boats, Brazil four Type 209/1400 boats (plus a modified Type 209/1400 built in Brazil), Chile had two Type 209/1400L, Colombia acquired two Type 209/1200, Ecuador had two Type 209/1300, Peru took two Type 209/1100 and four Type 209/1200, while Venezuela took two Type 209/1300 submarines. Over 60 Type 209 submarines have been built since the early 1970s, making this the most successful European conventional submarine class of the modern era. What is notable is that Latin American customers accounted for more than a third of Type 209 submarine orders.

These figures for combat aircraft and submarine acquisitions demonstrate how significant the Latin American defence market once was. But for various reasons, Latin America was seen as a virtual disaster area with very little to attract the interest of defence suppliers. That opinion began to change in 2001 when the major financial institution Goldman Sachs came up with the idea that the economies of Brazil, Russia, India and China (BRIC) would by 2050 be amongst the most important world economies. Later South Africa would be added to the four BRIC countries who were then referred to as the BRICS countries.

By 2007 the Goldman Sachs BRIC thesis was that the Gross Domestic Product (GDP) of Brazil, as determined in constant 2006 US dollars, would rise 968% between 2006 and 2050, in value terms that would be US\$1,064Bn in 2006 to US\$11,366Bn in 2050. At that point Brazil would be the number four economy in the world. This study showed Mexico as the number five economy in the world in 2050, with its GDP having risen 997% since 2006, in value terms that is from US\$851Bn in 2006 to US\$9,430Bn in 2005. According to Goldman Sachs the top ten world economies in 2050 would be China, US, India, Brazil, Mexico, Russia, Indonesia, Japan, the UK and Germany.



Photo: FAB

The Brazilian Air Force (FAB) was forced to cancel its F-X MIRAGE III replacement programme in 2005, instead acquiring 12 ex-French Air Force MIRAGE 2000C aircraft (shown here). Eventually under the F-X2 programme FAB signed a contract for an initial 36 GRIPEN E/F in 2014.

ceivable defence requirement, what of the customers? The Middle East and Asia represent the two major export marketplaces where everybody wants to be, but one market area that was once treated with the same importance is now, with certain notable exceptions virtually ignored: Latin America. For our purposes Latin America is used as an umbrella term to cover South and Central America. The objective of this

ers shows how important Latin America was. Argentina acquired 21 MIRAGE III and 10 MIRAGE 5, Brazil acquired 27 MIRAGE IIIEBR/DBR, Chile purchased 41 MIRAGE 5/MIRAGE 50, Colombia purchased 18 MIRAGE 5, Ecuador took six MIRAGE 50 and then acquired 18 MIRAGE F.1JA/F.1JE, Peru purchased 41 MIRAGE 5 and in 1982 contracted for 12 MIRAGE 2000P/DP, with Venezuela initially taking nine MIRAGE

The Case of Brazil

Whether this BRIC/BRICS theory was believable is open to debate, Goldman Sachs went cold on the idea post-2010. While confidence in the economic growth potential of China and India appears justifiable, some of the other projections appeared to be far fetched. In the end what mattered was the growth of the perception that Brazil was finally going to exploit its potential and enter a new era of economic growth. The victory of Luiz Inácio Lula da Silva, the progressive candidate in the 2002 election, can be seen as the starting point of the belief that Brazil would become a global player. Lula was charismatic and extremely popular, more importantly after his administration came to power in January 2003 he delivered.

Under Lula by 2008 Brazilian government debt had moved from virtual "junk" status to investment grade, the country was seen as one of the top ten economies in the world. Brazil had a new found confi-



Photo: Embraer

Brazil intends to be a player in meeting defence needs in Latin America and beyond with systems such as the KC-390 transport aircraft. First deliveries to the Brazilian Air Force are on course for the first half of 2018, with full operational capability due to be reached in the second half of 2018.

One of the key defence programmes was the F-X2 fighter programme for the Brazilian Air Force (FAB). The original F-X programme was aimed at finding a replacement for the MIRAGE III fleet, this commenced in 2001 but was effectively

Boeing F/A-18E/F SUPER HORNET, Dassault RAFALE, Eurofighter TYPHOON, Lockheed Martin F-16BR, Saab GRIPEN and the Sukhoi Su-35. By October 2008 the FAB has reduced the F-X2 candidates down to three aircraft: the F/A-18E/F, RAFALE and GRIPEN. A new RfP was then issued to the three contenders with responses to be received by February 2009. The FAB commenced a technical evaluation in March 2009 and the expected timetable was that a winner would be announced in October 2009.

It appeared that the RAFALE had been selected as the preferred bidder in September 2009, but this development was rapidly disavowed and the competition continued. In December 2009 it was announced that a decision on the F-X2 has been postponed until 2010. Through 2010 no decision was made, and with Lula leaving office on 1 January 2011, the F-X2 decision would rest with his successor Dilma Rousseff. The problem was that the new government was in no hurry to make a decision due to the amount of money involved and the complex nature of the programme. And so the F-X2 competition continued into 2012 and then continued into 2013, with a winner finally being announced in December 2013 as the GRIPEN-NG was selected to meet the F-X2 requirement.

Much was left to resolve though, in October 2014 a US\$5.475Bn contract was signed between Saab and Brazil. This covered the supply of 28 GRIPEN E and eight GRIPEN F aircraft, training, spares and a ten-year industrial cooperation contract covering technology transfer and the involvement of Embraer as a strategic partner in the programme. The contract came fully in to force in September 2015, with financing being covered by a major export credit/loan from Sweden of US\$4.6Bn.

Although France did not win F-X2, it did win other major contracts in Brazil, one



Photo: US Navy

In the 1970s Brazil purchased seven NITEROI Class frigates from Vosper Thornycroft, building four units in Brazil. Six of the frigates remain in service, after a modernisation programme, as combatant units, with the seventh frigate BRASIL (shown here) being designed and built from the outset as a training unit.

dence and everybody had new confidence in Brazil, the country had been awarded the World Cup of 2014 and Rio de Janeiro Olympics of 2016. The government also decided that it was time to embark on a major military modernisation programme, the intention was not just to replace legacy equipment, they were looking for technology transfer, local content and production and wherever possible the means to provide Brazil the ability to participate in export programmes.

cancelled by 2005. This led FAB to acquire 12 ex-French Air Force MIRAGE 2000 aircraft as a temporary measure with the first aircraft arriving in 2006. At the beginning of 2008 FAB was authorised to begin work on a new fighter programme to be known as F-X2. This was an ambitious programme that would build from an initial 36 aircraft to a final force goal of 120, with the vast majority to be built in Brazil.

A Request for Proposals (RfP) was issued in mid-2008, with responses coming from the

of these was the H-X BR helicopter programme won by Airbus Helicopters, with the helicopters to be produced in Brazil by Airbus Helicopters subsidiary Helibras. This contract was signed in December 2008, it covered 50 H225M helicopters and was valued at US\$2.65Bn. Also signed in December 2008 was a contract covering the construction of four SCORPENE Class submarines for Brazil, plus technical assistance on the non-nuclear elements of the Brazilian SSN programme.

Another major Brazilian programme was a new wheeled armoured vehicle to replace the old Engesa EE-11 URUTU fleet. In December 2009 it was announced that IVECO of Italy had been awarded a €2.5Bn contract covering the development and production of the GUARANI Viatura Blindada Transporte de Pessoal - Media de Rodas (VBTP-MR). The GUARANI is a 6x6 vehicle and multiple variants, possibly ten different, will be developed and produced at the IVECO facility in Minas Gerais, Brazil. The assumption was that there was so much to come from Brazil, but the Brazil-

difficult economic circumstances have put paid to significant procurement. Brazil is not alone in facing poor economic conditions.

In April 2017 the Stockholm International Peace Research Institute (SIPRI) released its annual update of the SIPRI Military Expenditure Database covering 2016. As regards Latin America, SIPRI noted that: "Military expenditure in Central America and the Caribbean and South America combined decreased by 7.8 per cent to a level not seen since 2007. The fall is largely explained by spending reductions by oil-exporting countries such as Ecuador, Mexico, Peru and Venezuela. Brazil's spending continued to decline as a result of a worsening economic crisis."

The Venezuelan Disaster

Venezuela reportedly has the largest oil reserves in the world, but the Maduro regime is presiding over an economic disaster. The International Monetary Fund (IMF) estimates that inflation in Venezuela

ment as was the case with Colombia or as part of a criminal trade as is the case with Brazil. Concerns are already being raised in Latin America of what could happen if more weapons flow out of Venezuela, or even worse if it became a failed state and Venezuela's arsenals are pillaged. In May Reuters reported, using official Venezuelan documents, that the Venezuelan military had an enormous quantity of Man Portable Air Defence Systems (MANPADS) on hand, comprising of 1,500 9K338 IGLA-S (SA-24) grip stocks and 5,000 missiles. The consequences of the IGLA-S and other advanced Venezuelan equipment ending up on the open market is unpleasant to contemplate. The Venezuela situation represents an obvious risk to the security situation in Latin America, meaning that those with the ability to prepare to confront these risks are doing so. The fact is that despite there being numerous regional states suffering from a poor economic situation, and as a result restricted defence budgets, there are others who do have the ability to look to boost their own defences. It is these states that represent the core defence market in Latin America.

Opportunity Exists

European Security & Defence (ESD) had the opportunity to speak to a European government official involved with defence export promotion to Latin America to gain some insight into the current situation and define who were the key markets for European defence companies. Chile is regarded as an extremely important market, this is a stable and democratic country, with a well managed economy that attracts significant Foreign Direct Investment (FDI). Chilean government bonds are said to have the highest rating in South America.

One of the most important export commodities for Chile is copper; when the copper price is high, that helps to stimulate the broader economy, allowing the government to set aside the financial surplus gained and invest it in Sovereign Wealth Funds. These funds provide spending possibilities when the copper price is low and the economy is less healthy. Funding from copper sales also helps to pay for major defence purchases. Apart from a well run economy, Chile also has an effective procurement system and a highly professional military. As such Chile remains one of the core defence markets in Latin America. Despite its problems Brazil still remains important, according to the official. While Brazil might not be that active now, defence sales are a long-term exercise and the size of Brazil and its economic potential

Photo: via author



Chile remains an important defence market for Europe. The Chilean Navy commissioned two SCORPENE Class submarines in 2005 and 2006, O'HIGGINS (SS-28) and CARRERA (SS-29). Chile has one of the most professional militaries in Latin America and an effective procurement system.

ian miracle was unravelling. President Dilma Rousseff was suspended from office in May 2016 and impeached in August 2016, being succeeded by former Vice President Michel Temer who will serve to January 2019. Sadly the abandoned stadia and other venues of the Rio de Janeiro Olympics will perhaps be the most visible epitaph of the Lula/Rousseff years.

For many Brazil was going to be the driving force for a new era of robust defence expenditure and between 2008 and 2015 many major contracts were signed. Today the situation is very different and Brazil's

is running at 2,069% this year and predicts that the rate of inflation will rise to 2,349% next year. People are starving in Venezuela, hospitals have run out of drugs, crime is rampant and yet the Maduro regime tenaciously clings on to power no matter what the cost. Senior regime figures have been linked to drugs cartels and there are also real and reported links with guerrilla/terrorist groups in Latin America and beyond. What is becoming a major concern is that Venezuela is awash with weapons and that these weapons are going across porous borders either with official encourage-



Photo: via author

An Airbus CN-295 of the Colombian Air Force (FAC), one of nine in service, taking part in the Mobility Guardian international paradrop exercise in the US in August 2017. Colombia is seen as one of the most interesting emerging defence markets in Latin America.

are such that it cannot be ignored. One country that is seen as having tremendous potential as a defence market in Latin America is Colombia. Once Colombia was associated with drug cartels, violence, insurgency and corruption, it was seen by many as being on the verge of becoming a failed state. Instead Colombia fought the cartels and the insurgents, and it did this while preserving a democratic state and personal freedoms.

The primary insurgent threat in Colombia was the Revolutionary Armed Forces of Colombia (FARC), in November 2016 the government of Colombia signed a peace accord with FARC that calls for its disarmament, demobilisation and the reintegration of FARC members into Colombian society. As a part of this process the Colombian government is extending its control into previously insurgent dominated areas, the long war with FARC appears to be over. Previously the Colombian government had managed to oversee the disbandment of anti-FARC paramilitary organisations. There are still internal security issues to confront, primarily the narcotics trade and organised crime. As previously mentioned the situation in Venezuela remains a major concern. The condition of the local economy is good, though as the primary export commodities of Colombia are coal and oil, reduced demand in these sectors is hurting government spending. That being said, Colombia has defence requirements and can pay for them, the European official noted that Colombia always pays its bills!

Peru is also seen as an interesting market, as is Mexico, though both are very complex places to do business. Ecuador normally does not get much attention, but the need for EEZ surveillance and protection especially in the rich fishing grounds around the Galapagos Archipelago is becoming an important requirement. Finally one trend is becoming pretty consistent in Latin American defence markets, they want to be able to, wherever possible, build locally and have the ability to support, upgrade and extend the service life of their equipment locally. There will be an increasing emphasis on technology transfer to make this local industrial participation a reality. This could create the basis for further industrial participation by Latin American countries in international programmes, they have labour cost advantages and untapped intellectual potential that could be employed more efficiently. As ever Latin America is a defence market with potential, but in certain countries this potential could become reality far sooner than expected. ■

Masthead

European Security & Defence

Issue 7/2017 · November 2017

ISSN 1617-7983 · www.euro-sd.com

Published by

**MITTLER
REPORT**

Mittler Report Verlag GmbH
A company of the Tamm
Media Group

Editor-in-Chief: Dr. Peter Bossdorf (pb)

Managing Editor (Magazine): Stephen Barnard (sb)

Managing Editor (Newsletter): Dorothee Frank (df)

Industrial Editors: Waldemar Geiger (wg), Gerhard Heiming (gwh), Jürgen Hensel (jh)

Sub-Editors: Christopher Barnard (cb), Christian Kanig (ck)

Editor Special Assignments: Stefan Nitschke, PhD. (sn)

Correspondents: Rolf Hilmes (Army Technology), Peter Preylowski (Airborne Systems)

Regional Correspondents: Tamir Eshel (Israel), Tim Guest (UK), Jaime Karremann (The Netherlands), Beka Kiria (Georgia), Shinichi Kiyotani (Japan), Yury Laskin (Russia),

J. Bo Leimand (Denmark), Jay Menon (India), Chet Nagle (USA), Luca Peruzzi (Italy),

David Saw (France), Joris Verbeurgt (Belgium/EU/NATO), Esteban Villarejo (Spain)

Supported by the editorial team of "Europäische Sicherheit & Technik"

Layout:

davis creativ media GmbH, Germany

Production:

Lehmann Offsetdruck GmbH

22848 Norderstedt, Germany

Office address:

Mittler Report Verlag GmbH

Baunscheidtstraße 11, 53113 Bonn, Germany

Phone.: +49 228 3500870, Fax: +49 228 3500871

Email: info@mittler-report.de, www.mittler-report.de

Director of Marketing

Jürgen Hensel (jh)

Baunscheidtstraße 11, 53113 Bonn, Germany

Phone: +49 228 3500876, Fax: +49 228 3500871

Email: juergen.hensel@mittler-report.de

Advertising Representatives:

Dipl.-Betw. Uwe Nemeyer, optiproject GmbH –

Agenur für sicherheitspolitische und wehrtechnische Kommunikation

Von-Imhoff-Weg 5, 53359 Rheinbach, Germany

Phone: +49 2226 909637, Fax: +49 2226 909653

Email: uwenemeyer@optiproject.de, www.optiproject.de

France/Italy

Diana Scogna

Phone.: +33 6-6252-2547, Email: diana.scogna@mittler-report.de

UK/Ireland/Eastern Europe/Israel/Turkey:

Stephen Barnard, c/o Mittler Report Verlag GmbH

Phone: +49 228 35 00 886, Email: stephen.barnard@mittler-report.de

USA/Canada:

Susan Spilman-Gardner

Email: Susan.Gardner@mittler-report.de

Phone: +1 817-751-5888

Russia & CIS:

Laguk Co., Yury Laskin, General Director

Krasnoholmskaya Nab., 11/15, 132, RF-109172 Moskau, Russian Federation

Phone: 007-495-911-1340, Fax: 007-495-912-1260, Email: ylarm-lml@mtu-net.ru

Subscription/Reader Service:

PressUp GmbH, Postfach 70 13 11,

22013 Hamburg, Germany

Phone: +49 40 38 66 66-319, Fax: +49 38 66 66-299

Email: mittler-report@pressup.de

European Security & Defence

© 2017 Mittler Report Verlag GmbH

The views expressed are not necessarily those of the editor or publisher.

All rights reserved. No part of this publication may be reproduced without prior written permission of the publisher in Bonn.

Cover Photos: Lockheed Martin, Forsvaret, Rafael

Annual subscription rate (8 issues):

€49.80 incl. postage

Virtual and Live Firing Under One Roof

Interview with Michael Paulk, Director of Virtual Systems, Meggitt Training Systems

ESD: Please explain the relationship between Meggitt, Meggitt Training Systems and FATS.

Paulk: Meggitt Training Systems, a division of Meggitt PLC, provides live-fire and virtual firearms training systems to US and allied military, defence and security forces; federal and international law enforcement agencies; large metropolitan training academies; thousands of police departments; ammunition and firearms manufacturers; and commercial shooting range owners around the world.

The company was created first through Meggitt's 2003 acquisition of 90-year-old Caswell International. Since 1926 Caswell had provided shooting range innovations resulting in many successful product launches, including the industry's first moving-target system, first environmentally friendly bullet trap that reduces lead dust, first wireless range control device, and first fully mobile shooting range.

Then in 2006, Meggitt purchased Firearms Training Systems (FATS®) Inc., which was originally founded in 1984. This acquisition was based on FATS' reputation as the leader in the development, manufacturing and support of simulation small- and combined-arms training systems, indirect fire/forward air control, and vehicle trainers. Today's FATS systems have up to three modes for marksmanship, judgmental and collective training based on customer requirements. In 2008, Meggitt merged Caswell and FATS to create Meggitt Training Systems. This merger sought to capitalise on synergies resulting from combining the two operations to provide live fire and simulation training as an integrated product offering.

ESD: Where are you now in terms of deliveries against current contracts, and what does the short term (12-24 months) hold?

Paulk: FATS military simulators are the system of record for the US Army, US Marine Corps, United Kingdom Ministry of De-

fence, US National Guard, US Air Force, Canadian Army, Royal Canadian Navy, Royal Canadian Air Force, Australian Defence Force, Singapore Army, Singapore Police Coast Guard, plus Belgium, Italy and other customers worldwide.

Our two largest current contracts are for the US Army's Engagement Skills Trainer II and the US Marine Corps' Indoor Simulated Marksmanship Trainer. Both

are in year four of five-year IDIQ contracts for roughly 900 EST II and 650 ISMT



The FATS 100MIL is a major expansion in weapons training capability, introducing features such as advanced game engine 3D Marksmanship, enhanced diagnostics with intelligent automatic coaching and VBS3-based collective training.

systems. Deliveries are continuing on schedule and will conclude in the coming months. Positive customer feedback regarding EST II and ISMT is now driving interest in the export-friendly FATS 100MIL.

ESD: The FATS 100MIL has been described as tailorable and scaleable: What is meant by that?

Paulk: The FATS 100MIL small-arms training system provided the foundation to win the EST II and ISMT contracts. It represents a major expansion in weapons training capability, introducing revolutionary features such as advanced game engine 3D marksmanship, enhanced diagnostics with intelligent automatic coaching and collective training. The new system provides an impressive array of functionality for both instructor and trainee, delivering solid weapon-handling and shot-placement analytics, coaching tools that automatically highlight trainee results for reinforcement or correction, and enhanced graphic capabilities for an all-encompassing immersive training platform.

Customer-specific doctrine, including training manuals and videos, can be easily integrated to deliver tailored learning to trainees. The FATS 100MIL offers all three training modes (marksmanship, judgmental and collective), while military police and law enforcement departments are good candidates for the new FATS 100P portable training system that features marksmanship and judgmental modes for training on the go. The compact 100P fits easily into two hard-carry cases, allowing one person the ease of transportation, set up and operation.

ESD: How does Meggitt's new live-fire screen fit into the company's offerings?

Paulk: Meggitt's full-size, live-fire screen allows users to train within a shooting range using live ammunition while scenarios are displayed on screen through the FATS system. The live-fire screen includes a natural rubber screen directly integrated with the FATS virtual system, leveraging the same software and courseware used for Meggitt's laser-based weapons. Optical measurement of the bullet in flight determines hit positioning, which means a much shorter guard time (the minimum required by the system to discriminate between successive shots) compared with



"Meggitt's full-size, live-fire screen allows users to train within a shooting range using live ammunition while scenarios are displayed on screen through the FATS system."

other available live-fire screens. All electronic equipment, including projection, is located above the top of the screen and is typically fixed to the ceiling behind an existing range baffle. This eliminates the need for heavy and bulky steel frames common in other systems.

Unlike competing live-fire offerings where screen integrity affects hit detection capability, Meggitt's screen surface is not needed for detection of projectiles passing through the area of interest and is used

only for showing the projected image. It can be readily integrated into live-fire shoot houses with other surfaces for projected images. The easy-to-install, self-healing screen can be used with various types of weapons ranging from revolvers to submachine guns, and is designed to withstand up to 50,000 rounds over the entire surface area before replacement or repair.

In short, military and law enforcement customers no longer have to choose between simulation and live-fire training.

ESD: What's the plan "post-FATS?"

Paulk: FATS stands for more than 30 years of innovation in virtual training and Meggitt is committed to continuing that rich legacy. In addition to the simulators themselves, FATS was the first company to introduce wireless BlueFire® weapon simulators, using Bluetooth® technology. The company's patented BlueFire weapons wirelessly replicate the form, fit and function of live weapons, and provide the same accurate, real-time training diagnostics as tethered weapon simulators. Overall, more than 50,000 weapons have been integrated into FATS systems to date. Looking into the future, we expect greater integration of virtual and live-fire training, through Meggitt's new live-fire screen and other immersive technologies that still permit the use of real ammunition. Increasing training needs, paired with more robust networks, should allow for more combined-force training by multiple military branches within a country or even across a coalition of nation states. Our investment in talent with extensive military and law enforcement experience has kept Meggitt at the forefront of virtual and live-fire simulation for decades. As such, we firmly believe the best is yet to come.

ESD: Thank you.

www.Police-Exhibition.eu

GPEC® 2018 – Europe's only One-Stop-Shop for Homeland Security

GPEC®

2018

GPEC General Police Equipment Exhibition & Conference®

10th International Exhibition for Police and Special Equipment 20 - 22 February 2018 in Frankfurt, Germany

Patron: Prime Minister of Hessen Volker Bouffier

GPEC® is Europe's leading closed specialized trade fair for police and law enforcement equipment. At GPEC® 2016 more than 520 exhibitors from 31 countries presented technologies and new products in the field of C4I and operational equipment to 6,694 experts from 55 countries. Since the inauguration event in 2000 GPEC® is the first and only representative overview for all kinds of command, control and tactical equipment of homeland security:



Specific specialist conferences and official working group meetings round off GPEC® as branch and user meeting for all management levels. At the globally renowned trade fair venue Frankfurt a.M. with its excellent accessibility from all over the world the international character of GPEC® will be further developed.

Equipment – Training – Operation

EMW
EXHIBITION & MEDIA WEHRSTEDT

EMW Exhibition & Media Wehrstedt GmbH
Hagenbreite 9 · 06463 Falkenstein/Harz · Germany
E-Mail: info@gpec.de · Internet: www.police-exhibition.eu



Germany and Norway Order Airbus A330 Tankers

(ck) Germany and Norway have ordered a fleet of five Airbus A330 MRTT Multi Role Tanker Transport aircraft, placed on behalf of NATO Support & Procurement Agency (NSPA) through OCCAR - Europe's organisation for the management of cooperative armament programmes. With this order, Germany and Norway join the Netherlands

Photo: Airbus



and Luxembourg in the European/NATO Multinational Multi-Role Tanker Transport Fleet (MMF) programme. This contract adds five aircraft to the two previously ordered by the Netherlands and Luxembourg. The contract includes two years of initial support and it is designed to enable other nations to join the group: the MMF programme is funded by the four nations who will have the exclusive right to operate these NATO-owned aircraft in a pooling arrangement. The aircraft will be configured for in-flight refuelling, the transport of passengers and cargo, and medical evacuation flights. All seven aircraft are expected to be handed over between 2020 and 2022. The European Defence Agency (EDA) initiated the MMF programme in 2012, and OCCAR manages the MMF acquisition phase as Contract Executing Agent on behalf of NSPA. NSPA will be responsible for the life-cycle management of the fleet. Airbus Defence and Space Head of Military Aircraft Fernando Alonso said: "This new order further demonstrates the A330 MRTT's position as the world's premier tanker/transport aircraft. But it also firmly establishes the MMF as one of Europe's most important collaborative programmes and a model for the future European defence projects which are expected to be launched in the coming years."

Airbus Helicopters Delivers 400th UH-72A LAKOTA to US Army

(ck) Airbus Helicopters has delivered the US Army's 400th UH-72A LAKOTA helicopter, and in so doing has met all of the contract requirements by delivering every aircraft on time, on budget and of the required quality. For the US Army, the UH-72A is a key helicopter that the Army will operate for the foreseeable future. The LAKOTA platform is a versatile, twin-engined aircraft with a digital glass cockpit, flight controls and navigation systems. Army and Army

Photo: Jerome Deulin



National Guard units operate the LAKOTA in a variety of missions including flight training, surveillance and reconnaissance, medical evacuations, border security, VIP transport and disaster response. The UH-72A is produced at the Airbus Helicopters Inc. facility in Columbus, Miss. by a workforce which consists mostly of US military veterans. The US Army selected the UH-72A in 2006 following a rigorous evaluation. It is the Army's lowest-cost twin-engine helicopter to buy, own and operate. As part of its Aviation Restructuring Initiative, the US Army selected the LAKOTA for its Initial Entry Rotary Wing Training programme at Fort Rucker, and the US Naval Test Pilot School also operates the LAKOTA in a training role. Since the LAKOTA's introduction Army and National Guard units have flown more than 460,000 hours with it. In December 2016 the Army awarded Airbus Helicopters a five-year Contractor Logistics Support contract valued at nearly US\$1Bn and Airbus Helicopters Inc. will provide the support at Army and National Guard bases in 43 states, including Fort Rucker, and in Guam, Puerto Rico and Germany.

France and Italy Reach Agreement on STX

(ck) The French and Italian governments have reached an agreement regarding the bankrupt French shipyard STX France. Its previous owner, the South Korean company STX Offshore and Shipbuilding, was

Photo: Fincantieri



forced to sell its shares due to financial difficulties. In order to save jobs, the French government nationalised the shipyard and has since been looking for an investor; the only investor is the Italian shipbuilder, Fincantieri. France and Italy have now launched a process to increase co-

operation in the naval defence sector. The French company Naval Group and the Italian company Fincantieri will play key roles on a steering committee set up to define a roadmap detailing the principles of the future alliance. A first proposal is expected by June 2018: the agreement reached by the Italian and French governments on the shareholding structure of STX France is a first step.

US Army to Buy TacFLIR Surveillance Cameras

(ck) FLIR Systems, Inc. has been awarded a US\$74.7M order to deliver TacFLIR surveillance cameras in support of the US Army EO/IR-Force Protection (FP) programme. The US Army will purchase the systems through Army Contracting Command, Redstone. Units delivered under this contract will support the ongoing US Army EO/IR-FP programme, which provides perimeter security and force protection for US troops stationed around the world, such as in Iraq and Afghanistan. As part of the same programme, FLIR was also awarded a US\$8.8M contract in the third quarter 2017 to deliver other FLIR RANGER radars. The contract expands the use of FLIR stabilised surveillance systems for the US Army's EO/IR-FP programmes: FLIR has delivered over a thousand EO/IR sensors to the US Army as part of this programme to support the safety of US forces and those of US allies, including a variety of systems. FLIR will manufacture the systems in Wilsonville, Oregon. Deliveries will begin in 2017 and be completed within one year.

iAccess Technologies Awarded USAF C-130H Avionics Modernisation Programme

(ck) iAccess Technologies, Inc. has been awarded a contract from the USAF Material Command in Wright Patterson, OH, for the first increment of the C-130H Avionics Modernization Program (AMP), which addresses current and near-term Communication, Navigation, and Surveillance/Air Traffic Management (CNS/ATM) mandates, and limited safety upgrades, enabling the C-130H to operate safely and effectively in international air space. ADS-B is a surveillance technology using Mode S EHS to periodically broadcast aircraft position and specific parameters to air traffic control (ATC) secondary surveillance radar (SSR), and to other aircraft for self-separation and situational awareness. iAccess will design, integrate, and produce ADS-B Out & Mode S EHS kits for 172 USAF C-130H1/H2/H2.5/H3 and LC-100 aircraft. Work will be performed in California, Georgia, and Minnesota.

Israel Shipyards to Produce Patrol Vessel for Cypriot Navy

(ck) Israel Shipyards Ltd. have launched a new offshore patrol vessel (OPV) for the Cypriot Navy. In a project valued at tens of millions of Euros, the OPV, carrying high-end systems, will be delivered to the Cypriot Navy towards the end of 2017. The OPV



Photo: Israel Shipyards

was ordered in December 2015 and will be used to protect the coastline of Cyprus. The new OPV has a displacement of 430 tons, an overall length of 62 metres, a maximum speed of 32 knots, and carries a crew of up to 30 members plus a Special Forces unit. Installed on the vessel are multiple systems including two Rafael TYPHOON Weapon Stations, advanced radar, electro-optical payloads, communications systems including satellite communications, navigation systems, command and control systems, and more.

Paramount to Buy MIRAGE F1 Fighters

(ck) Paramount Group, the African global aerospace and defence company, has improved its pilot training capability through the acquisition of four Dual-Seat MIRAGE F1 fighter aircraft from the French government. For many years, Paramount Aerospace Systems, a subsidiary of Paramount



Photo: Paramount Group

Group, has been supporting a number of air forces around the world in the maintenance and technical operation of advanced fighter aircraft, and has been operating a pilot training capability for advanced fighter training in South Africa and customer countries. The demand for these services is increasing due to the global shortage of well-trained military transport and combat pilots. These aircraft are compatible with the existing fleet of MIRAGE F1 aircraft that

was acquired by Paramount from the South African Government.

QinetiQ Supports Formidable Shield

(ck) QinetiQ supported eight NATO countries in the Outer Hebrides during the international maritime exercise Formidable Shield. The exercise was one of the most complex ever undertaken in the UK and was used to test integrated air and missile defence capabilities of the NATO countries. QinetiQ operated the Hebrides Range of the Ministry of Defence (MoD) as part of the Long Term Partnering Agreement (LTPA) for the eight participating countries: Canada, France, Germany, Italy, the Netherlands, Spain, the United Kingdom and the United States. The exercise was held between 18 September and 18 October. It was led by the US 6th Fleet and supported by the UK MOD, and aimed to improve allied interoperability in a live-fire integrated air and missile defence environment, using NATO command and control reporting structures. Formidable Shield provided 13 ships with the opportunity to validate in-service systems against live targets. QinetiQ has invested £60M into the range to modernise equipment and facilities, including new radars.

Stephen Hedger Joins Rheinmetall

(ck) Stephen C. Hedger, a former Assistant Secretary of Defense in the US Department of Defense, has joined Rheinmetall Group as Senior Vice President Corporate Development USA. This is a new position established by Rheinmetall which signals a commitment to continued growth in the US defence market for Rheinmetall. Hedger will be based at Rheinmetall's headquarters in Düsseldorf, Germany. He last served as Chief of Staff to former US Deputy Secretary of Defense Robert Work, who oversaw the annual development of the US's more than US\$600Bn defence budget, and as Deputy Chief of Staff to then US Secretary of Defense Ash Carter. Hedger also served under current US Secretary of Defense James Mattis to assist with the transition of the new Trump Administration team at the Pentagon. Prior to this tenure, Hedger was nominated by President Obama to serve as Assistant Secretary of Defense for Legislative Affairs and confirmed into that role by the US Senate in



Photo: Stephen Hedger

2015. He previously served as an assistant to President Obama in the White House. He holds a degree in International Relations from the United States Military Academy at West Point and a Juris Doctorate degree from the Georgetown University.

Rheinmetall and Paravan to Cooperate Globally

(ck) Rheinmetall Technology Group will cooperate with Paravan, a market leader in drive-by-wire technologies for autonomous driving. Rheinmetall and Paravan plan to develop semi- and fully automatic platforms for military and dual-use applications as well as civilian emergency response vehicles for protecting and rescuing people in high-risk situations and disaster zones. Paravan has been developing drive-by-wire control technologies for 15 years: this technology is a prerequisite for autonomous driving and features an independent power supply. In the last five years Paravan has equipped over 200 test vehicles, pre-series vehicles and show cars for autonomous driving. Paravan modular systems consist of software, actuators, interface management and integrated sensors, and these systems can be adapted to the needs of system manufacturers like Rheinmetall. Paravan's expertise lies in the redundant digital control of steering, accelerating and braking as well as supplying interfaces for digitisation, GPS, control computers, cameras, radars and sensors.

Rolls-Royce to Supply MTU Engines to Poland

(ck) Rolls-Royce is to supply 500 MTU Series 106 engines to the Polish vehicle manufacturer Jelcz. The type 6R 106 TD21 engines



Photo: MTU

will be used to power four-wheel-drive Jelcz 442.32 all-terrain trucks employed by the Polish Armed Forces. The first of these engines are due to ship during 2017. MTU has already supplied 900 Series 106 engines for Jelcz vehicles currently in service with the Polish army. These six-cylinder engines develop 240 kW (326 HP), are impervious to electro-magnetic interference and can run on aviation fuel.

Rostec Supplies Civic Optical Devices to Poland

(ck) Shvabe Holding, a subsidiary of Rostec State Corporation, has exported collimator and optical sights, including night sights, to Poland. This has been the tenth delivery of sights to Polish partners this year. Shvabe Holding has supplied a batch of collimator and optical sights, including night sights, as well as sight brackets and lenses, to Warsaw for hunting and shooting sports. The company also produces complex optoelectronic and thermal imaging products, and other optoelectronic devices for civilian purposes.

Saab to Upgrade Norwegian Air Surveillance Radars

(ck) Saab has signed a contract with the NATO Support and Procurement Agency (NSPA) in Luxembourg for upgrading three SINDRE I air surveillance radars in Norway. Deliveries will take place between 2017 and 2020, with work undertaken by Saab Technologies Norway, in Halden, Norway and Saab Defense and Security USA, in Syracuse, New York, USA. Saab's upgrade will include replacing obsolete hardware as well as upgrading software.

ISDEF 2017 POST SHOW REVIEW

(sb) The 8th edition of ISDEF took place on June 6-8, 2017, and successfully cemented the shows reputation as the largest defence and security event in Israel. As in previous years, the focus of the exhibition was on interoperability and the diverse use of products by end users for various pur-

poses. The expo was opened by a speech from the Israeli Deputy Defence Minister, Eli Ben Dahan; and visitors included both procurement and end users from the public and private sectors. Attendees had the opportunity to learn about the latest developments in defence technology and watch live demonstrations showcasing a variety of products. In addition to the emphasis on interoperability and business development, ISDEF 2017 also dedicated significant resources to promoting and sharing professional knowledge among manufacturers, distributors and end users. This was enhanced in a conference that took place alongside the exhibition and featured world-renowned lecturers from the IDC, INSS, Tel Aviv University and more. The conference took place in addition to the workshops and discussed global concerns from immigration to homegrown terrorism and the impact on HLS and the financial issues. ISDEF 2017 was also the main event celebrating 25 years of diplomatic relations between Israel and India. This manifested itself in the presence of official Indian delegations at the diplomatic level, including as an Indian national pavilion of 400m2. In addition to the Indian pavilion, ISDEF also featured national pavilions on an unprecedented scale, including the Czech Republic, China and a US pavilion with 30 exhibitors. This year's expo proved that quality and quantity need not come at the expense of each other. With more than 14,000 attendees and almost 300 exhibitors, ISDEF 2017 also featured advanced products and

technologies by leading companies such as IMI Systems, HP, Plasan, Surefire, Schmidt & Bender, Steiner, ECA Group, Avon Protection and Beth-El Industries. Overall, ISDEF 2017 exceeded the expectations of the event organizers, exhibitors and visitors alike. EUROPEAN SECURITY & DEFENCE magazine from Mittler Report Verlag in Germany reinforced the record media exposure, and diplomatic engagement and attendance were outstanding. ISDEF 2017 set a high bar for future defence exhibitions in Israel; and the organisers are confident that they will exceed all expectations at ISDEF's next event, which takes place in Tel Aviv from 4th to 6th of June, 2019.

IAI and Hankuk Carbon Enter Joint Company Agreement

(ck) Israel Aerospace Industries (IAI) and Hankuk Carbon from Korea have signed an agreement to establish a joint venture company in South Korea, to be named Korea Aviation Technologies (KAT). KAT will focus on development and manufacturing of unmanned aerial vehicles (UAVs) with vertical takeoff and landing (VTOL) capability that will target the Korean military and civilian market. KAT is expected to develop and manufacture the next generation VTOL UAV- with an approximate maximum take-off weight (MTOW) of 300 – 450 kg and in the future may develop and manufacture other VTOL UAVs for both military and civilian applications. It will support the operational needs of its customers while advancing Korean technologies.

Preview

ESD 8/2017 · December 2017

- **Technology Focus: Optics and Optronics**
- Protection Systems for Military Land Vehicles
- Mortar Ammunition
- Reconnaissance in the Army
- Naval Guns and Mounts
- Conventional Submarines
- Romanian Procurement Programmes
- Naval Industry in Germany
- Modular Facilities for Medical Treatment
- Military Engineering: Bridging and Recovery
- European Offshore Patrol Vessel Designs
- Current and Projected US Army Programmes
- Swiss Defence Industrial Base
- **Country Focus: Hungary**



CZ BREN 2

TRUSTED
BY PROFESSIONALS

VISIT US AT MILIPOL 2017
STAND No. M6 140
PARIS, FRANCE
21-24 NOVEMBER 2017

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

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

Stated dimensions may be different in particular design and configuration.



W WWW.CZUB.CZ

E INFO@CZUB.CZ

F FACEBOOK.COM/CESKAZBROJOVKA.CZ

#CZGUNS
WWW.INSTAGRAM.COM/CZGUNS/

THE CHALLENGES OF THE FUTURE CALL FOR A FIGHTER DESIGNED FOR IT.

AT LOCKHEED MARTIN,
WE'RE ENGINEERING A BETTER TOMORROW.

With its advanced stealth, sensor fusion and processing, the F-35 Lightning II is unmatched at countering the threats of the 21st century. But just as remarkable is what it can do economically. As a joint production effort among several nations including Denmark, the F-35 delivers a lot more than air superiority, such as jobs, advanced technology and ongoing foreign military sales. Which means that while the F-35 is the only multirole stealth aircraft in production, it's not hard to see all of its advantages.

Learn more at F35.com/denmark

F-35 LIGHTNING II

NORTHROP GRUMMAN | BAE SYSTEMS | PRATT & WHITNEY

LOCKHEED MARTIN