

European Security & Defence

International Security and Defence Journal

8/2018



Royal Norwegian Air Force



Russia's VOSTOK-2018 Exercise



Torpedo Developments



NO TIME? NO LAB? NO PROBLEM.

EASILY IDENTIFY CHEMICAL HAZARDS WITH THE FLIR GRIFFIN™ G510 PORTABLE GC-MS.

The FLIR Griffin G510 is a completely self-contained GC-MS, including batteries, carrier gas, vacuum system, injector, touchscreen, and heated sample probe. It analyzes all phases of matter and confirms vapor-based threats in seconds, so that responders can take immediate action.



www.FLIR.eu/G510

 **FLIR**®

FLIR Griffin™ G510
Portable GC-MS
Chemical Identifier

Doubting the Future of the INF Treaty



The Intermediate-range Nuclear Forces Treaty (INF Treaty), signed in Washington at the end of 1987 and effective from 1 June 1988, is regarded as one of the milestones in bringing about the end of the Cold War. Under the Treaty, the USA and the then Soviet Union undertook to remove all ground-based nuclear and conventional missiles, rockets and their launchers in the short range (500 to 1,000 kilometres) and intermediate range (1,000 to 5,500 kilometres) categories. In the event of a war, it would have been the Europeans in particular who would have borne the brunt of these systems, and they accordingly welcomed the Treaty with considerable relief. At the same time, this put the lie to all the rumours that had been doing the rounds just a few years before, suggesting that the NATO double-track decision of 1979 was simply a cunning ruse to step up the threat: it had promised nothing less than stationing US medium-range rockets in Europe while simultaneously negotiating for their complete elimination - a pledge which was redeemed with the INF treaty.

Today, a good 30 years later, willingness to cooperate with regard to arms limitation (and beyond) appears to have evaporated. Russia, as the successor to the Soviet Union, with its ongoing intervention in the Ukraine is in contravention of international law, and presents a strategic challenge to NATO and the EU. Moscow also appears to have reneged on the INF Treaty: NATO has evidence that the range of new Russian cruise missiles is far greater than officially declared, so great in fact that they should never have been produced and deployed at all. If Moscow does observe it, Washington also will shortly be shelving the INF Treaty. But, more generally, the question arises as to whether a bilateral treaty of this kind still has a place in this day and age. For a long time other states have mastered the technological know-how to produce medium-range weapons with which Europe or the USA (or, indeed, Russia) could be threatened. To envision a multilateral agreement which would have to include states such as China, or, in the final analysis, even Iran and North Korea, is an illusion.

It should come as no surprise to anyone that the new East-West antagonism, which has been brewing since 2007 and came to the boil with the crisis in Ukraine in 2013/14, now also has a nuclear component. The situation in Ukraine cannot be resolved in such a way that neither Russia nor the West will lose face. Supreme in all these machinations is Ukraine's sovereignty and integrity. Thus this crisis has become another "frozen conflict", which is attracting greater attention than those in South Ossetia/Abkhazia, Berg-Karabakh and Transnistria, and which, like these, also has the threat of escalating militarily at any time.

Ukraine has drawn the conclusion, from the courtship NATO has made, that it does have certain security guarantees from the West. This was a delusion, and possibly not simply self-deluding. NATO cannot protect Ukraine, just as it is not able to offer support to Georgia with anything more than empty diplomatic initiatives and chest-slapping symbolic naval exercises. For the Alliance, it would already be very nearly impossible to fulfil its obligations to support the exposed Baltic States, should they ever be the target of hostile military "intervention".

True, one should not belittle what the Alliance has achieved since the Wales Summit - the Member States are investing more in their armed forces, and, after more than 15 years, in which the focus has been on stabilisation engagements in Afghanistan and elsewhere, they have found their way back to their real core commitment of defence of the homelands and of the Alliance. Nevertheless, NATO's military capabilities are somewhat limited, even in comparison to the West's diplomatic armoury, and cannot be compared with the resources and capabilities to which it could make recourse in the days of the Cold War. It must be said that in the final analysis we do not know how important the conventional strength of NATO actually was in staving off any military adventures by our Cold War opponent: perhaps at that time it was indeed the nuclear weapons arsenal which provided a decisive, credible deterrent.

This form of deterrent is still necessary today, and, as in the Cold War era, we have to take care that the transatlantic solidarity does not become undermined by a strategic opponent deploying medium-range weapons which threaten only the Europeans and not the Americans. The logic of the NATO double-track decision of 1979 still holds good, unchanged. Thus the consequence of rearmament has to be accepted, if there is indeed no other choice.

Peter Bosdorf

War in Syria



Photo: SPC Zoe Garbarino/DVIDS

Chess Game of the World Powers

Page 17

Hellenic Armed Forces



Photo: NATO AMC/DVIDS

Missions – Roles – Structures – Perspectives

Page 31

■ SECURITY POLICY

- 12 **Russia's Vostok-2018 Exercise: What Does it Mean?**
Stephen Blank
- 17 **Syria: A Chess Game of the World Powers**
Andreea Stoian Karadeli
- 23 **India Votes: Is Narendra Modi Still the Front-Runner for 2019?**
Bindiya Carmeline Thomas
- 27 **EU CBRN Action Plan: A Mixed Verdict**
Dan Kaszeta

■ ARMED FORCES

- 31 **Missions, Roles, Structures and Future Perspectives of the Hellenic Armed Forces**
Admiral Evangelos Apostolakis HN,
Chief of the Hellenic Defence General Staff
- 34 **"We are going to face many challenges"**
Interview with Vice Admiral Nikolaos Tsounis,
Chief of the Hellenic Navy General Staff
- 36 **Northern Night Watch – The Royal Norwegian Air Force**
Georg Mader
- 42 **Tragedy at Dawn: Norwegian Frigate Collides with Tanker**
Guy Toremans
- 44 **NATO's Centre of Excellence for Cold Weather Operations**
Author Team: NATO CoE – CWO
- 48 **The Swiss Army**
Peter Jenni
- 52 **Casualty Treatment in the War in Eastern Ukraine**
Alex Horobets

■ ARMAMENT & TECHNOLOGY

- 54 **Thermal Sights for Infantry Weapons**
Tamir Eshel
- 59 **New Developments in Lightweight and Heavy Torpedoes**
Luca Peruzzi
- 64 **Railgun Programmes – a Status Report**
Jack Richardson
- 67 **TF-X – Turkey's indigenous Stealth Fighter**
Georg Mader
- 72 **Japan's Next Attack Helicopter**
Shinichi Kiyotani
- 76 **Russian Drones on the Rise**
Eugene Kogan

■ INDUSTRY & MARKETS

- 79 **Spain's Defence Industry**
Esteban Villarejo
- 85 **Belgium Goes for the F-35 LIGHTNING II**
Joris Verbeurgt

■ THE BRUSSELS BACKDROP

- 46 **Macedonia One Step Closer to NATO and EU Membership**
Joris Verbeurgt

■ VIEWPOINT FROM ...

- 22 **Jerusalem**
Tamir Eshel

TF-X



Photo: TAI

Turkey's Indigenous Stealth Fighter

Page 67

■ COLUMNS

- 1 Editorial
- 6 Periscope
- 82 Masthead
- 88 Firms & Faces
- 92 Preview Issue 1/2019

Index of Advertisers

AFCEA EUROPE	89
ASDA	51
COLLINS AEROSPACE	4-5
ENFORCE TAC	3
FLIR	2 nd cover
GENERAL DYNAMICS EUROPEAN LAND SYSTEMS	81
GPEC DIGITAL	29
IDEX	11
INTERNATIONAL ARMoured VEHICLES 2019	19
INTERNATIONAL MARITIME MUSEUM HAMBURG	84
I/ITSEC 2019	75
IQPC	15
LAAD	21
QIOPTIQ	4 th cover
SENSOROR	41
YUGOIMPORT	3 rd cover

ENFORCE TAC

INTERNATIONAL EXHIBITION & CONFERENCE
LAW ENFORCEMENT, SECURITY AND TACTICAL SOLUTIONS

6-7.3.2019 | NUREMBERG, GERMANY

ONE LOCATION, TWO EXHIBITIONS

BOOK YOUR TICKET TODAY!

THE SPECIAL TRADE FAIR FOR SECURITY EXPERTS

Book your ticket today: enforcetac.com/ticketshop

Trade visitor credential required

Conference partner



UTSEC

by Enforce Tac

Summit for Drones,
Unmanned Technologies
& Security.

Discuss the latest developments in using and defending against drones with manufacturers and experts. Enforce Tac visitors are admitted free of charge.

Book your ticket today: utsec.de/ticketshop



NÜRNBERG MESSE

ALPHA

BRAVO

COLLINS

DELTA

ECHO

FOXTROT

GOLF

HOTEL

INDIA

JULIET

We are Collins Aerospace. With our customers we chart new journeys and reunite families. We protect nations and save lives. We fuse intelligence and partnership to tackle the toughest challenges in our industry. And every day, we imagine ways to make the skies and spaces we touch smarter, safer and more amazing than ever.

UTC Aerospace Systems and Rockwell Collins are now Collins Aerospace.

**TOGETHER, WE ARE
REDEFINING AEROSPACE**



collinsaerospace.com

© 2018 Collins Aerospace, a United Technologies company. All rights reserved.

■ India Procures LRSAM Air & Missile Defence Systems

(df) Israel Aerospace Industries (IAI) has been awarded an additional contract for supply of LRSAM Air & Missile Defence (AMD) Systems, the marine version of the BARAK 8 AMD system, for seven ships of the Indian navy. The contract made with the main contractor, Indian state-owned company Bharat Electronics Limited (BEL), is valued at US\$777M. The LRSAM system, part of

Photo: IAI



the BARAK 8 family, is an operational AMD system used by Israel's navy as well as by India's navy, air and land forces. It provides broad aerial and point defence against a wide range of threats to the marine arena from air, sea or land. The system integrates several state-of-the-art systems including digital radar, command and control, launchers, interceptors with modern RF seekers, data link and system-wide connectivity. The BARAK 8 AMD system was developed by IAI in collaboration with Israel's MoD, India's Defence Research and Development Organisation (DRDO), the navies of both countries, IAI's ELTA Group, RAFAEL and local industries in India and Israel.

■ Novelty Launched at NIAS18

(df) At NIAS18 infodas took the opportunity to present its SDoT Secure Network Card to an international military audience for the first time. This is a computer hardware component that currently does not exist anywhere in the world, being a network in-

Photo: Dorothee Frank



terface controller for endpoints, servers and IT infrastructure components (e.g. switches, routers) that cannot be exploited by third parties such as State-sponsored hackers. It is expected to receive approval for GEHEIM (SECRET) classification from the German Federal Office of Information Security (BSI) soon. Compromised network cards remain a real issue from a cybersecurity perspective as a critical hardware component, but also because a compromised device can be used to compromise an Operating System (OS) via surrounding peripherals on a computer. Network adapters have become complex objects: they are not only used to process network frames between the wire and the OS, they are also used as out-of-band low-cost management devices. Their position in the hardware stack led to new remote administration functions like ASF (Alert Standard Format), IPMI (Intelligent Platform Management Interface) or AMT (Active Management Technology), which allow network adapters to communicate with a command and control node. Moreover, those administration functions are active even with a broken, powered-off or even absent Operating System, which means that they have a very privileged position on the motherboard, and have access to other components. The best way to prevent network cards from being compromised consists of formally verified code running in the firmware that is limited to certain functions and ensuring that other hardware elements on the card have been verified. This and more security-by-design elements were part of the infodas approach during the development of the SDoT Secure Network Card approved for SECRET systems. All future infodas devices are to be equipped with this new component. In addition, the secure network interface controller has standard interfaces so that it can also be used by other manufacturers for their products.

■ Portable Counter-UAS System

(df) MyDefence co-hosted the Electric Storm event in Denmark in October to demonstrate the capabilities of the latest MyDefence Counter UAS products for dismounted soldiers. The event featured a live demonstration of the detection and jamming capabilities of the WINGMAN 103 drone detector and the PITBULL Counter UAS jammer. This event follows the recent announcement by DeDrone that they were able to detect drone swarms, and MyDefence has announced a drone swarm jamming capability, which was demonstrated at Electric Storm. During the event, five drone operators at-

Photo: MyDefence



tempted to execute a coordinated drone attack. The coordinated attack was effectively neutralised using the PITBULL Counter UAS jammer, and all drone operators lost control of their drones. The device is wearable and weighs only 775 grammes without a battery. It has an operational range of around one kilometre. Used in conjunction with the WINGMAN drone detector, the PITBULL can automatically jam drone signals when a drone is detected. This reduces the cognitive load of the operator, allowing soldiers to focus on the mission without worrying about enemy drones.

■ RIFAN 2 for French Navy

(ck) More than sixty vessels in the French Navy are now equipped with the 'Réseau Intranet de la Force Aéronavale étape 2' (RIFAN 2) system, ranging from aircraft carriers and front-line frigates to support ships,

Photo: Airbus



patrol vessels and submarines. With this system, all ships at sea can now establish secure broadband links with each other and with the onshore command centre. The RIFAN 2 programme contract, worth around €160M, was awarded to Airbus as the prime contractor and Naval Group and Rohde & Schwarz as co-contractors. The purpose was to equip the French Navy with a secure intranet system designed to transmit data at various classification levels, ranging from 'Unrestricted' to 'Secret' and 'NATO secret'. The system can combine several communication streams in order to optimise the use of the transmission capacity available at sea, which is, by nature, limited. It therefore uses satellite connections, such as COMCEPT or SYRACUSE, as well as radio communication resources. RIFAN 2 also provides a cybersecurity incident monitoring capability which can take place both at an onshore management and control centre, or locally on board ship.

■ H145M for Serbia

(ck) Airbus Helicopters handed over the first H145M for the Serbian Air Force in the presence of Serbian Minister of Defence Aleksandar Vulin. In total Serbia will receive nine H145Ms, earmarked for the Air Force and for the Ministry of the Interior. Four of the Air Force's aircraft will be equipped with the HFORCE weapons management system. The contract foresees transfer of technology,



Photo: Airbus Helicopters

spare parts, and tools for maintenance and repair. The H145M has optional equipment packages that can be installed depending on the mission; it can be used for troop transport, utility, surveillance, air rescue, armed reconnaissance and medical evacuation. The Serbian aircraft will be equipped with a fast roping system, high-performance camera, fire support equipment, ballistic protection as well as an electronic countermeasures system to support the most demanding operational requirements. The HForce system will allow Serbia to equip their aircraft with air-to-ground and air-to-air weapons. Powered by two Safran ARRIEL 2E engines, the H145M is equipped with full authority digital engine control (FADEC) and the HELIONIX avionics suite. It includes a high performance 4-axis autopilot, increasing safety and reducing pilot workload. Its low acoustic footprint makes the H145M the quietest helicopter in its class.

■ Italian Coast Guard Upgrades SAR Capabilities

(ck) The Italian coastguard, which is at the forefront of migration management in the Mediterranean, will improve its SAR capabilities by acquiring the new SEAGUARDIAN tactical maritime mission systems from A.ST.I.M. for its Class 200 patrol boats. Only recently, the Italian CP 274 offshore patrol boat was converted with the SEAGUARDIAN TMS SAR MK4 system and a new radar system. SEAGUARDIAN has an ECDIS/W-ECDIS



Photo: Astim

Warship Electronic Chart Display and Information System (ECDIS) that complies with STANAG and international standards and can integrate numerous radar sensors and display their images on a digital chart. The system can simultaneously display nautical and terrestrial charts and superimpose additional military layers according to operational requirements. By integrating other functions typical for navigation systems (management and display of radar and W-AIS targets superimposed with the map, route planning and interfaces to the on-board autopilot), it is possible to create and manage network maps and surveillance areas that comply with the technical protocols of the Italian Coast Guard. The system can also communicate with VHF, UHF, HF and SATCOM radios.

■ Surveillance Software for Firing Ranges

(ck) Cambridge Pixel, a developer of radar display, tracking and recording sub-systems, has supplied its RADARWATCH coastal surveillance software and target trackers to Maritime Information Systems Ltd (Maris) as part of an upgrade to safety systems at UK mili-

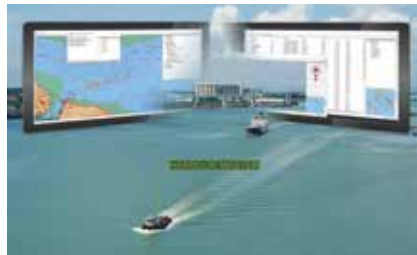


Photo: Cambridge Pixel

tary firing ranges. The software has already been installed at ranges in southern England. Cambridge Pixel's new RADARWATCH display application and tracking software improves safety at firing ranges by providing an integrated radar video and AIS (ship transponder) track display, as well as alarm capability for targets entering user-defined danger zones. RADARWATCH is designed for integrators of coastal surveillance and small port & harbour security applications, and features comprehensive alarm logic allowing alarms to be configured based on areas, target activity, or target behaviour. RADARWATCH can display tiled maps, S57/S63 electronic charts, video from up to 2 radars and 16 cameras, within multiple windows and across multiple screens. It is compatible with most radar scanners.

■ Naval Surveillance System for Latvia

(ck) CONTROP, a company specialising in Electro-Optics (EO) and InfraRed (IR) defence solutions, will provide the Latvian Navy with

its ISEA-30HD system, to enhance the Navy's maritime surveillance capabilities. The system was designed for various maritime vessels and is already in use by the Latvian



Photo: CONTROP

Navy and other navies worldwide. The ISEA-30HD has a stabilisation system that enables a continuous line-of-sight (LOS) to ensure a clear picture even in rough seas and in harsh environmental conditions including fog, high salinity, and moisture. The ISEA-30HD interfaces with other onboard systems, including the vessel's radar system, providing slew-to-cue functionality. The system comprises the payload electronics box, a Control Unit (CU), a display, DVR and UPS. As part of the contract, CONTROP provides the Latvian Navy with training, operator and technical manuals and spare parts. ISEA-30HD's real time live images can be transmitted from the scene to an operational centre, which enables decision making even during limited visibility conditions. This system can detect small floating objects undetectable by the vessel's radar. The system's sensors include a 3-5µm IR detector based Thermal Imaging (TI) camera, with a continuous zoom lens, a HD colour day camera, and an Eye-safe Laser Range Finder.

■ Underwater Security Systems for the Netherlands

(ck) The Dutch MoD has contracted DSIT Solutions, a subsidiary of Rafael Advanced Defense Systems, for its POINTSHIELD Portable Diver Detection Sonars (PDDS). POINTSHIELD is an automatic underwater security system for protecting ships as well as fixed critical coastal and offshore sites from underwater sabotage. The system can automatically detect, track and classify all types of underwater threats and provides operators with real time continuous monitoring of all types of intrusions. The system is in service with several navies and coast guards around the world.



Photo: DSIT

■ New DRONE GUARD

(ck) The use of commercially available small drones has increased dramatically over the past few years. These platforms threaten sensitive facilities, crowds, major events and high profile individuals, as well as other aircraft, due to their small size, slow speed, and

Photo: ELTA Systems



low altitude. ELTA responds to these challenges with its enhanced DRONE GUARD C-UAS system which detects and disrupts the operation of UAS and small drones. The new DRONE GUARD has added a Communication Intelligence (COMINT) system for more precise detection and identification based on broadcast frequency and communication protocol analysis and verification to neutralise threats. The COMINT system can jam or disrupt the drone's control channel and navigation, by supporting an array of communication protocols that can 'fend off' a single drone or even a swarm of drones from the intended target.

■ GUARDION Protected German Holiday

(ck) The modular drone defence system GUARDION (C-UAS) supported the Berlin police in protecting against drone threats on the German Re-Unification Holiday on 3 October 2018. GUARDION, as a modular C-UAS system for complex security applications, was integrated into the security architecture of the Berlin authorities. This C-UAS system was developed jointly by ESG, Rohde & Schwarz and Diehl Defence and has con-

Photo: ESG



tributed several times to the security of major political events such as the G20 Summit in Hamburg in 2017, the state visit of US President Obama in June 2016 and the 2015 G7 Summit. GUARDION offers scalable solutions for the detection and disruption of

drones in stationary, mobile or operational configurations. ESG is responsible for the selection, integration and networking of the sensors, the optimised situation overview with the TARANIS control system developed by ESG and the connection to existing IT networks and infrastructures.

■ New 81mm Mortars for Swiss Army

(ck) At the conclusion of the 81mm Mortar Replacement Programme launched in 2015, the Swiss Procurement Agency, armasuisse, has contracted EXPAL Systems to supply the new 81mm mortar system to the Swiss Army. By enhancing accuracy, reliability and manoeuvrability in operations, EXPAL has modernised the weapon system to adapt it for the needs of indirect fire on modern battlefields. EXPAL offers 60, 81 and 120mm mortar systems and the entire

Photo: EXPAL



portfolio of ammunition, as well as EIMOS, a 60/81mm mortar system integrated into a high mobility vehicle. EXPAL will also deliver its Fire Control System TECHFIRE and the mini UAV SHEPHERD-MIL, used as Unmanned Forward Observer, to the Swiss Army. EXPAL mortars are in service in 10 European armed forces.

■ Australia Selects PREDATOR

(ck) Under Project Air 7003, Australia has selected General Atomics Aeronautical Systems, Inc. (GA ASI) to provide Armed Remotely Piloted Aircraft Systems (RPAS) to the Australian Defence Force (ADF). The ADF has selected the MQ-9 variant, a part of GA-ASI's PREDATOR series, because of its proven performance; it recently surpassed five million flight hours. GA-ASI has established a grouping of ten Australian companies called "Team Reaper Australia" which provide a range of innovative sensor, communication, manufacturing and life-cycle support capabilities. Team Reaper includes Cobham, CAE, Raytheon, Flight Data Systems, TAE Aerospace, Quickstep, AirSpeed, Rockwell Collins Australia, Ultra, and SentientVision.

■ New HUGIN AUV

(ck) Kongsberg has enhanced its proven HUGIN AUV (Autonomous Underwater Ve-

Photo: Kongsberg



hicle) for subsea survey missions. The new HUGIN SUPERIOR offers enhanced data, positioning and endurance capabilities to improve subsea survey operations for commercial or government users. HUGIN SUPERIOR is equipped with the new HISAS 1032 Dual Receiver Synthetic Aperture Sonar (SAS) which generates approximately 1000 metres swath at 2.5 kn for SAS imagery, real aperture and SAS bathymetry, with consistent resolution over the entire swath (typically 5x5 cm in mission imagery). The system also features the industry standard EM2040 Mk II multibeam echosounder. A data suite with upgraded SAS processing, sidescan sonar imagery, bathymetry, sub-bottom profiler, camera, laser, magnetometer, turbidity and diverse environmental sensors for methane and CO2 measurement, for example, allow the new HUGIN to be used in development surveys, pipeline inspection, environmental monitoring or wreck searches. The new HUGIN SUPERIOR also comes with a 30% increase in energy capacity on board.

■ First Launch of MARTE ER

(ck) On 9 November 2018 MBDA fired its first MARTE ER missile, marking the successful completion of an important phase in the development of MBDA's anti-ship weapon. The missile was tested on an Italian firing

Photo: MBDA



range, and the rocket flew more than 100 km on a planned trajectory comprising several waypoints and an overflight, and it successfully completed all flight phases. The MARTE ER can be fired from ships, helicopters, coastal batteries and fighter jets. In early 2018, the Qatar Emiri Air Force (QEAF) ordered the MARTE ER for its new NH90 helicopters. The MARTE can perform a variety of missions and therefore provides a high

degree of flexibility. After the 18-month system definition phase, MARTE ER will be integrated onto the Eurofighter TYPHOON to provide the aircraft with an anti-ship capability.

■ New Batteries for Submarines

(ck) Naval Group has developed a powerful and highly secure LIBRT Lithium-Ion rechargeable battery system to increase the dived time of conventional submarines and optimise charging time. This success is the result of collaboration between Naval Group and several other French organisations. The LIBRT Li-Ion battery system improves safety on board submarines and reduces the signature. LIBRT technology delivers twice as much power as previous-generation submarine batteries, so in hostile environments the submarine benefits from a longer range under water, and the rapidly rechargeable battery reduces the time required for snorkelling, increasing the submarine's survivability. The LIBRT lithium-ion battery system was developed as part of a Naval Group R&D programme in collaboration with the French Procurement Authority (DGA).

■ NATO Delivers New Radars to Lithuania

(ck) The NATO Communications and Information Agency (NCI Agency) successfully handed over two new radars to the Lithuanian Air Force on 4 December 2018. This milestone was reached after years of collaboration with Lithuania to procure fixed air defence radars. The NCI Agency brought expertise from managing the same work for other NATO nations including the Czech Republic, Hungary and Poland. The Lithuanian radars are now contributing to NATO's air surveillance capability as part of the NATO Integrated Air and Missile Defence System. In return, Lithuania receives combined NATO Air Surveillance data, allowing visibility on air traffic far beyond the nation's borders. Previous Lithuanian radars dated back to the era before the nation acceded to NATO in 2004. These systems could not meet NATO's needs, leading Lithuania to seek a modern air surveillance capability, and the €40M project began with a study conducted by the NCI Agency, on the country's radar capabilities. Based on the study's outcome, the Lithuanian MoD requested the Agency to run the procurement, which began in 2010. Spanish company Indra provided the radar systems, and the NCI Agency conducted factory acceptance tests, site acceptance tests and live flying tests.

■ Oshkosh for US Army

(ck) The US Army will buy 6,107 Joint Light Tactical Vehicles (JLTV) and associated installed and packaged kits from



Photo: Oshkosh

Oshkosh Defense. The contract is worth US\$1.69Bn. To date, Oshkosh has delivered more than 2,600 vehicles. Oshkosh expects a Full Rate Production (FRP) decision in December 2018, followed by a first Army unit equipped in early 2019. The JLTV fills a critical capability gap for the US Army and Marine Corps by replacing a large portion of the legacy up-armoured HMMWV fleet with a modern light protected vehicle.

■ German Army to Receive New Trucks

(ck) In the summer of 2017, the German procurement authority BAAINBw awarded RMMV a framework contract to supply the Bundeswehr with 2,271 trucks from the HX2 family, with a total value of €900M, including special tools and training support. In November 2018, the first 20 factory-fresh military trucks were handed over to German Army logistics. The new trucks will gradually replace the ageing Kat I mil gl vehicles. The versatile, high-performance 6x6 and 8x8 trucks have an unprotected cab, but the chassis is designed so that it can later be replaced



Photo: RMMV

by a high-protection armoured cab. In this way the trucks can be transformed at any time into protected vehicles that remain as manoeuvrable and flexible as ever, despite their extra weight, and offer their crews protection when deployed in harm's way.

■ MTU Generators for UK TYPE 45 Vessels

(ck) Rolls-Royce is to supply 18 MTU Series 4000 diesel generator sets to BAE Systems as part of the Power Improvement Project (PIP) to increase the resilience of the power and propulsion system in all six TYPE 45 destroyers. The PIP is required to deliver a significant improvement in the performance and reliability of the Type 45 destroyers. The two existing diesel gensets are to be replaced by three MTU



Photo: RRPS

gensets per vessel. These three MTU gensets will complement two existing Rolls-Royce WR21 gas turbines, also supplying power to the electric propulsion system.

■ Mobile Aerostat System for Rough Terrain

(ck) Israeli aerostat company RT LTA Systems has presented a new version of its SKYSTAR aerostat series: SKYSTAR 120. SKYSTAR 120 is a micro-tactical aerostat system designed to provide commanders with a real-time reconnaissance capability when operating in rough terrain. The SKYSTAR 120 Ground Control Station is mounted on an all-terrain vehicle, allowing the operating force to keep moving with the aerostat on the vehicle alongside them, either filled with Helium and ready to be launched or already flying in the air. This allows the operating force to better fit the observation and communication lines in real time according to field conditions. The SKYSTAR 120 is operational under extreme weather conditions and offers surveillance range of up to some 500 m.

Photo: RT LTA



■ Manned – Unmanned Helicopter Teaming

(ck) On behalf of the German procurement authority, BAAINBw, UMS SKELDAR, a provider of rotary Unmanned Aerial Vehicles (UAV) and avionics software, has cooperated with ESG in a live demonstration of manned-unmanned teaming (MUM-T) of helicopters. The demonstration involved an Unmanned Mission Avionics Test Helicopter (UMAT), based on the SKELDAR R-350, and a German Armed Forces Bell UH-1D HUEY manned helicopter. The demonstration shows the increase in reach and forward reconnaissance of manned platforms into potentially dangerous situations. "In the joint exercise, the pilot took the role of Mission Commander, co-ordinating with in-air displays to monitor the UMAT payload data / video stream, as a UMAT position on a Sense & Avoid display / moving



Photo: UMS SKELDAR

map," UMS SKELDAR reported. Missions included the provision of reconnaissance data from a selected location, exploration of forest perimeters between positions and the validation of possible landing zones for the helicopter.

■ New Lithium-Ion Submarine Battery

(ck) thyssenkrupp Marine Systems (tkMS) has developed a new type of lithium-ion battery system for submarines together with Saft, a manufacturer of advanced battery systems for industry. In an adapted form, the system could also be used for other maritime applications in future. Compared with lead-acid batteries, maintenance is negligible, and the lifetime is much higher. "The new batteries depend little on the removable energy from the discharge currents and a submarine can – regardless of battery charge – drive at maximum speed" tkMS reports. In addition to a system design tailored to safety and to the special requirements of operations in the maritime sector as well as a

selection of safe cell chemistry, a series of tests has demonstrated system safety at battery cell and system level. The system is a study carried out on behalf of the German procurement authority BAAINBw, to support battery integration into new submarine projects for HDW Class 212 as well as re-fit solutions into existing weapon platforms.

■ Camcopter for Maritime Safety Agency

(ck) The European Maritime Safety Agency (EMSA) has contracted Schiebel with



Photo: Schiebel

a coveted maritime surveillance service provision contract. EMSA selected Schiebel's CAMCOPTER S-100 UAS based on its maritime surveillance expertise. Payload capabilities and VTOL abilities from shore and from vessels were further qualifying factors. In fulfillment of this contract, Schiebel will provide simultaneous maritime surveillance services at several sites. The CAMCOPTERs will be equipped with an L3 Wescam MX-10 Electro-Optical/Infra-Red (EO/IR) camera gimbal and an Overwatch Imaging PT-8 Oceanwatch payload, as well as an Automatic Identification System (AIS) receiver.

■ Counter-Mortar Radar for US Marine Corps

(ck) The Marine Corps Systems Command has awarded SRC Inc. a 5-year



Photo: SRC

indefinite delivery, indefinite quantity (IDIQ) contract with a ceiling of US\$93M for the "sustainment support and technology refresh" of the USMC inventory of AN/TPQ-49 systems and procurement of new AN/TPQ-49A systems. The contract includes system refresh kit installation, new system production, live fire testing, programme management, initial/sustainment spares provisioning, and equipment training. The AN/TPQ-49 radar system is a current US Marine Corps programme of record and provides early warning and location of the rocket and mortar threats facing troops. The fire detection radar provides continuous 360-degree surveillance and 3-D rocket, artillery and mortar (RAM) location using a non-rotating, electronically steered antenna.

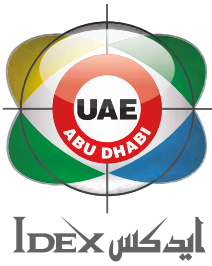
■ New Naval INS

(ck) Safran Electronics & Defense has developed two new Inertial Navigation Systems (INS) product lines for both surface vessels and submarines - BLACK ONYX and ARGONYX - which increase operational effectiveness, facilitate product integration and reduce the cost of ownership. The ARGONYX product line is for all surface vessels, from patrol boats and corvettes to frigates and aircraft carriers,



Photo: Safran

while the BLACK-ONYX product line covers all submarines, conventional and nuclear-powered, as well as air-independent propulsion (AIP) models. The navigation units are light and robust and deliver all the data needed for navigation: heading, roll and pitch, angular velocities, position and heave, vertical/horizontal speed and acceleration. They also offer high performance in environments without access to signals from global navigation satellite systems (GNSS), allowing submarines to run without surfacing for unprecedented periods. Compatible with Sigma 40 interfaces, they are interchangeable, which means they can be selected for modernisation and upgrade programmes.



IDEX 2019

INTERNATIONAL DEFENCE
EXHIBITION & CONFERENCE

ABU DHABI, UAE

25 ANNIVERSARY OF
THE INTERNATIONAL
DEFENCE EXHIBITION
AND CONFERENCE
ABU DHABI, UAE

DEFENCE TECHNOLOGY FOR THE FUTURE

The Middle East and North Africa's largest defence and security exhibition returns to Abu Dhabi in February 2019.

VISITORS REGISTRATION IS NOW OPEN!

The global defence industry will continue to meet influential VIP's, decision makers, military personnel and key investors at IDEX 2019. Attracting more than 1,235 exhibitors and 105,000 local, regional and international trade visitors and officials from government industry and armed forces.

For detailed information about IDEX 2019, please visit www.idexuae.ae

To book an exhibition stand or outdoor space please email:
shahla.karim@adnec.ae or
rashed.alkaabi@adnec.ae

17-21 FEBRUARY

idexuae.ae

Strategic Partner



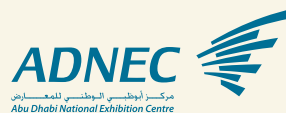
Principal Partner



Organised By



Host Venue



In association with



Platinum Partner



Gold Partner



Official Healthcare Provider



Russia's Vostok-2018 Exercise: What Does it Mean?

Stephen Blank

From Russia's standpoint, it is at war with the West. Moreover, it has made clear that, in the event of a war in the Baltic and presumably elsewhere on its periphery, it will not hesitate to use nuclear weapons.

Furthermore, every major Russian exercise has a nuclear component to it. Under the circumstances, it behooves us to understand whatever messages and les-

forces. Turkey too was invited but declined to appear, an invitation that undoubtedly reflects Russia's efforts to further distance Turkey from NATO.

Rehearsal of a Major War

But its importance and significance hardly end here. New weapons like the Su-34 and Su-35 fighter jets, new tanks, ships, and KALIBR cruise missiles were all deployed here. And the exercise clearly aimed to test the preparedness of both front-line and reservist forces as well as Russia's capacity for mobilising forces from regions of over 7,000 kilometres. Thus Vostok-2018, building on previous annual and other exercises represents a rehearsal of major theatre war that Russia hopes to keep at a conventional level but with the nuclear threat firmly in view and ready to use if NATO or some other opponent counterattacks. Building on past exercises, Moscow apparently believes large-scale joint operations on its periphery are likely and therefore must be rehearsed in advance. And the command and control of such forces also entails, as occurred in previous annual exercises, the large-scale mobilisation and rapid deployment of troops from the interior to the periphery as quickly as possible. As Dmitry Gorenburg writes, "Moscow will proclaim that Vostok-2018 is not related to current international events and situations but these 'strategic manoeuvres' are, in fact, a rehearsal for mobilisation, deployment and operations in a multi-theatre, if not global, war." Thus Gorenburg's view accords with that of this author as previously written. Furthermore, the emphasis on purely conventional operations in the initial phases of any future conflict does not mask the fact that Moscow also envisages the potential use of nuclear, biological, and chemical troops in a future war and corresponding military scenarios necessitating their use. Indeed, all three types of troops participated here and like other exercises Vostok-2018 was collocated in time with nuclear exercises. This replicates the earlier pattern of simultaneous or rapidly sequential nuclear and conventional exercises. For example, in 2016, ten days after exercise Kavkaz (Caucasus) the nuclear-armed Northern Fleet be-

Photo: Kremlin



The opening of the Vostok-2018 manoeuvre at Tsugol Military Training Ground in Zabaikalskii Krai, Russia, on 13 September 2018

sons we can learn from Russian exercises, especially one like Vostok (East)-2018 that was the largest in Russian Federation history and was both a joint and combined arms exercise involving all the branches of Moscow's conventional and nuclear forces along with Chinese and Mongolian

First of all, Vostok-2018 was not a strategic command-staff exercise but rather strategic manoeuvres, and nothing like that has been conducted on Russian territory since Zapad-81 by the USSR in 1981. Counting all personnel in the Central and Far Eastern Military districts the total number of forces was supposed to come close to 300,000, the largest exercise since Zapad-81 as well. Officially, Vostok-2018, not surprisingly for an exercise on this scale, had as its stated goal the improvement of command and control of joint military operations across multiple services (and given China and Mongolia's presence, combined operations as well) in the Far East, rehearsing the movement of troops over large distances and the coordination of operations between the ground forces and the Pacific Fleet. And there is no reason to think this was not a major – or even the primary – purpose of the exercise.

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 focussed 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.

gan a naval all-arms exercise utilising coastal defence forces, surface ships, naval aviation, supply ships, and submarines. This exercise spanned the entire length of the Arctic coast from Franz Josef Land to the Laptev Sea and the Bering Strait. In analysing this exercise, Johan Norberg observes that, "Exercises in the Kola region [off the Arctic-author] soon after an annual strategic exercise enable the General Staff to train to handle an escalation from conventional war to nuclear."

Nuclear Scenarios

Vostok-2018 also comprised the large-scale involvement of the Northern and Pacific Fleets as well as the aerospace forces as well as the use of "new forms and methods of combat" that Russia learned from its Syrian operation. Among other things, this means that neither in the Pacific nor in Europe does Moscow think the Arctic and its forces based there (such as its Northern Fleet) can be isolated from that conflict. The implications for Europe and NATO are clear. Any European scenario will likely engage the Northern Fleet (a nuclear fleet) and the Arctic if not air and ground forces, in combat operations against NATO. Consequently, hopes of insulating the Arctic either as a matter of peacetime policy or of strategic planning from the overall deterioration of East-West relations appear to be unfounded and unrealistic. Indeed, despite disclaimers to the contrary, it appears that the Baltic Fleet also participated in this exercise by simultaneously conducting an amphibious operation including not only ground forces and the naval infantry but also drones, aircraft and helicopters. And since nuclear weapons feature in every major exercise and are "hard-wired" into Russian conventional operational planning, we should expect nuclear scenarios as well. Indeed, this author has previously argued that a Baltic scenario will necessarily spread into the Arctic. In Zapad (West)-2017, for example, what most observers regarded as an exercise against the Baltic actually involved highly complex large-scale, conventional and nuclear exercises in the Arctic. This suggested that Russia too cannot isolate these theatres in the event of a major conflict. Moreover, the fact of Vostok-2018 being a multi-theatre exercise suggests that Russia will command and control future operations like this, if not others as well, not from a district headquarters but from the national military centre in Moscow. In his remarks before the exercise began, Chief of Staff General Valery Gerasimov also indicated that the exercise would feature wide use of drones, airborne parachute drops, and mobile brigades making "non-standard decisions". The US analyst Michael Kofman took that last state-

ment to mean the inclusion of schemes of manoeuvre that do not incorporate extant drills or plays, use automated command and control, and involve staff planning that draws from operational experience in Syria. But it remains to be seen whether Russia will actually gravitate towards "free play" in its exercises and operations.

Chinese and Mongolian Troops

The second major element of Vostok-2018 is its inclusion of Chinese and Mongolian troops. Although only 3,200 Chinese troops took part, the scale and scope of this combined forces exercise far outstripped previous Sino-Russian exercises. Furthermore, Russian Defence Minister Shoigu announced that in the future Russia and China will regularly hold exercises like this, a sure sign to this writer of an alliance and of ever more intimate combined staffs' planning, since such exercises now include joint operations of multiple forces operating from multiple



Russian President Putin and Defence Minister Sergei Shoigu witnessed the Vostok-2018 manoeuvres.

theatres as well as nuclear issues. Additionally, the more China participates in Russian command, control, communications, and air defence and nuclear exercises the more allied they realistically become, whether there is a formal document or not.

Thus this exercise suggests that Russia will strive to master joint operations, including airborne, air assault, and amphibious varieties, and use them against adversaries, to knock out an opponent quickly. Likewise, the PLA clearly wants and feels it has to learn how to conduct joint operations of this sort to take down US (if not allied) forces in the Asia-Pacific. One Russian commentator described the scope of Russian operations here as comprising the use of rocket-propelled artillery, launches of the ISKANDER-M mis-

sile and the R-500 missile, anti-ship strikes using the MOSKIT cruise missile, air support of ground operations, the use of heavy flamethrower systems, a tank "carousel" fire damage method, aerial bombardment of ground targets, use of attack helicopters, and parachute or airborne assault.

Further Observations

As noted above, Vostok-2018, like its predecessors but even more so, points to Russian use of combined and joint forces in multi-theatre operations with a nuclear backdrop in the future as a likely contingency that Moscow will have to face or execute. We also noted the participation of the Arctic and Baltic Fleets, suggesting the multi-theatre nature of potential future operations and the fact that the Arctic, contrary to many fond hopes, will not be insulated from those potential future operations. But there is still more to this than the potentially ominous implications of large-scale joint operations and of possible military alliance with China in a multi-theatre conflict.

Photo: Kremlin

to accomplish missions in unfamiliar terrain to Russian success in Syria, the first example of the use of Russian forces in a remote theatre of operations. As a result, and probably this was further refined during Vostok-2018, “battalion-based tactical groups are being created on the basis of units manned by contract servicemen. They are provided with everything necessary for conducting combat operations, including surveillance, navigation, and closed communications.” Therefore, we also must keep in mind that forces are practising and preparing for the possibility of further expeditionary missions by Moscow to remote theatres. Thus Jack Watling, a land affairs analyst at RUSI, writes, “The exercises emphasise close collaboration between ground and air units as well as the use of specialist units in mixed formations, skill sets that are invaluable in the kind of expeditionary warfare that has for decades been the preserve of NATO. Many of the specific drills in the preliminary stage of Vostok-2018 have replicated fighting insurgents, and with Russia seeking further involvement in Africa, including Eritrea and the Central African Republic, these exercises are valuable in preparing for a more assertive foreign policy.”

Russian Expeditionary Campaigns

Yet at the same time nuclear-capable Tu-95 (BEAR) bombers were intercepted near Alaska, a pattern we have seen in earlier exercises, suggesting that the nuclear component was also a prominent feature of the Vostok-2018 exercise. Indeed, Tu-95 long-range aircraft crews undertook air patrol missions during the exercise and launched long-range cruise missile strikes. These observations suggest that, while the large-scale conventional theatre operation with the nuclear threat lurking visibly is the most likely expected contingency, Moscow is preparing for multi-theatre, joint, and combined exercises possibly with China against NATO and at the same time preparing for future expeditionary campaigns, possibly in the Middle East and even Africa. In other words, within the parameters of Vostok-2018, we see Russia contemplating the use of military forces for a wide range of operations comprising much, if not all, of the “spectrum of military operations” whether against NATO or in developing nations. Obviously this is a much more ambitious programme than anyone has imagined Russia can accomplish. But Russia is taking serious steps to outfit its forces with new weapons and technologies to accomplish a wider range of missions. For instance, it has reportedly tested advanced missiles that might be



Photo: V. Kiselev

Vostok-18 was the largest exercise since Zapad-81 (shown here), which involved over 100,000 soldiers and took place not only in the Soviet Union, but across several Warsaw Pact countries.

able to evade detection by radar technology during this exercise. If this actually occurred, it would have special relevance to the nuclear dimensions of Vostok-2018, because it would add stealth to the capability of Russian missiles. Under these circumstances, the rehearsed escalation from a conventional to a nuclear scenario should become an element of increased NATO attention.

A second aspect to bear in mind is that this exercise clearly displayed Moscow’s ambitions or fears as to what kinds of operations it must be ready for and perform. But while Russian media, in accordance with the hoary traditions of socialist realism, endlessly recount how all the objectives for Vostok-2018 were fulfilled, it is interesting to note that Chinese media, based on its forces and observers’ experiences and insights, were rather less impressed and filled their media with criticism of the Russian Army’s shortcomings. For instance, they reportedly used “exactly the same tactics that Soviet commanders had used 37 years ago”, suggesting quite strongly that in fact Russian operational art and tactics have not advanced much since then. Indeed, they suggested that if Russia employed such tactics against China there would be “colossal” Russian losses. Chinese reports also pointed to outdated equipment in many areas despite the Russians’ employment in some zones of their most advanced weapons.

Whether these Chinese reports are true or not, we must remember that Russian tactics in Ukraine if not Syria have proven highly effective and forced NATO to send forces to Ukraine to learn from its forces how to meet those tactics, particularly with regard to electronic warfare and long-range fires. Beyond that fact nobody, including China, disputes the lethality and power of the new Russian conventional strike packages that have come into being in the last decade. We must also remember that China’s forces have not experienced combat since 1979 and are not noticeably reticent about emulating the Russian penchant for boasting about their forces in regard to other countries’ operations and forces.

Finally, the fact that Russia tried to introduce “non-standard” tactics suggests that the Russian military leadership grasps its problem to at least some degree and is seeking to remedy it. And even though Russia has never been known for tactical innovation, it has since 2014 shown that its leadership has inherited the Tsarist and Soviet ability to innovate at the operational level where it possibly counts more. Certainly, as the experience of the Wehrmacht in World War II and the US in the last decade suggests, tactical proficiency alone, though critical, is not all that it has been cracked up to be, and is not enough to bring about decisive and positive strategic outcomes.















Conclusions

On balance, Vostok-2018 shows that Moscow is contemplating expeditionary as well as theatre-wide contingencies both conventional and nuclear. Neither does it renounce chemical or biological warfare and clearly expects to use those weapons and perhaps confront them as well. We also see that Russia is learning how to conduct large-scale mobilisation and rapid deployment, and conduct joint and possibly combined operations. In addition, nobody should think that somehow the Arctic will not be involved in these future large-scale contingencies. If anything, Arctic forces, whether they be conventional or nuclear, will probably be engaged rather quickly in combat scenarios in Europe and possibly in Asia, since anyone wanting to fire submarine-based nuclear missiles, as the US does, needs to be able to do so from Arctic waters located near the North Pacific. Whether or not the aforementioned Chinese critiques are on point, it seems clear from this exercise and everything that we have seen since the invasion of Ukraine in 2014 that Russia not only believes itself to be at war with the West, it is preparing for actual combat operations with what appears to be a much greater sense of urgency than is NATO. That conclusion, like the others stated here, does not give grounds for complacency. ■

DEFENCE IQ'S 2019 EVENTS CALENDAR

Defence IQ
a division of IQPC

OFFICIALLY
SUPPORTED BY
European Security & Defence

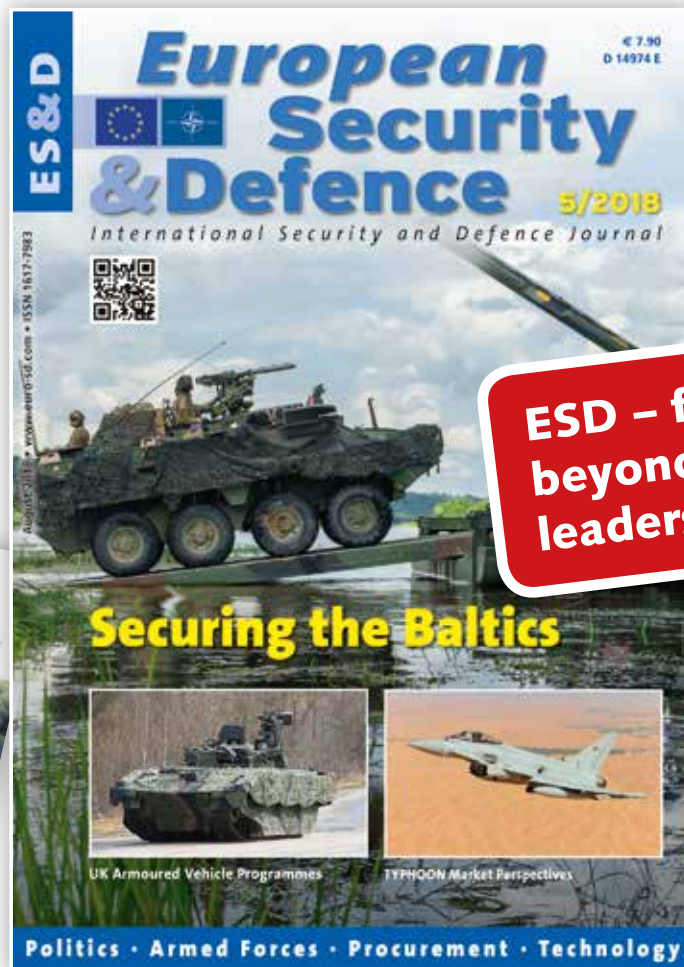
January		September	
January		September	SOLDIER MODERNISATION AND HUMAN SYSTEM ENHANCEMENT
February		September	
March		September	
May	UNDERWATER BATTLESPACE	October	
May		November	
May		November	
August		December	

FIND OUT MORE +44 (0) 207 036 1300 | enquire@iqpc.co.uk

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, transatlantic and global 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 and from the European theatre, to and from decision makers at all levels in the security and defence arenas.

Save over 30%!

→ Annual Subscription Rate:

€ 49.80

(print format; postage included)

Annual subscription includes 10 issues

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

Syria: A Chess Game of the World Powers

Andreea Stoian Karadeli

More than seven years have passed since the beginning of the unrest in Syria. What is the current situation in Syria?

Today, the al-Assad Government controls 60% of the country and the major population centres; Islamic State has been defeated and the rebels against

– have been displaced, leading to a refugee crisis in neighbouring countries and in Europe. Some observers have prematurely concluded that Bashar al-Assad has



Photo: USMC / Sgt. Matthew Callahan

A US Marine fires an M777-A2 Howitzer in Syria, 1 June 2017. The Marines had been conducting fire support for their local partners, the Syrian Democratic Forces.

A Short History of Syria

In the prosperous times of the Ottoman Empire, merchants, politicians and warriors used the word Syria to describe the country surrounded by the Taurus Mountains in the north, the Mediterranean in the west, the Sinai Peninsula in the south and the desert in the east. The province was a prosperous trading centre of the Ottoman Empire, recognised both in Europe and in the Arabian Peninsula.

For example, an 18th-century Parisian would have heard of this region as Levante; the old name comes from the Latin "levare", which means "to rise", because when seen from Paris the sun rises in the east. For an Arab merchant travelling north from present-day Saudi Arabia, the Syrian territory in Arabic would be called Bilad al-Sham or the "land to the left" of the sacred sites of Islam on the Arabian Peninsula. The two examples perfectly reflect the different perceptions of Syria which ultimately translate into different geopolitical interests and which, in turn, result in foreign and regional powers determining the dynamics of the Syrian war.

Syria has always been dominated by its stronger neighbours who pursued their own interests. The geographical location of the country was well-suited for the emergence of larger population centres. Any power trying to control the country inevitably had to cross Syria, where blood was shed, races mixed, religions negotiated and goods traded at a furious pace. Unfortunately, Syria was often divided or subordinated by its neighbours, who took advantage of Syria's geographical weaknesses and sectarian divisions, and it has not been much different since the Syrian uprising in 2011.

After the Sykes-Picot Agreement of 1916, Syria and the Levant fell under French rule. The French skilfully exploited the sectarian division in the country, and they were masters in manipulating ethnic and religious minorities. At the time, very few were aware of the disastrous long-term effects of this strategy. The French preferred a group called Nusayris, who lived along the rugged Syrian coast, gave them the Alawite religion and

Author

Andreea Stoian Karadeli is a Foreign Lecturer in the Faculty of Political Sciences at Sakarya University in Turkey and a Ph.D. Candidate at Mihai Viteazul National Intelligence Academy in Romania. Her interdisciplinary research varies from cultural and intercultural studies to conflict resolution and focusses on national security and terrorism, with expertise in the Middle East. Latest publications of the author describe the Daesh phenomenon in Turkey and Europe.

won the war because he has managed to remain in power for so long. Whether winner or not, he is definitely the ruler of the country, which is only a shadow of pre-war Syria: Most of the Syrian economy has been destroyed, including the national and economic infrastructure.

The impact of the Syrian civil war is more complex than expected, while the impact on the region will be felt in decades to come. This article examines the current situation in Syria from a geopolitical perspective and argues that the Syrian war is far from just a sectarian conflict, but the perfect mirror of today's international political system – a multidimensional chess game.



Destroyed tanks in front of a mosque in Azaz, Syria. The city north of Aleppo saw heavy fighting between the Free Syrian Army (FSA) and the Syrian Arab Army (SAA).

staffed many military positions with them during the French mandate. The Alawites eventually became the ruling elite of the country, beginning with the coup d'état of Hafiz al Assad in 1970.

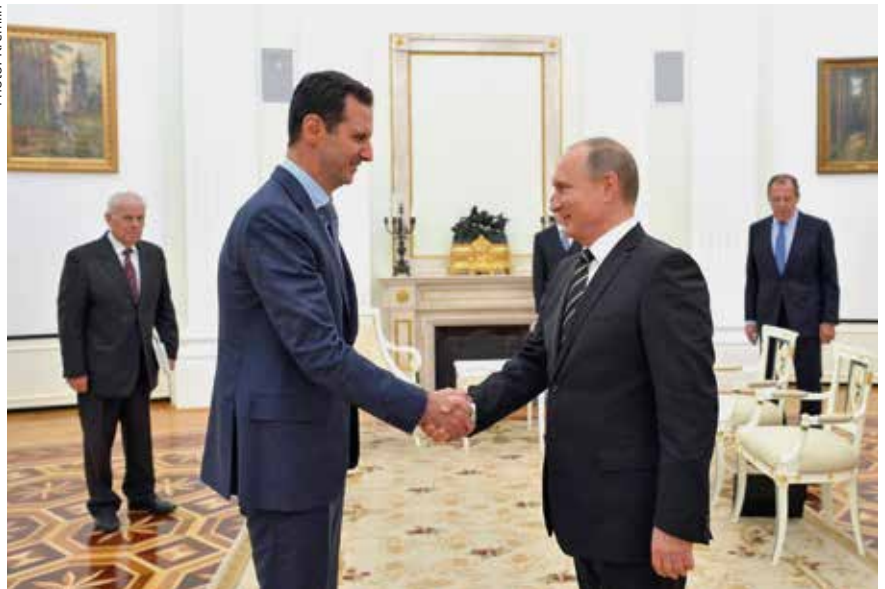
The Geopolitics of the Syrian War

The Syrian crisis began in 2011 and gradually escalated beyond the problem of a single state into a regional proxy war between the great powers. The civil war within the country resulted from sectarian dynamics and influenced the geopolitical rivalry between the regional and global powers that participated as proxies in the civil war. Figuratively speaking, Syria became a multi-dimensional chessboard with changing opponents who, when things don't go well, would rewrite the rules and adjust them to their agenda.

Bashar al-Assad is one of the kings on the chessboard, and his goal is the reunification of the country under the rule of Damascus and the reconstruction of the destroyed cities of Syria. Idlib is the last remaining hurdle before his goal, where a large concentration of anti-Assad groups endures – jihadists associated with Al Qaeda and a modest Turkish occupying power representing Operation Olive Branch. The province bordering Turkey in the north is mountainous and its reintegration into a post-war Syrian nation state will be difficult.

Currently, the Syrian war has at least three theatres, each with its own complexity: Idlib in the north, the area east of the Euphrates River and the region adjacent to the southern Golan Heights. The mere classification of the various armed forces involved is exhausting. Turks, Iranians, Americans and Kurds are the most important actors in

the East. Russians, Turks, Kurds and Assad are in a temporary stalemate in the north. And Iran, Assad and Israel are in a dispute over Golan, a conflict that has suddenly even spread to Moscow. But the conflict is far from over, and a new trouble spot of particular interest to Turkey is Menbij. At the moment, Turkey and the USA are still conducting joint patrols in Menbij, but their interests differ and tensions might flare there as well.



Syrian President Bashar al-Assad meeting with President Putin in Russia, 21 October 2015

On one side of the chessboard there are three important forces: Turkey, Russia and Iran. Their plans for the Syrian conflict were never compatible, but the eventual unity of their position results from their own needs and from the bad strategy of the other side: the United States and its allies.

Turkey's Perspective

First of all, Turkey still looks back nostalgically on the times of the Ottoman Empire, when the Syrians were part of their rule, but at the same time Turkey is aware that the Syrian crisis directly affects Turkish domestic politics. More than 3 million Syrian refugees are in Turkey according to official figures; the number may also be much higher. At the same time, the horror scenario of Kurdish autonomy would reinforce the Kurds' dreams of independence in Turkey. President Erdoğan would then face the darkest fear of the Turkish nation, which was reflected in history in the Sevres Agreement. The Sevres Agreement should never enter into force and leave the Lausanne framework, but the fear of division and territorial loss has shaped Turkish politics and its perception of national security and terrorism. The internal struggle with the PKK (Kurdish Workers' Party) escalated into an external struggle with its Syrian faction – PYD (Democratic Union Party) and its armed division YPG (People's Protection Units) supported by the United States, a NATO ally for Turkey.

Therefore, Turkey felt betrayed by the Americans and decided to negotiate with Russia and finally Iran, the two supporters of Assad, in the Syrian game of chess. It was not an easy

decision, but in the end President Erdoğan fully implemented this decision at the international level, being aware of the Turkish potential and historical heritage in the region. Turkey will play a decisive role in the Syrian post-conflict negotiations, both for symbolic reasons and to isolate the Kurds in order to protect itself from an internal crisis.

By early 2018, the Turks had already conquered one of YPG's three Kurdish cantons – Afrin in "Operation Olive Branch" – after occupying the Azaz-Jerablus-El-Bab triangle and displacing ISIS in "Operation Euphrates Shield". These were successful but dearly won battles. But the war is far from over, and the hardest battle is yet to come. The main forces of the Kurds – about 60-70,000 fighters – are concentrated behind the Euphrates. There are more than a dozen American military bases in their territories. Given the fact that Turkey is fighting three different terrorist organisations inside and outside its borders and at the same time has to maintain military progress in Northern Syria in the face of the internal economic crisis and the refugee crisis, it is quite difficult to predict the outcome of their efforts.

Russia's Motives

Unlike Turkey, Russia and Iran have supported the Syrian regime since the beginning of the crisis. Their motives are also based on their own ideas in the region. Russia has had a relationship with Syria since Soviet times, as it is the only Russian partner in the Mid-

dle East and houses the Russian naval base in Tartus, the only Russian Mediterranean port. In addition, by supporting Assad, Russia wants to legitimise its military power in the region in order to be considered an indispensable pole in a multipolar international system. Another reason for Russia's interest is the large natural gas reserves discovered in the Levant Basin off the coast of Israel and Cyprus, which is why it is of great economic importance for the Kremlin to exercise control over these natural gas reserves.

The Shiite Crescent

Iran is the third pillar and a strong ally of the Syrian regimes; it can be described as a symbiotic relationship: Syria is crucial for Iran, and Iran is crucial for Syria. Relations between Syria and Iran point to their common enemy Israel. Historically, Syria has been Iran's strategic partner in deterring Israel from attacking the Islamic Republic or its nuclear power plants, and Syria has been Iran's direct supply line to Hezbollah and as an instrument for Tehran to expand its influence within the "Shiite Crescent" – the growing number of Shiite regimes loyal to the Islamic Republic. With

regard to the Syrian conflict, the Iranian Government's strategy is to keep Assad in power for as long as possible, if not indefinitely, while creating conditions for it to retain its influence in the event of the fall of the Syrian president.

The Islamic Republic is pursuing this strategy by providing material support for the Assad regime and its armed forces. In addition, Iran supports pro-Assad militias that maintain Iranian influence in Syria in the event that the president is overthrown. Iran has trained militants before sending them to Syria. This approach serves the short-term goals of the Iranian Government and at the same time creates the basis for Iran's long-term interests in the Levant. Syria is also a pawn in the Iran-Hezbollah axis, which serves as a supply route for weapons. This is the reason for the concentration of pro-Assad forces in early 2012 in the Damascus suburb of Zabadani, a large urban area along Hezbollah's supply route.

The Western Involvement

On the other side of the chessboard, the United States has been joining forces with its European allies (especially Britain and

Defence IQ presents the 19th annual... @IAVehicles #IAVEvent

International Armoured Vehicles

21 - 24 January, 2019
Twickenham Stadium, London, UK

THE WORLD'S PREMIER ARMoured VEHICLES FORUM

<p>21 JANUARY 2019 07:00-16:00 MRO & RETROFIT IN-SERVICE SUPPORT DRINKS RECEPTION</p>	<p>22 JANUARY 2019 07:00-20:00 MAIN CONFERENCE DAY ONE DRINKS RECEPTION</p>	<p>23 JANUARY 2019 07:00-18:00 MAIN CONFERENCE DAY TWO DRINKS RECEPTION</p>	<p>24 JANUARY 2019 08:00-15:30 ROBOTICS & AUTONOMOUS SYSTEMS FOCUS DAY END OF CONFERENCE</p>
--	--	--	---

THE WORLD'S LARGEST DEDICATED ARMoured VEHICLES CONFERENCE

70+

SPEAKERS

50+

NATIONS

60+

SPONSORS

"One of the advantages of seminars like this is that we, the military, get to describe our challenges... and then our industry partners can give us an idea of what is in the realm of the possible - what technologies are out there - and then as we give them requirements, they can give us possible solutions"

General Perkins,
 Commanding General,
 U.S. TRADOC,
 2017-2018
 Keynote Speaker

Register online at: www.interantionalarmouredvehicles.com
or call +44 (0) 207 036 1300

France) and its Middle Eastern partners (Israel and the Gulf states, led by Saudi Arabia), and they all are fighting for the fall of Assad and individual opportunities that will arise from Syrian chaos. Given the weak relations between Syria and the United States, it is understandable that the United States has based its

to trust the powers that supported it during the war. After Brexit, Britain has many problems to worry about, but the Syrian war is an opportunity to draw closer to its ally – the US – and show that the UK is still an important player on the chessboard, with or without the European Union. More than

Saudi Arabia used the Syrian Spring and its rapid escalation into civil war to confront its geopolitical enemy, Shiite Iran. Saudi Arabia actively financed the Syrian opposition during the civil war; according to reports, the Saudi Government financed large deliveries of infantry weapons from Croatia to the Syrian rebels. In addition, Saudi Arabia is spending millions of dollars to support and train the Syrian rebel group Jaysh al-Islam to overthrow Syrian President Bashar al-Assad and counterbalance the jihadist groups operating in Syria. It is essential for Saudi Arabia that Assad falls from power and that Iran does not expand its influence in Syria. This would allow Iran access to the Mediterranean and support its proxies.



Photo: Kremlin

Kurdish YPG fighters retreating to the forests of the Afrin region in northern Syria to flee from the Turkish Operation Olive Branch, 3 February 2018

Syrian policy on indirect intervention. The US, together with two of its main European allies – Britain and France – has supported the Syrian opposition and the various cells that have emerged in Syria, but most of the support has gone toward their old local partners – the Kurds. The intensification of the conflict has led to an increase of the economic and military involvement of the US, which is why the USA has given up on its original policy of indirect intervention. The bill is expensive: 2,000 boots on the ground and more than US\$30Bn spent, and the war is not yet over. President Trump's promise to pull out of Syria in early 2018 has not yet been fulfilled.

With the balance now tilting toward Iran and its sectarian allies, France's current policy of supporting the Sunnis and Saudi Arabia against the Alawite regime developed by the French in the first place has a touch of irony, but it fits in with the classic balance of power approach to the region. The Alawite regime no longer meets France's expectations, and it has been spiralling out of control and prefers

anything, for the UK as a great power in decline, the war is more of a desperate struggle to preserve its prestige that has been established over history.

Israel bases its strategy towards Syria on the "Oded Yinon Plan for Greater Israel", which aims to transform Israel's geopolitical environment into smaller, weaker and more easily controllable regional units by Balkanising the large Arab states surrounding it. At the same time, Syria's defeat for the Assad regime will also be a defeat for Iran, which will be even more isolated and lose contact with its Lebanese partner Hezbollah.

The Syrian chessboard is also important for Iran–Saudi Arabia antagonism. Already in 2008, rumours circulated that the Saudi Government wanted to start a civil war in multi-religious Syria. The plan to turn Muslims and Christians against Allawites, Muslims and Allawites against Christians and Christians and Allawites against Muslims would have led to total chaos if it had not been intercepted in time by Syrian security forces with some Iranian help.

China's Intentions

Hidden behind the various chess players, China supports Russia and pursues a policy of indirect intervention in the region. China, like the USA, has a leading position behind politics in Syria. The antagonism between the USA and Russia has a major influence on Syrian policy in China. In this way, China has called American hegemony into question as it is showing resistance to US global dominance and wants to expand its sphere of influence in the Middle East vis-à-vis the US. Thus, Syria became a place of resistance against the USA by chance. Together with Russia, China became the advocate of the Westphalian system. At the same time, China became the largest investor in Syria's oil industry. First and foremost, China wants to expand its economic and trade relations in the Middle East, which it has been developing since 2016, thus triggering a geo-economic rivalry with the US in the region.

Conclusion

The Syrian war is a complex interplay of motives and agendas of various regional and international actors. Each player in this multidimensional chess game has his own interests and fears on which his actions and strategies are based. Some players have changed sides and others have changed from players to pawns, but the game is far from over and no winner is discernible. Given these geopolitical factors, details such as the restoration of peace and stability throughout the country or peace or national reconciliation between segments of Syrian society are still far away, if at all possible. Like the factors that led to it, the impact of the Syrian war is deeper and more complex than expected and will be felt in the region for decades to come. ■



LAAD
DEFENCE & SECURITY
2019

02 - 05 | APRIL
RIOCENTRO
RJ | BRAZIL

THE LEADING LATIN AMERICAN DEFENCE AND SECURITY EXHIBITION



/LAADExhibition



/in/laadexhibition



/LAAD_Exhibition

WWW.LAADEXPO.COM.BR



+37.000
VISITORS

183
OFICIAL DELEGATIONS

+450
EXHIBITOR BRANDS

+442
PUBLIC SECURITY
AUTHORITIES

Association Support

Official Publication

International Official Publication

Associated with

Organised by



**Tecnologia
& Defesa**





Viewpoint from Jerusalem



Why Moscow Rewarded the Syrian Mishap

Tamir Eshel

In recent months Israel has become increasingly uncomfortable with the growing Russian presence in Syria, as it limits its ability to contain Iranian and Iranian-backed elements in the country. These include groups of Lebanese Hezbollah, trained, equipped and indoctrinated by Iranian revolutionary guards, and equipment supplied by the Iranians and designed to equip Hezbollah with anti-aircraft missiles and convert its rockets into precision weapons – activities considered by Israel as “game-changing”.

Until September 2018 Israel and Russia managed to coordinate and deconflict their activities over Syria, leaving Israel the freedom of action it needed as the civil war in Syria continued. Israel informed Russia about planned air strikes, while Russian air defence and fighter planes avoided confronting Israeli jets over the region. This arrangement lasted more than two years but was challenged repeatedly as the war drew to an end, and Israel stepped up its strikes against the growing Iranian presence.

Earlier this year Israel also targeted irregular paramilitary groups inspired and supported by Iran, as they established operating bases in Syria. Over time Israel became bolder and more persistent, while Iran intensified its activities in Western Syria, probing Israel’s response with increasingly aggressive activities.

Israel responded with a swift and heavy blow against Iranian forces deep inside Syria and against the Syrian air defence that tried to protect those targets. This led the Iranians to seek shelter in areas protected by Russian forces. For Tehran and Hezbollah, this would be ‘win-win’ situation – if Israel is deterred, they could expand their foothold in the area, and if Israel acts, it risks complicating its relations with Russia.

The first sign was the establishment of missile improvement facilities near Homs. Israel spotted the activity, located within the surface-to-air protected areas of Russian S-400 units. Despite this risk, Israel decided to act and attacked those facilities on July 22. Israeli fighter jets encountered heavy air defence activity from Syrian SAM sites, but the Russians remained quiet. The Iranians decided to move closer to the Russian bases. Less than two months later the Israelis spotted Iranian activity in Latakia, suspected to be an Iranian weapon storage

facility, very close to the Russian Hmeimim airbase. On the night of 17 September, the Israelis struck that target. As in previous strikes, the Israelis struck from standoff range, deploying sophisticated electronic attack and deception to avoid Syrian SAMs. However, a Russian IL-20 electronic reconnaissance plane that returned from a patrol mission over Idlib in Northern Syria was not lucky; it was identified as one of the attacking planes and was downed by Syrian missiles. Moscow blamed Israel.

Blaming Israel was easy. It helped the Russian military to cover the fact that the Syrian–Russian common aerial situational picture that was proudly announced last year had collapsed, that Russian planes flying over Syria do not share friendly identification (IFF) signals with Syrian air surveillance and that Russian supervisors who used to control Syrian SAM activities were removed from their positions, which exposes foreign aircraft to great risks.

Russian president Vladimir Putin, who initially sufficed with a cautiously worded statement the day after the incident, aligned with his military brass and rushed a battalion of S-300 PMU-2 missiles, delivered straight from the Russian Army to Damascus as a ‘gift’ for the Syrian mishap.

These S-300 will operate along with the more advanced S-400 systems already deployed to protect Russian bases in Latakia and Homs. The Israel Air Force and other coalition forces are reportedly familiar with the new threat, having trained against Greek S-300 units in Crete. Nevertheless, the Russian weapon poses a new and significant danger to military and commercial aviation throughout the Eastern Mediterranean, particularly to surveillance aircraft operated by Israel, Russia and the coalition forces.

Will the Russians maintain control of those sites? They better had. Activating those advanced SAM sites during air raids would lead to a pre-emptive strike against the radars and command centres, with evident risk of harming Russian advisors, that could escalate into another military confrontation in this war-torn country. A complex situation that, for the first time after a long and frustrating conflict brings smiles to Iranian faces.

India Votes: Is Narendra Modi Still the Front-Runner for 2019?

Bindiya Carmeline Thomas

With only a few months left in his first term as India's Prime Minister, Narendra Modi is making a last-ditch effort to secure a second term in office as voters turn cynical.

In his pitch for a second term, Modi used his last Independence Day address on 15 August 2018 to outline his "Vision for the India of tomorrow" – an India with affordable healthcare (ostensibly dubbed Modi-Care), a manned mission to space by 2022, reforming the farming sector, women empowerment and safety, inflation control, anti-corruption measures and education and job opportunities for the youth.

In the same speech, the prime minister addressed criticism launched by the opposition calling them "senseless" and proclaimed that he was "impatient as several countries have gone ahead of us. I am restless and impatient to take my country ahead of all these countries."

Since his landslide victory in 2014, the prime minister has presented his grand visions for India with very few achievements to speak of. The government's surprising decision to demonetise currency (500 and 1,000 rupee notes) overnight, in an effort to combat corruption, has been rebuked as cruel and damaging to the economy.

As a result, millions of Indians were handicapped by the cash-crunch, forcing countless to spend hours in lines at banks each day to withdraw only a small amount. The decision cost approximately 1.5 million jobs nationwide and 1% of the GDP.

And it would appear that the move might have been in vain. The Reserve Bank of India (RBI), in its annual report for 2017, found that "99.3% of the money withdrawn from circulation had been returned to banks, indicating either there was less 'black money' than expected, or that schemes to launder money were more successful than thought." It is perhaps no surprise then that over the last year his popularity among the nation has been dismal. Could it be that the elev-

enth-hour promises are simply a desperate attempt to rebuild his image to the Indian people? Possibly. Modi and his Bharatiya Janata Party (BJP) are no doubt surprised to learn that, for the first time since his election, the prime minister's approval rating has dipped well below 50%.

in 2017. According to a 2017 Gallup poll, Indians' high hopes for their economy and their leadership may not yet align with what they are personally experiencing.

"Indian Prime Minister Narendra Modi took office in 2014, pledging to boost the country's economic growth and create jobs.



Indian PM Narendra Modi with Frank-Walter Steinmeier, President of Germany, in March 2018

According to India Today's Mood of the Nation survey, Prime Minister Narendra Modi's popularity dropped from 53% in January 2018 to 49% less than 5 months later in July 2018.

The same poll found that, in January 2017, Modi held the approval of 65% of the country.

Are Indians Faring Better or Worse with Modi?

Despite the government's best efforts to fight corruption, reform and unify the tax system, boost R&D and local manufacturing with 'Make in India', and increase foreign investments, it would appear that only 3% of Indians consider their lives as thriving

That year, 14% of Indians rated their lives positively enough to be thriving. Every year since then, majorities of Indians have been highly optimistic about their economy and have expressed confidence in their government. But Indians' ratings of their lives have also gotten worse every year, and just 3% of all Indians fall into the thriving category in 2017," according to Gallup.

India's largely rural population initially led the declines in life evaluations, with thriving dropping from 14% to 7% between 2014 and 2015, and edging even lower to 4% and 3% in the years after that. Declines among urban Indians have been much more gradual, although they are down in the past year, dropping from 11% to 4%, the study added.

Author

Bindiya Carmeline Thomas is a specialist defence and aerospace journalist and a regular contributor to ESD.

It must also be noted that the World Bank bumped India up from its previous 130th position to 100th in the “ease of doing business” ranking.

“India’s growth is forecast to increase to 7.2% in FY2017 (1 April 2017–31 March 2018) and accelerate to 7.7% by the end of the forecast horizon – slightly below previous projections. This outlook mainly reflects a more protracted recovery in private investment than previously envisaged. Nonetheless, domestic demand is expected to remain strong, supported by ongoing policy reforms, especially the introduction of the nationwide Goods and Services Tax (GST). Significant gains by the ruling party in state elections should support the government’s economic

Cancelled Programmes

June 2015 – 65,678 assault rifles (worth US\$750M)

June 2016 – 98 torpedoes to arm the Indian Navy’s new SCORPENE submarines (US\$200M)

June 2016 – 16 multi-role helicopters (US\$300M, cancelled after a decade-long process)

August 2016 – 702 light armoured multipurpose vehicles (US\$190M)

May 2017 – 204 armoured recovery vehicles (US\$275M)

Defence Highlights under Modi

BRAHMOS, the world’s fastest supersonic cruise missile made history in November 2017, when it was successfully flight-tested for the first time from the Indian Air Force’s SUKHOI Su-30MKI frontline fighter aircraft.

The AKASH surface-to-air missile was successfully launched.

The first ever tri-service exercise, INDIRA, between India and Russia was conducted in October 2017.

reform agenda, which aims at unlocking supply constraints, and creating a business environment that is more conducive to private investment,” a World Bank report noted.

The Modi Doctrine

Narendra Modi has maintained a strong global presence since day one. Much to the chagrin of the opposition, the prime minister has made 41 trips to over 50 countries in 48 months, at a total cost of Rs 355 crore. At the time of writing, he was abroad for a total of 165 days.

Modi has made frequent visits to the United States, and by the end of 2018 he will have visited Nepal for the fifth time and will have to pay an official visit to Japan to meet with Japanese counterpart Shinzo Abe for the 12th time. He has also travelled to Australia, China, Japan, Laos, Singapore, South Korea, Thailand, Myanmar, Vietnam, and Fiji. Details of his domestic travels are yet to be revealed by the PMO.

India and Pakistan

At the start of his tenure as prime minister, Narendra Modi’s approach to foreign policy might best be described as effective and revitalising. Modi’s tough, no-nonsense response to Pakistan and China’s border incursions earned him the admiration of the public. His campaign pledge to be a “more assertive Indian leader” looked promising. However, four years on, it appears to have gone all downhill. The already strained ties between India and Pakistan have become more acrimonious after India’s Border Security Force (BSF) came under unprovoked fire from Pakistan in September 2018. The sniper fire from across the border in Jammu’s

heavy firing of both small and heavy arms in the early hours of 17 September, which lasted over a couple of hours. The army posts retaliated strongly and effectively to shelling and firing from the Pakistan Army, the statement said.

At the time of writing, India has retaliated by walking out of a planned meeting between External Affairs Minister Sushma Swaraj with her Pakistani counterpart Shah Mehmood Qureshi (only days after agreeing to the tête-à-tête) on the sidelines of the annual UN General Assembly session in New York.

The Indian Government’s decision to meet with Pakistani officials drew the ire of the opposition, who said that the “government’s policy towards Pakistan is a textbook example of how not to conduct your foreign policy.”

In 2017, the government informed Parliament that there had been a 230% increase in ceasefire violations along the LoC compared to 2016. Simply put, Pakistan violated ceasefire 771 times along the LoC, while the figure stood at 228 last year. In contrast, there were only 153 violations in 2014.



Modi with Japanese PM Shinzo Abe in 2018

Samba district killed one BSF soldier. A BSF party which was on domination patrolling ahead of the fence was fired upon, a BSF spokesperson said. The troops immediately retaliated.

The incident came only days after the Pakistani Army violated ceasefire agreements by resorting to heavy shelling along the Line of Control (LoC) in the Gulpur area of the Poonch district. According to local police, the Pakistani Army initiated indiscriminate

Meanwhile, Pakistan’s newly elected Prime Minister Imran Khan did not miss the opportunity to berate India following its decision to back out of talks. “Disappointed at the arrogant and negative response by India to my call for the resumption of the peace dialogue. However, all my life I have come across small men occupying big offices who do not have the vision to see the bigger picture,” he was quoted as saying by Pakistani media.

India and China

India appears to be doing a better job of thawing frigid relations with long-time foe China.

On the other hand, China has become increasingly capable of producing its own advanced weapons and has become less dependent on arms imports (which decreased by 11% between 2007–11 and 2012–16), something India has failed to achieve thus far. And for years, China has been immensely suspicious of India for hosting the Dalai Lama and the Tibetan government-in-exile in the mountain town of Dharamsala in Northern India. In turn, India has been livid with Beijing over its Belt and Road, which is essentially China's ambitious version of a 21st century Silk Road, made up of a "belt of overland corridors and a maritime road of shipping lanes."

In April 2018, at the Shanghai Cooperation Organisation (SCO) India became the only member country (besides Russia, Pakistan, Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan) not to endorse China's One Belt, One Road initiative.

New Delhi has, instead, expressed growing concerns over the US\$60Bn China–Pakistan Economic Corridor (CPEC) which runs through disputed parts of Pakistan controlled Kashmir which India claims as its own territory.

However, less than a year after both countries faced off in the most serious border incident since 1962, over China's attempt to build a road near the Doklam Plateau (which is situated between India, Bhutan and Tibet), Modi and China's President Xi Jinping have pledged to boost communication between their respective armies during an informal summit in 2018.

In fact, Modi made two official visits to China during a period of five weeks in early 2018. Both times, he met with President Xi to discuss several pressing issues "including the future of Iran's nuclear deal, the impact of US sanctions on Russia and situation in the Indo-Pacific region," the Ministry of External Affairs said in a statement.

Meanwhile, "terming India-China relations as a factor of stability in the world, the prime minister said that maintenance of peace and tranquillity in the border areas is indicative of the sensitivity and maturity with which India and China handle their differences, not allowing them to become disputes," the Prime Minister's Office said in August 2018.

India and the United States

The revitalised bilateral ties between India and China may be credited to US President Donald Trump's erratic foreign policy, which has also adversely affected Indo-US

relations. In January 2018, The Washington Post reported that senior administration officials said that the president has been known to affect an Indian accent and imitate Indian Prime Minister Narendra Modi, who in an Oval Office meeting last year told him, "Never has a country given so much away for so little in return" as the United States in Afghanistan.



Former US Ambassador to the United Nations, Nikki Haley, calls on Modi in June 2018.

According to the Post, "To Trump, Modi's statement was proof that the rest of the world viewed the United States as being duped and taken advantage of in Afghanistan, these officials said."

Since Modi's first meeting with Trump in July 2017, relations between India and the US have undoubtedly soured. Their second meeting only five months later in Washington was a stark contrast from the bromance that was their first meeting.

And their third meeting at the ASEAN summit in Manila in November 2017 was no better. So much so that it was widely reported in the Indian press that Modi felt Trump "treated him like just another Asian leader". Trump's disregard for Modi is unprecedented. The Clinton, Bush, and Obama administrations have always considered India's rise as being in the American interest. For instance, in 2011, then-Secretary of State Hillary Clinton wrote in an essay that "India's greater role on the world stage will enhance peace and security."

Members of the Trump administration, however, continue to reinforce that message despite Donald Trump haranguing Asian allies. In June 2018, then-US Ambassador to the United Nations (UN) Nikki Haley addressed the Observer Research Foundation in New Delhi, saying that Washington and

New Delhi must become global leaders in the fight against terrorism. Haley, an Indian American, asserted that India and the US enjoyed a "natural friendship" that is based on "their shared values and interests".

The Trump administration seeks to take the India-US relationship to the next level; to build a strategic partnership rooted in our common values and directed toward

our common interests," she said. With at least two more years of Donald Trump in the White House, it remains to be seen if and how Trump's "America First" ideology will complement Modi's "India First" strategy.

India and Russia

Narendra Modi described it best when he said ties between India and Russia have "stood the test of time" during an informal summit in Sochi in 2018.

Relations between the two countries appear to be on the mend after years of growing suspicions and concerns. Russia has been deeply resentful of India for looking to the US for military equipment, rather causing a strain on ties dating back to the Cold War. Conversely, India has been equally concerned with Russia's growing affinity with China and Pakistan.

It certainly did not help when the US overtook Russia's place as India's largest arms supplier, bagging contracts worth almost US\$10Bn in 2007–2008 including contracts to supply eight P-8I long-range maritime patrol aircraft worth US\$2.1Bn, 10 C-17 GLOBEMASTER III giant strategic airlift aircraft worth US\$4.1Bn and 12 C-130J SUPER HERCULES aircraft worth US\$2Bn.

The last two years, however, have seen some improvement in economic relations. According to data compiled by SIPRI (Stockholm International Peace Research Institute), between 2007–11 and 2012–16, India's imports increased by 43%, making it the world's largest importer of major arms. During 2012–16, Russia supplied 68% of India's arms imports (in comparison to 14% from the US and 7.2% from Israel) thus ensuring its position as India's top weapons supplier in the coming years.



Modi greeting the public during a rally in 2018

Taking their newly christened "special privileged strategic partnership" to new levels, India agreed to purchase S-400 surface-to-air missile systems worth US\$5.4Bn from Russia, despite the threat of US sanctions. "US sanctions will not be an impediment to Indo-Russia defence deals, and New Delhi and Moscow could soon sign agreements on frigates and Kalashnikov assault rifles", Russian Ambassador to India Nikolay Kudashev was quoted as saying by local news agencies in October 2018, following the announcement. Kudashev reportedly described the deal as the "largest contract" in the history of Indo-Russia ties and that it was one of the "speediest" agreements to be signed between the two countries and that there were no protracted negotiations.

The State of Defence

During his first term as PM, Modi sought to revolutionise the Indian defence industry. Most notable was the "Make in India" campaign, a new policy encouraging the local defence industry to meet the military's needs quickly and effectively. At the time of

the announcement, this new policy would allow for about half of India's total weapons requirements for the next decade (worth approximately US\$100Bn) to be developed indigenously.

The Defence Procurement Procedure (DPP) was revamped as well. The latest version (dubbed DPP 2016), intended to increase India's self-reliance, is expected to be released soon. While speaking at the Fourth International Conference on Electronic Warfare in July 2018, Chief of Integrated

Defence Staff to the Chairman Chiefs of Staff Committee PP Reddy called the new DPP "path-breaking and game-changing" in its reforms and that it would focus on "indigenisation, Make in India, growth of MSMEs, skill development, job creation and technology adoption."

"Above all, it aims to cut down the process and time required to realise state-of-the-art defence equipment," he was quoted as saying. Four years on, the 'Make in India' programme has not been the success the government hoped it would be. India continues to export over 70% of its weapons and arms from allies. For instance, the indigenous BRAHMOS missile is developed with 65% imported components.

In 2014–18, India invested a total of US\$56.3Bn in homeland security and is set to increase its defence budget through 2018-19. The MoD has been allocated US\$454M, a 7.81% increase over the amount allocated for 2017-18. This increase is keeping in line with Modi's ambitious promise to spend US\$250Bn to modernise the armed forces by 2025.

And despite Modi's best efforts, he has been unable to escape accusations for cor-

ruption and wrongdoing. The much-touted multi-billion-dollar RAFALE deal with Dassault has come under attack within the country. In 2016, Modi agreed to purchase 36 RAFALE fighter aircraft from France worth US\$8.5Bn after cancelling the medium multi-role combat aircraft (MMRCA) deal to buy 126 jets.

The opposition has accused Modi of overpaying for the jets particularly in light of how much less Qatar paid for 12 RAFALE jets (approximately US\$108M per aircraft) in 2017. They are also questioning why Reliance Defence Ltd was awarded the offset partnership contract over state-run Hindustan Aeronautics Limited (HAL).

"We had no choice. We took the partner that was given to us," former French President Francois Hollande was quoted as saying by French investigative news service, Mediapart.

The Indian Government has denied all allegations.

It certainly does not help that Modi has been unable to keep a minister of defence longer than a year. Since 2014, the MoD has been helmed by four different leaders with the latest being Nirmala Sitharaman.

Despite the allegations, in the coming years, India is expected to procure and invest more in segments such as multirole aircraft, corvettes, submarines, tanks, artillery guns, Multi-Barrel Rocket Launchers (MBRL), helicopters, submarines, surface-to-air missiles, Unmanned Aerial Vehicles (UAV) and frigates, among others.

In early 2018, the MoD issued a Request for Information (RFI) to procure approximately 110 fighter jets worth US\$20Bn for the Indian Air Force. According to the RFI, India intends to purchase a maximum of 15% of the total 110 fighters in flyaway condition and manufacture the remaining 85% under the Make in India programme.

Outlook

While Narendra Modi's first term as prime minister comes to an unsatisfying close, there's no doubt that Indians are just as impatient for change. Growing discontent, anger and mistrust toward the government has forced the infamous 'Modi wave' into nothing more than a ripple.

Modi has inadvertently given the opposition the arsenal it needs to war against the BJP in 2019. Since taking over as Congress President, Rahul Gandhi has done well in re-establishing the party as a more tenacious and consistent force of good for the nation. As 2019 approaches, Modi has the hard task of proving to the Indian people he is still the best candidate for the job. ■

EU CBRN Action Plan: A Mixed Verdict

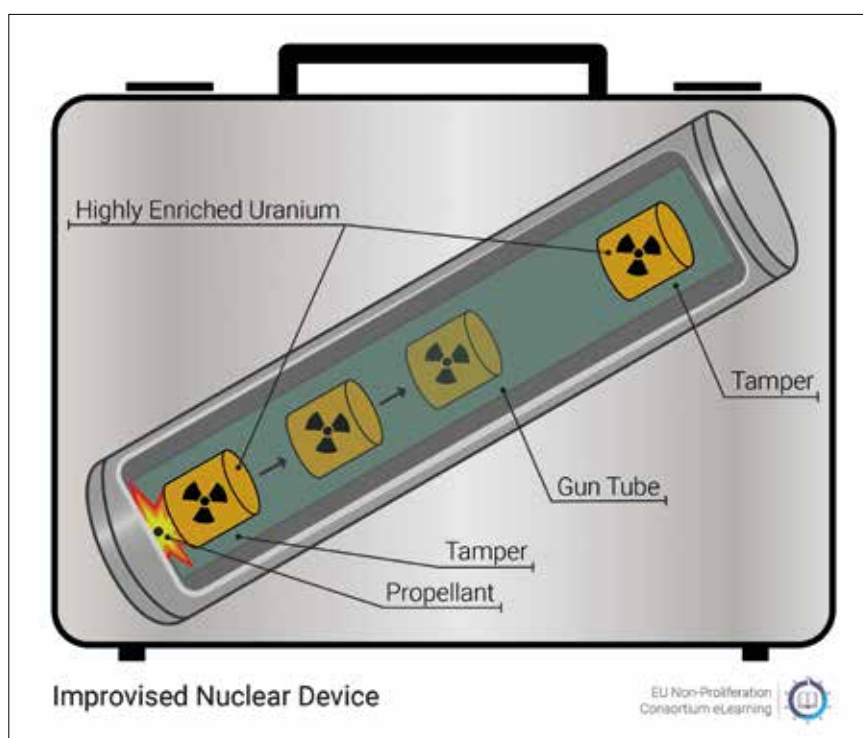
Dan Kaszeta

The general reaction of many in the European security and defence communities to papers coming out of Brussels is one of resignation and cynicism. Many such endeavours originating within the European Commission end up producing talk and paperwork, and little else.

This correspondent sits in on many meetings to review many types of proposed work that really amounts to very little action in the real world, and has been involved with CBRN-related projects that accomplished, at best, modest improvements. Digging through the actual 16-page EU plan, there is very little to which any serious observer can philosophically object. Although the document reads like many products that were written by a committee and subjected to a consensus process, there is some value here. The Action Plan identifies a variety of actions and deliverables organised under four different broad objectives, clouded in the usual Brussels-speak typical of such policy documents. It is worth analysing each of the components of the Action Plan in some detail. Such an analysis yields a very mixed assortment of ideas and concepts.

Objective 1: “Reducing the Accessibility of CBRN Materials”

This objective contains four commitments. One is to optimise the exchange of information on CBRN, principally by trying to tag along with existing efforts in the IED and explosives arena, such as Europol’s European Bomb Data System. The authors of this provision seem to believe that, somehow, information on CBRN materials is not being shared between member states. There is not much evidence that this is the case, particularly given the example of the recent Salisbury incident, where a dossier was circulated that was sufficiently convincing as to get other member states to join in expulsions of diplomats. A tweak to some existing com-



The EU CBRN Action Plan aims to improve knowledge of CBRN risks.

puter systems is peripheral to the subject. The real heart of this objective is covered in the second commitment, which seeks to strengthen border controls to intercept CBRN materials. However, the proposed deliverables are weak. It is not explained what the deliverable “establish a common repository of cargo information” is or entails, but on the face of it, this would be such a monumental undertaking given the size and scope of traffic into and out of the EU, let alone material moving within the EU under free movement of goods. This deliverable also assumes that CBRN materials would be openly declared in shipping papers, which may not be the case. The third commitment seeks to strengthen EU export controls, to prevent access to dual use and CBRN-related items through commercial transactions. The recent inves-

tigation in Belgium around the sale of Sarin precursors to Syria highlights that more can be done in this area and there are genuine weak points that need to be addressed. However, the proposed deliverables are modest and involve updating lists of materials and the proposed action to “assess the scope and nature of technical interactions between CBRN and dual-use items” is confusing and not explained in any detail.

Objective 2: “Ensuring a More Robust Preparedness for and Response to CBRN Security Incidents”

The serious material actions in this plan are categorised under this objective. A wide variety of commitments and actions are listed under this objective. Efforts to coordinate

Author

Dan Kaszeta is Managing Director of Strongpoint Security Ltd. and a regular contributor to ESD.



CBRN Integrated Response Italy is an Italian pilot project aimed at developing an integrated CBRN response capacity of first responders and law enforcers in order to transfer the approach to other EU Member States.



and promote training and exercises are laudable, but the proposed action of developing a “common EU CBRN training curriculum” seems unrealistic, given the wide variety of ways in which emergency services are organised and operate across the member states. Another objective seeks to enhance the “European Emergency Response Capacity” by encouraging member states to contribute CBRN assets to it. A joint action plan to “strengthen preparedness as well as actions at points of entry” is proposed but not described. A proposed action to pool CBRN detection expertise with explosive detection experts is not well explained, nor is there any clear rationale for such an effort, considering that these are fundamentally different disciplines. Likewise, a “gap analysis” of CBRN detection seems an odd thing to propose, in that the gaps are well understood by industry and member states. This seems like an unnecessary effort.

Nuclear issues are partially addressed by measures to improve customs training at the European Nuclear Security Training Centre and a proposal to enhance cooperation in the area of nuclear forensics, a discipline that most member states do not adequately address.

A number of proposed measures are focused on biological threats. The action plan proposes measures to improve early warning and response and to improve the preparedness of laboratories to identify bio-

logical threats. Objective 2.6 contains some really interesting proposed work to procure and stockpile vaccines, an area which has hitherto proven difficult. This could have real merit if the associated issues can be addressed, and it is good to see the EU finally seriously addressing the subject. The objective “improving awareness and response to bio-risks” includes a number of efforts centred on the European Centre for Disease Prevention and Control (ECDC) to



The EU CBRN Action Plan proposes cooperation between the NATO Joint CBRN Centre of Excellence and the EU CBRN Centres of Excellence initiatives.

develop training materials and awareness, especially of possible improvised or emerging threats, such as “do it yourself” biology. While much of the proposed actions under Objective 2 ignore chemical and radiological risks, it is still a reasonable one in that the timelines associated with biological terrorism are often measured in days and weeks, whilst chemical scenarios are often denominated in minutes and hours. International frameworks like the EU are better suited for the larger and longer-duration threats, so this emphasis is not misplaced.

Objective 3: “Building Stronger Internal-External Links”

The third objective seeks to build links with non-EU entities, including non-EU countries and other international organisations. The Organisation for the Prohibition of Chemical Weapons (OPCW), Interpol, the International Atomic Energy Agency, and the North Atlantic Treaty Organization are all active in CBRN affairs, as are a number of other agencies. A number of non-EU members such as Norway, the USA, and Canada are quite active in CBRN defence matters. EU member states are actively working with all of these partners. As a result, the EU cannot expect to operate in isolation from the complex web of activities already underway. The action plan proposes broad actions to deepen cooperation by information sharing, exchange of best practices, and joint training and exercises. However, these proposed actions are placed into operation through relatively modest deliverables, primarily two workshops. One could expect far more in this area. The plan lacks

concrete details in an area where numerous actions could be taking place.

Much is made of getting NATO and the EU to work better together in CBRN affairs and an entire commitment is based on this idea. NATO has traditionally focused on the military aspects of CBRN, while the EU needs to focus on civil scenarios. It should be stressed, however, that neither the EU nor NATO has a monopoly on expertise, due to the significant overlap in the composition of both bodies.

NATO-EU cooperation is not new in this arena, and largely the same people constitute the expert and practitioner pool in CBRN in both organisations. The proposed cooperation between the NATO Joint CBRN Centre of Excellence and the EU CBRN Centres of Excellence initiative is good, but begs the question of why has it taken this long to occur. Indeed, the NATO centre appears to already be doing much work that is identified in the EU Action Plan. Perhaps a rational effort to see what NATO is doing and then filling in the gaps would be a better course of action. Unfortunately, the EU Action Plan seems to call for gap analysis where the gaps are already known, but not call for gap analysis where they are not known.

Objective 4: "Enhancing Our Knowledge of CBRN Risks"

This commitments and actions supporting this objective seek to enhance knowledge in the CBRN arena. First, the plan supports setting up an Advisory Group on EU CBRN Security and tasks this new group with a variety of action items, many of which are identified elsewhere in the document. The deliverables include a first meeting in January 2018, yet another gap analysis to be done by April 2018, and a "mapping of existing centres of expertise" by May 2018. The Action Plan does not explain how this new Advisory Group supplants, replaces, or works

with a EU CBRN Task Force established circa 2006, or the CBRN Advisory Group established by the previous EU Action Plan in 2010. Basic research does not reveal that any of the deliverables have been met, and the only references available to this Advisory Group on CBRN Security appear to be in the action plan itself. If it exists, it has already been renamed or it operates in darkness and obscurity, and this author makes his livelihood on knowing what is happening in CBRN in Europe and would have had a hint of it. A more likely explanation is that

inertia has delayed its implementation.

Another commitment is to set up an "EU CBRN Support Network" to connect existing expertise and experts. The value here may only be to formalise what already exists. The author's own experience is that the pool of true experts in the CBRN area in Europe is modestly sized and well-known to each other. In some ways, this makes the establishment of yet another formal network easy to accomplish. However, networking existing experts does not increase the overall number of experts, the shortage

GPEC® digital 2019

**The Update for Law Enforcement:
the New Specialized Trade Fair!**

13 - 14 March
2019
Messe Berlin
CityCube

Leading in the field of Homeland Security and Law Enforcement the specialized exhibition and conference GPEC® regularly creates the industry forum for top exhibitors and thousands of visitors from all over the world. With the specialized edition GPEC® digital 2019 we now use this scope to fully concentrate on the dominating topic of our time: the digitization. Visitors can now get information and exhibitors can already register at www.gpecdigital.com!

of whom is still a fundamental problem. Europe needs more experts, and not just additional forums for the existing experts to talk to each other.

Yet another action item is to task Europol with becoming a knowledge hub on CBRN. While law enforcement clearly has much to learn about CBRN, there are some risks associated with making CBRN just a police issue. Firefighting services and emergency medical responders play a key role in this area. The centre of gravity of CBRN knowledge and responsibility for incident response is as likely to reside with the fire and rescue services in many EU member states. In some states, police responsibility and knowledge in this arena are poor. In many places, the interaction between fire/rescue services, emergency medicine, and the police is fraught with institutional rivalries. The problem at the EU level is that there is no fire and rescue equivalent of Europol. An EU-level networking effort that only connects police agencies and works through Europol is only going to address part of the CBRN response landscape.

The action plan finally comes into its own with a highly meritorious suggestion. There is a commitment to improving efforts to exploit the results of numerous research efforts in the CBRN arena. Numerous FP6, FP7, and Horizon 2020 projects have been funded in the last decade in the CBRN area, yet the results of many are languishing in obscurity. Some of these have been wasted efforts, yet others have yielded interesting results which tend to not be widely disseminated or exploited. Horizon 2020 does a slightly better job of this than FP6 and FP7, but there is clearly much more work to be done if the taxpayers of the EU are to get value for money. Any

Photo: The Netherlands MoD



CBRN first aiders demonstrate their skills at the opening of the Dutch National Training Centre CBRN, 26 November 2014

effort to support the dissemination and uptake of EU-funded research would be of great value to the EU's member states and associated partners. In addition, the Action Plan calls for some proactive efforts to incorporate end-user focused research efforts in new Horizon 2020 calls. Indeed, the most recent set of Horizon 2020 calls included relatively open-minded calls for CBRN projects.

Finally, the Action Plan calls for harmonisation and standardisation of CBRN products and systems. Unfortunately, this is likely to be a wasted effort. The CBRN industry that actually makes the products and systems is not readily amenable to such an effort. First of all, the North American market easily accounts for half of the CBRN spending globally. US-centric standards push what the manufacturers design and build and major US military procurements dominate the design of many CBRN

products, even if they are sold in the rest of the world. Second, military products and systems dominate the market rather than systems designed for civil responders. The majority of civilian CBRN products (that is, the ones the EU are likely to care about) are adapted into the market space from military products or from the similarly large industrial health and safety market. Within Europe, NATO is a much larger player in this arena, as are national safety and health authorities, which already accredit materials and products. Indeed, US and NATO standards are often the same thing, and many non-NATO countries cleave to these standards anyway. The EU could certainly try to set standards in the civil CBRN niche, but it seems unlikely that the EU could reasonably set a standard that competes with existing standards. In fact, in some areas, such as detection, the technology sometimes evolves faster than the glacial pace at which standardisation bodies operate. Clearly, whoever wrote this part of the Action Plan does not understand the overall situation.

An Action Plan or a Talking Shop?

While there is nothing particularly objectionable in this Action Plan, it appears to suffer from lowest common denominator consensus-making, a lack of ambition, or some combination of both. Where there are serious issues, the Action Plan often proposes very modest actions. And when it is ambitious, it is unrealistically ambitious. Perhaps a more focused plan, dealing with the areas most clearly in the remit of the EU and most clearly aligned with the reality that is already on the ground would be of greater benefit. ■

Photo: The Netherlands MoD



The EU CBRN Action Plan proposes the creation of a network of CBRN training institutions.



Missions, Roles, Structures and Future Perspectives of the Hellenic Armed Forces

**Admiral Evangelos Apostolakis HN,
Chief of the Hellenic Defence General Staff**

The Eastern Mediterranean, our own neighbourhood, is a region of great strategic importance. However, there is a wide range of challenges and risks, such as terrorist attacks, violent extremism, energy insecurity, smuggling, irregular migration and human trafficking, that could upset the balance in the region.

The security environment is very complex and volatile, mainly because it consists of ethnic animosities, nationalism, conflicts, weak democracies and weak administrative institutions. In addition, climate change, economic crises, corruption and cross-border organised criminal activities are a burden on the region.

Despite the various predictions and forecasts at the beginning of the 21st century, it is now clear that the Eastern Mediterranean still has a unique geopolitical position in the global balance of power. Re-

quences could spread to the immediate neighbourhood and beyond. The variety, scale and complexity of the challenges call for coordinated cooperation between regional and international allies and partners.

Illegal Migration

The Hellenic Armed Forces are committed to protecting the country's national sovereignty, integrity and interests, on the basis of international law and relevant treaties. In this

Irregular immigration and refugee flows in the Aegean Sea constitute the biggest challenges that Greece is currently facing. In this context, allow me to emphasise that since 2015, Greece has been the entrance for well over one million irregular migrants, seeking admission into Europe, mainly through Turkish routes. Greece has assumed a disproportionate burden and accommodates the largest number of migrants and refugees relative to its population, while being fourth in absolute numbers.

The Greek armed forces have been instrumental in the overall effort to cope with the refugee/migrant crisis. In particular, they patrol maritime and territorial borders 24 hours a day, 7 days a week, while Greek Navy units participate continuously and actively in NATO's Aegean activity to interrupt illegal trafficking and irregular migration. In addition, the Greek armed forces have assisted in the establishment and maintenance of reception and identification centres to receive refugees and migrants currently residing in Greek territory.

In this context, we firmly believe that the problem of illegal immigration can only be tackled at the point of departure and not at the point of arrival. In any case, the possibility of foreign fighters and terrorists infiltrating Europe via migration routes should not be ruled out.

A Complex Environment

In addition, energy security will certainly be a major challenge in the wider area of the south-eastern Mediterranean, where there is undoubted overlap between major energy networks and international trade routes. In addition, the recent natural gas



Photo: HQ MND-SE

Admiral Evangelos Apostolakis HN, Chief of the Hellenic Defence General Staff

cent developments in the region, such as those in Syria and Libya, have attracted the attention of key geopolitical actors. Failure to address these challenges would definitely have a negative impact on the stability of the region, while the conse-

respect, we address traditional challenges by allocating daily means and capabilities of the Hellenic Armed Forces. We deploy a significant number of vessels in the Aegean Sea and our aircraft confront any violation of our airspace.

deposits that have changed the geopolitical and geo-economic situation in the region and the complexity that characterises the protection of critical maritime energy infrastructures have highlighted the importance of maritime security operations by competent naval forces.

Multilateral Cooperation

Moreover, I would like to highlight our significant support to current NATO and EU missions and activities, through the contribution of national means and infrastructures of Souda Bay in the island of Crete. Its



Photo: HQ MND-SE

The Hellenic Armed Forces are an important contributor to NATO's Headquarters Multinational Division South-East (HQ MND-SE) which ensures stability on the south-eastern flank of the Alliance.

Greece, as a strong pillar of democracy and stability, plays an important role in the geopolitical structure of the region, in particular by safeguarding European and allied values, principles and interests. In this respect, the Greek armed forces have a long tradition of making a commitment to security at regional and global level one of their top priorities and therefore participate in all relevant efforts and initiatives, attaching particular importance to the role of international organisations in the protection of human rights. With a constant presence in terms of ideals and attitudes, we fulfil our national and international commitments within NATO, the EU and the UN.

The Hellenic Armed Forces firmly participate in a great number of NATO operations, missions and standing forces, namely Operation Sea Guardian, the enhanced NATO Response Force, the Resolute Support Mission in Afghanistan, the Kosovo Force, and contribute to the implementation of the Readiness Action Plan and the Integrated Air Missile Defence. In this context and despite the prevailing circumstances, we highly respect the "burden sharing pledge" in the Alliance, remaining one of the few NATO countries that consistently keep the defence expenditures at a minimum of 2% of their GDP.

variety of installations and facilities form a "One-Stop-Shop", thus constituting a key enabler and force multiplier for the Alliance. A forward located regroup, replenish, repair and training facility for the naval units moving towards or returning from operations, Crete has proved its paramount strategic value in the area of the Eastern Mediterranean.

The Hellenic Armed Forces have made a substantial contribution to our Allies and Partners, by providing the services of the NATO Maritime Interdiction Operational Training Centre (NMIOTC). Besides in the training of our Allies & partners, NMIOTC contributed decisively to Regional Capacity Building by providing specialised training to naval and security services of the members of the Djibouti Code of Conduct, under the auspices of IMO. Under the same framework, NMIOTC has also provided training to members of the East African Standby Force. Additionally, our Multinational Peace Support Operations Training Centre (MP-SOTC) provides high-level accelerated theoretical and practical training on all peace support operations-related topics for military personnel and multinational units prior to their deployment.

Our willingness to enhance the interoperability and exploit the Integrated Air Missile Defence (IAMD) capabilities of the Alliance

led to the Hellenic initiative on establishing a NATO IAMD Centre of Excellence (COE) in Souda Bay, Crete. Being certain that the NATO transformation process will benefit from the establishment of the said COE, based on a smart defence and multinational solutions mindset, the Hellenic National Defence General Staff is committed to facilitating this development.

Regarding the EU, the Hellenic Armed Forces actively contribute to the development of an effective Common Security and Defence Policy (CSDP), which is fundamental for enhancing the Union's global strategic role and its ability to act as a security provider, and decisively contribute to "the progressive framing of a common Union defence policy". In this vein, the Hellenic Armed Forces participate in EU CSDP missions and operations to prevent and manage conflicts or crises and address their root causes, namely Operation SOPHIA, Operation ATALANTA and EUTM MALI.

Furthermore, I would like to emphasise our firm response to the call for a Permanent Structured Cooperation in Europe (PESCO), a decisive initiative towards a closer cooperation in defence and security across the EU and its Member States. In this manner, we lead significant PESCO projects such as Maritime Surveillance of the Eastern Mediterranean, Cyber Defense, Advanced Helicopter training, Intelligence training and Command System for Joint Special Operations Forces.

Traditional and New Relations

As a significant actor in the Eastern Mediterranean, we seek to establish new relations and further enhance long-standing ones, outside the Alliance and the EU. In this manner, the Hellenic Armed Forces have been working towards establishing productive relations and cooperation with our regional partners on a multinational as well as on a bilateral level. In a nutshell, Greece and the Hellenic Armed Forces maintain excellent relations with almost all countries in the region and are widely accepted and appreciated.

The Hellenic Armed Forces play a key role in promoting synergies, cooperation and friendly neighbourhood relations, acting as a conduit among countries in the Eastern Mediterranean and the Gulf. Especially with Israel, Egypt and Cyprus, we work closely and continuously in order to promote maritime and energy security and maintain the sea lines of communication in the broader region of the Eastern Mediterranean.

We exploit our traditional relations with countries in the Eastern Mediterranean and



the Gulf, promoting the essence of Defence Diplomacy. We host multilateral military exercises, where NATO allies and partners train side-by-side. In this context, I would like to acknowledge our Air Force exercise Hnichoos with participants from the US, UK, UAE, Israel, Italy, Egypt, and Cyprus, and Joint exercise Medusa with participants from Egypt, Jordan, Bahrain, Saudi Arabia, and the UAE. In the Balkans, we maintain multilateral military cooperation initiatives with Bulgaria, Romania and Serbia, which constitute the appropriate framework to promote peace, security and stability in the region. Specifically, in 2018 we conducted the Joint Special Operations Forces Exercise Salamis Storm and in 2017 we hosted the Annual Balkan Chief of Defence Forum in Athens.

The Adriatic-Ionian Initiative

In the Adriatic and Ionian Seas, the Hellenic Navy has been one of the leading parties of the Adriatic-Ionian initiative (ADRION), an expression of regional cooperation with the navies of Greece, Italy, Albania, Montenegro, Croatia and Slovenia, seeking to promote maritime security in the Ionian-Adriatic region. Moreover, we have been participating in the UN peace-keeping operation UNIFIL since 2007. Hellenic Naval units, serving under the "blue-flag", patrol off the coast of Lebanon, for the noble cause of the UN to promote peace and stability in the region, and assist the capacity-building efforts of the Lebanese authorities.

In this context, it is imperative that the Hellenic Armed Forces acquire and retain a mix of hard and soft military power that will allow the maintenance of a reliable deterrence and defence posture, in terms of sophistication, robustness and effectiveness, in order to address both conventional and contemporary challenges. At the same time, we do not neglect our permanent tasks to cooperate with national civilian authorities in humanitarian support operations, Search and Rescue operations and disaster relief situations, which require additional capabilities and provisions, specialised resources and manpower.

To meet this multi-faceted task, our Force Structure, being tailored to the particularities of the operational environment in the Aegean and the Eastern Mediterranean, is providing our forces with the means to project power to the area of strategic interest, to conduct security operations, support state diplomacy, and to operate jointly in concert with our Allies and partners. Moreover, it goes without saying that this set of forces must maintain high interoperability standards not only within the military, but also with relevant civilian structures and organisations.

Transformation and Optimisation

In this endeavour, the Hellenic Armed Forces follow the principles of transformation and incorporate optimisation of resources. We are innovative in terms of implementing institutional changes (organisational, structural & doctrinal), and balance investments and resources between readiness, capability, and capacity. In this manner, we invest in capability development, targeted armaments & procurement programs.

Moreover, we attribute special attention to our human resources, our "greatest advantage", along with our close contact with the Greek society, as they constitute invaluable force multipliers and present a significant leverage in overcoming these challenging times. In this respect, we maintain a multifaceted support and contribution to the Greek society, ranging from disaster relief and Search and Rescue operations to social and construction works.

We are constantly asking ourselves two key questions: how do we work best and how do we prepare for the future? This last

able resources, with the desired goal being a more efficient and robust leadership and force structure. Without leaving defensive gaps and finding a balance between critical mass and quality, we aim at a gradual modernisation of our capabilities to achieve the expected transformation.

However, I would like to point out what, in my opinion, is our most demanding and unique asset: the human factor, our personnel. In the last difficult years, our soldiers, sailors, pilots and civilians, officers and petty officers, regardless of rank, title or position, have surpassed themselves in spite of difficulties to achieve the common mission. In addition, they had the unconditional support and trust of their families and the wider society that was the wind under our wings.

At a time of rapid change, turbulence and unpredictable challenges that underscore the need for adaptation, flexibility, agility and modularity, the Greek armed forces are determined to remain at the "front" by continuously demonstrating their determination to be relevant, capable, credible, proactive and qualified. I aim for a solid defence stance



Photo: US Air Force

Hellenic Air Force members beside a wall painting at Forward Operating Base OQAB in Afghanistan on 26 November 2014. The painting is a mural of the Greek Tomb of the Unknown Soldier, located in front of the Parliament in Athens.

question is becoming increasingly important and demanding in an environment in which resources are unlikely to increase, at least in the short term, and in which the speed of operations and defence and security requirements are constantly increasing.

In this sense, our contribution to solving these key issues, fully aligned with our national defence policy and serving the objectives of our national military strategy, makes a double contribution: defence reform and investment in human resources. The ongoing reform and reorganisation process is aimed at rationalising the avail-

so as to be ready to contribute, anytime and anywhere, to the joint efforts for stability and security and to the protection of our national integrity and interests.

The Greek armed forces maintain a "steady course" towards the future, with their military tradition as a "compass" and the maintenance of stability, security and peace as their goal. On this journey, the hearts, souls and impeccable performance of our people and the millennia-old history of our nation make me very proud and give me the confidence that we have what it takes to steer our ship into calm and hospitable waters. ■

“We are going to face many challenges”

Interview with Vice Admiral Nikolaos Tsounis, Chief of the Hellenic Navy General Staff

Standing guard over Greece’s 6,000 islands and islets in the Aegean, Ionian and Mediterranean seas and the shipping routes at the strategically vital crossroads between Europe and Asia, the Hellenic Navy (HN) has a broad mission set. Moreover, the geopolitical developments in the Balkans, the Black Sea region, the Middle East and northern Africa and the Aegean, being the new fulcrum for the European migration crisis as the key entry point into the EU, pose unique challenges to the country’s national and regional security, making naval issues even more relevant to Greece. ESD had the opportunity to interview Vice Admiral Nikolaos Tsounis, Chief of the Hellenic Navy General Staff.

ESD: Admiral Tsounis, did you set yourself specific goals when you were appointed Chief of the Hellenic Navy on 16 January 2017?

Tsounis: Upon assuming duties as Chief of the Hellenic Navy, I was well aware of the challenges my country and the Hellenic Navy in particular were facing due to the economic and financial crisis. Determined to preserve our core capabilities that we deem critical for the accomplishment of our mission, my staff and I set a number of goals: a human-centric administration, a high operational readiness and availability of the Hellenic Fleet’s assets, optimisation of the management of the available resources, improvement of the quality of our training and compliance, in the best way possible, with our NATO and EU commitments.

ESD: How hard was the Hellenic Navy affected by the economic recession?

Tsounis: The recession and the associated austerity measures profoundly affected all sectors of our society – public, private and military. We introduced numerous organisational changes and revised and reallocated our budgets to meet operational requirements. In that context we reduced personnel, closed facilities, decided on a case-by-case basis our participation in NATO’s Standing Naval Forces, put our participation in international operations on hold and suspended most of our procurement and modernisation programmes, except the HYDRA (MEKO 200HN) class frigate upgrade and the ROUSSEN class (SUPER VITA)

fast attack craft programmes. Our homeland force deployments retained more or less the past years’ status though. However, with our country’s economic conditions slowly improving, we are making headway with completing the programmes that were suspended.

ESD: The changed security situation in Europe saw an increase in the navies’ tasks. I suppose this was also the case for your navy?

Tsounis: Indeed. While our primary tasks remain the safeguarding of the national sovereignty and the sea lines of communication (SLOC), we have to address a plethora of additional tasks. The heightened levels of the use of the maritime domain for illicit activities considerably increased our commitments, such as handling the flow of migrants into Europe, terrorism, human trafficking and environmental protection, to name but a few. Despite this significant increase in tasks, there has been a less proportionate increase in ‘seadays’ for our units due to the decreased defence budgets. Therefore, in order to better comply with this multitude of tasks, we introduced a more holistic approach, namely enhancing cooperation with civilian authorities and other armed forces, emphasising jointness to avoid duplication and mitigate the increase in cost.

ESD: The Hellenic Coast Guard is upscaling its footprint in the Aegean Sea, operating new and more capable units. Can the Coast Guard take over any of the tasks to free up some navy assets?



Vice Admiral Nikolaos Tsounis

Tsounis: The Hellenic Coast Guard is a key enabler. Guided by our commitments to achieve effective maritime surveillance, working with Hellenic Coast Guard is an operational priority as well as economical necessity. Together we ensure a continuous naval presence in the Hellenic islands, and in the eastern Aegean, as far as the island of Kerkyra (Corfu). Our collaboration considerably improved during the last years, in particular in matters related to maritime security and law enforcement at sea, patrolling the SLOC, search and rescue and the protection of the marine environment.

ESD: Do you seek more innovative ways to deliver more with fewer units?

Tsounis: The Hellenic Navy’s point of view was, and still is, ‘do more with less’. As our resources reduced significantly over the past years we had to take bold decisions, yet always without making compromises on operational capabilities and on the safety of our crews and ships. In order to remain on par with our ever-increasing missions we drew up a roadmap covering the upgrade of our surface, subsurface and airborne assets alongside the acquisition of new capabilities. Prioritisation of these programmes is linked to the strategic environment, however. We continue to explore all possibilities and work closely with the defence industry to develop innovative technologies to meet our expanding requirements, always keeping in mind the strict fiscal measures.



ESD: Several of your units date from the late 70s and early 80s, that is, the GLAFKOS class submarines, the LASKOS, OSPREY and VOT-SIS class fast attack craft, the ELLI class frigates, and your amphibious and support units. Can they still comply with their commitments?

Tsounis: We are examining all options to sustain their maximum availability. The mid-life upgrade of six ELLI class frigates was completed in September 2010, and four out of our nine LASKOS class fast attack craft were modernised between 2008 and 2011, extending their in-service time well into the 2020s. A number of modernisation programmes such as the upgrade of our HYDRA class frigates and more limited overhauls of a number of other platforms are in the pipeline. As far as our amphibious assets are concerned, the JASON and ZUBR class units, these still cover our amphibious requirements quite adequately. I am proud to say that the Hellenic Navy recently became a full member of the European Amphibious Initiative (EAI). I would like to point out that between 2005 and 2015 several new platforms reinforced the fleet: the four AIP-equipped PAPANIKOLIS class (Type 214) submarines and five ROUSSEN class fast attack craft.

ESD: What are the most important procurement and modernisation programmes in the coming years?

Tsounis: The upgrade of our four HYDRA class frigates, to extend their service life to around 2030, has been decided; and the modernisation programme of the P-3 ORION maritime patrol aircraft (MPA), will see the reactivation of our fixed-wing naval aviation in the 2022-2023 timeframe. As for the ROUSSEN class units, the construction of two additional units, HS KARATHANASIS and HS VLACHAKOS has been approved. These are anticipated to join the fleet by the end of 2019.

ESD: What are your navy's key priorities which should be met in the near future?

Tsounis: Given the emergence of asymmetric threats and the resulting security issues, we are looking at new platforms to meet our operational needs and the requirements arising from the forthcoming accession of Greece to the Eastern Mediterranean energy chessboard. These new assets will provide the naval platforms capable of performing the full range of future missions and combating tomorrow's threats.

ESD: Drones have become important assets. Will you acquire AUVs, USVs or UUVs?

Tsounis: Our defence planning programme actually includes the procurement of unmanned systems, advanced MCM systems, and Special Operations craft. To this end we

are looking for innovative solutions that will address current and future challenges. We closely monitor the developments in this field and hope to procure these systems through national defence industry.

ESD: Having seen service for some years now, what is your experience from operating the PAPANIKOLIS class submarines? Are you already considering some updates?

Tsounis: The arrival of our AIP-equipped Type 214 submarines gave a real boost for our underwater fleet. The outcome of operating these boats proved beyond our expectations. Featuring a superior design, state-of-the-art sensors and communications systems make these submarines lethal weapons. As for planned upgrades, we envisage to replace the Atlas Elektronik DM2 A4 torpedoes, as well as the SUT Mod.0 torpedoes of our sole Type 209 AIP-equipped submarine HS OKEANOS as well as the integration of a new weapon system with the ISUS 90 weapon control system.

ESD: Today, international cooperation is no longer a matter of choice but a necessity. What do you think is needed for an effective approach to improve Maritime Situational Awareness (MSA) and Maritime Security (MS)?

Tsounis: The dense maritime traffic in our region and in the Eastern Mediterranean in general as well as the European migration crisis requires an increased focus on MS and MSA. It goes without saying that preparedness for wide-ranging security threats demands networking between the actors, making international cooperation and interoperability imperative. This requires a common situational awareness system made up of a grid of sensors such as coastal radar stations and AIS systems. The information thus gathered should then be shared among key enablers and stakeholders. Consequently, we sustain a policy that maritime security should be preserved by the regional initiatives based on mutual trust among states, confidence-building measures and setting aside national sensitivities.

ESD: Greece finds itself on the front line between Europe and Africa, making the Hellenic Navy a paramount asset. How does your navy contribute to regional stability? Do you see prospects for wider cooperation?

Tsounis: Being located at the EU's sea borders to the east and southeast, we are well aware of our responsibilities. In order to respond to the emerging security challenges, we look to strengthen regional and international cooperation. Collaboration with national authorities and security enablers has already improved our effectiveness. Additionally, we try to enhance regional maritime security awareness

through arrangements with neighbouring countries and our participation in respective NATO and EU initiatives. For instance, links are being set up in the shape of bilateral arrangements with Egypt, Israel and Cyprus, and along with Italy, Greece is the 'lead nation' of the Adriatic-Ionian Initiative (ADRION). We also participate in regional and trans-regional maritime situational-awareness initiatives, such as the Virtual Regional Maritime Traffic Centre, the Trans-Regional Maritime Network and the Maritime Security Capacity Building Activities in Africa, and the Hellenic Navy is the leading nation in the development of an MSA-related Permanent Structured Cooperation (PeSCo) programme.

ESD: How do you see the Hellenic Navy's role in the Mediterranean, and beyond, evolve? What is the way ahead for your navy?

Tsounis: The way ahead is to assure the enhancement of our operational capabilities, and to restore our presence throughout the Eastern Mediterranean basin, making an effort to maximise our participation in NATO exercises and deploying again in support of 'out-of-area' crisis management operations NATO and EU duties dictate, or wherever our government orders us to go.

ESD: What will be the greatest challenges your navy will face in the coming years?

Tsounis: We are going to face many challenges. Our main focus is on asymmetric threats and ASW and MCM warfare. We drafted appropriate contingency planning for any possible shortfalls we may encounter from any new arising challenges or programme implementation hiccups. However, I expect the biggest challenge to be to remain a reliable force with highly trained, educated and motivated sailors.

ESD: Admiral Tsounis, having been at the helm of the Hellenic Navy for almost 24 months, is it different from what you expected?

Tsounis: Being a naval officer for over 40 years now, I learned to expect the unexpected and never to be surprised. Allow me to close by highlighting our strong belief in the quotation of Themistocles: "Our very existence depends on our ability to avail ships at sea". Faithful to this legacy, I can say that in this time of rapid changes, turbulence and fiscal austerity, flexibility and modularity, the Hellenic Navy is determined to remain on the "frontline", by remaining credible, proactive and qualified. I am confident that the goals that we set upon taking the helm of the Hellenic Navy will gradually progress further.

The interview was conducted by Guy Toremans.

Northern Night Watch

The Royal Norwegian Air Force

Georg Mader

Norway's Air Force is facing major challenges. The growing threat from Russia requires a new spectrum of capabilities.

In the award-winning HBO epic "Games of Thrones" (GoT) there is a professional military order that guards the huge ice wall that protects the northern border of the seven kingdoms from dark threats from the

creasing complexity of the European security environment. It must take a 360-degree approach to addressing threats and challenges from different actors and from all directions. In this case, they come from the

are becoming more complex. Sometimes their flight crews "pound" with their new armament at the rocky ice wall of Norway. We all remember the first clear pictures of the Su-27 before it collided with a RNoAF P-3C propeller over the Barents Sea in 1987. Or the first Su-34 Air-to-Air before Finnmark in 2014. According to RNoAF officials, the scope and intensity of Russia's recent "snap exercises" without notice have increased significantly since then, increasing the risk of unintended escalations. The same applies to violations of NATO airspace. Norway stresses that it does not consider Russia a military threat today, but one can never rule out that its growing military capabilities could pose a challenge to national and transatlantic security in the future. The combination of Russian military modernisation and documented operational will is a central factor in Norwegian defence planning. While Russia in the Arctic continues to focus on international cooperation, planning cannot rule out that in a given situation Russia would regard the use of military force as a relevant instrument in the High North as well.

The Russian North Fleet and the modern GBAD defence bases built around the Kola Peninsula are two aspects of the direct presence of Russians in the Norwegian area of interest. And, of course, Russia's expansion into the Arctic also affects the type of air and sea domain that is of strategic interest to Norway. Russia has built new garrisons and support facilities on its north coast and on Arctic islands such as Novaya Zemlya, Franz Josef Land and the New Siberian Islands. The Russian authorities use the modernised infrastructure for daily police work, but of course it can also be used for military operations.

The "Bear" is Back

For generations of Norwegian high-speed jet warriors, intercepting Russian aircraft was a long-standing routine before it ended with the collapse of the USSR and the Warsaw Pact. The late 1970s were the most tense



Photo: RNoAF

Norway ordered 52 F-35 LIGHTNING II aircraft to replace its F-16 fleet.

frozen land. In many ways, this elitist "night watch" resembles what the Luftforsvaret or Royal Norwegian Air Force (RNoAF) is doing today for the "kingdoms" of NATO and the EU south of the ice wall of the Norwegian wilderness. And as in GoT, after a long period of peace, the dark danger from the North has increased again. The only difference is that the warriors who are working around the clock on this wall never know the script of the next season. NATO must be able to cope with the in-

North and Norway has a special responsibility because attention to this flank is one of the most important contributions to allied and European security.

A More Assertive Russia

A central theme of the last Norwegian Airpower Conference was – after decades of almost no air activity – the revival of Russia as an air and sea power worldwide and especially in the North and the Arctic. Russia's and Norway's strategic areas of interest are congruent, which is why Russia's deterrence in the air and sea space from and off Norway, in the North Atlantic and in the Arctic is of central importance for Norwegian defence and for the Alliance. In this new security landscape, Russian air forces are training more and their exercises

Author

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



Photo: RNoAF

The RNoAF has four C-130J tactical transport aircraft

The RNoAF's Operational Capabilities

- 55 F-16 combat aircraft
- 12 SEA KING helicopters for search and rescue (SAR)
- 2 P-3N and 4 P-3C ORION maritime patrol aircraft
- 4 C-130 J HERCULES tactical transport aircraft
- NH90 helicopters for maritime operations (currently being phased in)
- 18 Bell 412 SP tactical transport helicopters
- 3 DA-20 JET FALCONS for electronic operations and VIP transport
- 16 Saab SAFARI training aircraft
- 1 NASAMS II air defence unit
- Ordnance disposal-, rescue-, NBC-, medical-, guards-, security- and dog units
- Various communication and relay sites
- 2 monitoring and early-warning stations for airspace surveillance and C2

and active years of the Cold War in terms of Soviet military activity at sea and in the air. The Norwegian operational readiness was tested several times a week by Soviet air traffic passing through the North Cape and flying parallel to and along the Norwegian territorial border. The Soviets rarely violated airspace and usually changed course by moving away from the Norwegian coastlines – but sometimes a little too close to feel comfortable. These experiences of the Cold War were formative for the Norwegian Air Force, which was up to date at the time and knew how to deal with the Soviet threat from Kola and close the gap between Greenland and Iceland and Britain.

And now – for the last eight or nine years – the Russians are back, especially since Russia's enmity after the war in Ukraine in 2014. This year, a RNoAF F-16 approached the left wing of an Su-34 escorted by a large Mig-31BM, when the latter flew a sudden manoeuvre, forcing the Norwegian interceptor to fly a dodging left turn to avoid a collision in the air. Norwegian authorities said that the

resulting HUD video proves how dangerous and aggressive some Russian pilots are in such close encounters, which have become quite common in the Nordic region of Europe.



Photo: RNoAF

A Russian pilot taking a picture during a close encounter with a RNoAF interceptor

As recently as 2 November, two RNoAF F-16 from Bodø became aware of a rather rare "visitor", a Tu-142MZ, identified by certain chin fairings. RF-34063 'Red 56' was a late production variant (NATO-dubbed BEAR-F Mod.4) and has been rarely seen in this region. It is now equipped with new NK-12MP engines and a new avionics suite; the Russian Navy has two Tu-142 squadrons, one with the Tu-142MK BEAR-F Mod.3 in Kipelovo-Fedotovo and one with Tu-142MZ BEAR-F Mod.4 in Mongoktho. Obviously, the Russian crew was interested in the BLUE RIDGE class command ship USS Mount Whitney, which was involved in the NATO exercise "Trident Juncture", the largest exercise in 20 years, which took place on 7 November and simulated a kind of Art.5 reaction to an armed attack on an ally. It is documented that most of the missions flown by the Russians over the Baltic Sea or around the North Cape are carried out with strategic long-range bombers like the Tu-95, Tu-22M BACKFIRE, Tu-160 BLACKJACK or ELINT platforms like Il-20 COOT and, of course, different types of fighter aircraft. But with all the "routine" along the wall, we must not forget the domestic "little things" that count: such as when, in 2016, the 338th Squadron sent an F-16 with life-critical medical equipment in 25 minutes over 450 kilometres to save a patient's life in a hospital in northern Tromsø.

Falcon on the Decline

The Chief of the Air Force (Ny Sjef Luftforsvaret), supported by the Air Force Staff, is responsible for force production and is based in Rygge in south-eastern Norway. The current leader is Maj.Gen.

Tonje Skinnarland, who was appointed in January 2017 at a time of significant change in the Air Force. The main Luftforsvaret base is still Bodø today, but in the future it will be Ørland Air Station in Central Norway. Bodø closes with the phasing-out of the F-16, where Ørland will be the future home of the newly procured Norwegian F-35A LIGHTNING-II fleet. In operational terms, however, RNoAF's main combat force still consists of an ageing fleet of 55 F-16AM/BM MLU fighters (of the original 74 which replaced the F-104 STARFIGHTER in 1979) armed with AIM-120 BVR missiles – and interestingly, the European IRIS-T WVR missile, which is unusual for this type – and precision-guided ammunition.

With the acquisition of new targeting pods and weapons, the Norwegian F-16s also evolved into an air-to-ground fighter and Norway's constant commitment to modernisation led – for example, when the first NATO operations in Libya began in 2011 – to Norway's aircraft being far more advanced than those of the USAF. The F-16 fleet logs about 7,000 hours per year but that will drop to around 3,000 by 2021. Pilots over 40 years of age have been banned from retraining to the F-35 to ensure that the F-16 has its own pilot core until it is completely phased out. Instead of trying to deal with the complicated policy of selling the HAWKS or taking over the cost of maintaining the older fighter aircraft as a reserve, the MoD in Oslo now plans to phase out its entire fleet once the successor has reached full FOC.

Force Producing Units

- Ørland Air Base (the main hub for Norway's F-35)
- Other Air Bases: Andøya, Evenes, Bardufoss, Gardermoen and Rygge.
- Air Force Base Bodø
- Station Group Sola and Banak
- The SAR service operates from Banak, Bodø, Rygge, Sola, Ørland and the civil airport at Florø
- Air-Defence Control and Reporting Centre (CRC): Sørreisa (Northern Norway).
- Air Force Operations Inspectorate, Rygge
- Air Force Training Inspectorate, Rygge
- Air Force Academy, Trondheim
- Air Force Flying School, Bardufoss
- Air Force Education Centre (Officer Candidate School and Technical School), Kjevik
- Basic Training Establishment KNM Harald Haarfagre, Madla, Stavanger



This year, a RNoAF F-16 approached an Su-34 when a MiG-31BM flew a sudden manoeuvre, forcing the Norwegian interceptor to fly a dodging left turn to avoid a collision. The HUD video proves how aggressive some Russian pilots are in such close encounters, which have become a common occurrence.

Photo: RNoAF



A Norwegian F-16A modified with SNIPER pod and IRIS-T missiles

Photo: RNoAF

The Watch's New Spear

This successor is of course the Lockheed-Martin F-35A, the largest procurement programme of the Norwegian Army to date which provides for the acquisition of 52 JSFs to replace the F-16 fleet. The type was selected in 2008 over the Eurofighter TYPHOON and the Saab JAS-39 GRIPEN because of its (then) superior sensor capacity, its data link and fusion as well as its stealth characteristics. Norway joined the F-35 programme as a Tier 3 partner during the system development and demonstration phase of the project. A contract for the first two aircraft was signed in June 2012. According to current plans, the first four F-35s will initially remain in the USA for pilot training as part of the international fleet at Luke Air Force Base (AFB) in Arizona.

One of the first RNoAF F-35 pilots to be responsible for the launch phase is Lt.Col. Martin Tesli, who explained to the author at RAF Fairford the far-reaching changes that the new aircraft will bring: "We were

RNoAF International Deployments & Operations

Since 1999, 338th Squadron has been part of NATO's Rapid Reaction Force and has been deployed several times:

From 23 March until 10 June 1999, RNoAF F-16s were deployed to Grazzanise AB in Italy to take part in Operation 'Allied Force' over former Yugoslavia. This was the first time since World War II that Norway had deployed fighters into action. The Norwegian F-16s were tasked with flying Combat Air Patrol (CAP) missions, as Norway did not send any of its new MLU-updated F-16s.

The next time the RNoAF F-16s were deployed in international missions was on 1 October 2002 to Manas Air Base in Kyrgyzstan to support US-led Operation 'Enduring Freedom' in Afghanistan. The F-16s remained in Manas until 31 March 2003.

From 1 January to 31 March 2005, four RNoAF F-16s were deployed to Siauliai Air Base in Lithuania to participate in the NATO Baltic Air Policing Mission. Since then, the RNoAF F-16s have carried out two more Baltic Air Policing Missions, from 16 December 2006 to 15 March 2007 and from 1 May to 1 September 2015, both by Siauliai Air Base.

In addition to conducting air policing over the Baltic Sea, the RNoAF F-16s flew three times over Iceland during the Icelandic NATO air policy and surveillance mission. The first mission was in 2009, the second in 2011 and the last in 2014.

The largest operation in which the RNoAF F-16s participated was Operation 'Odyssey Dawn / Unified Protector'. Six F-16s were deployed to Souda Air Base in Greece from 23 March 2011 to July 2011. In total, the RNoAF F-16s dropped over 500 precision bombs during the two campaigns.



Photo: RNoAF

Norwegian Air Force Chief Major General Tonje Skinnarland

standing up the first seven aircraft at the same time as the USAF. We are training in a squadron consisting of Norwegian, Italian and USAF pilots. We are on the ground floor working with the USAF to shape the concepts of operations for the aircraft with the USAF. And the USAF was also very open in its cooperation with us. Nevertheless, the operation under Norwegian conditions is a challenge and different from the sunny hatch in Arizona. Our country has completely different weather and lighting conditions. You also can see that on our future jets by the especially 'Norway'-designed braking parachute in its little stealthy 'blister' on top of the rear fuselage. We needed that for safe landings on icy or snowy runways or roads. Moreover, the

potential threat up here is "on" every day, created by the growing Russian BASTION on the Kola Peninsula. Not only have they modernised their air and sea capabilities, they have also improved their ground missile defence and attack capabilities north of our northern borders. One of the reasons for acquiring F-35s is that we cannot use the F-16 against the Russian BASTION threat as we need it. The F-35 will allow us to do this. It is a key element in building this capability and working with allies within NATO and also with our Swedish and Finnish neighbours. We see the LIGHTNING not only as a simple replacement aircraft, but as a contribution to our modernisation efforts and capabilities of the Ground Air Force. It

will interact with the Army, with the Navy and in many ways be a platform that we believe is a game changer for us".

Norway welcomed its first three F-35 Joint Strike Fighters to Ørland Air Base on 3 November 2017. These jets – flown over directly from the production site at Fort Worth, Texas – were the first F-35s to be permanently based in Norway. They took off at 6:35 AM (Norwegian time) and landed at Ørland Air Base at 3:57 PM the same day. Starting this year and through 2024, the RNoAF plans to obtain six F-35As annually. It is intended to declare initial operating capability (IOC) as early as next year or in 2020, while full operating capability (FOC) is expected by 2025. As said before, all the Norwegian F-35s will be stationed at Ørland AB, where a massive build-up of facilities has taken place. New hangars and maintenance shops were built to accommodate the new jets, as well as buildings and offices for all the new pilots and squadron support staff coming to the base in the next few years. It is safe to say that Ørland will be at the heart of the Royal Norwegian Air Force for many years to come. Due to the geographical shape of Norway, however, a small QRA detachment will be set up at Evenes AB in northern Norway, as the distance from Ørland to the far north of Norway is simply too large.

Shortly after delivery, however, the Norwegians discovered that at least one of their US\$120M aircraft was transmitting sensitive mission data back to the US manufacturer Lockheed Martin, in particular the ALIS logistics/support system, which was apparently transmitting back to Texas. Put simply, the manufacturer tracks and evaluates the habits of Norwegian pilots. The RNoAF regards this as a danger and insists on a filter with which the user na-

Photo: RNoAF



At Sola Air Base, an AW101 helicopter tipped over during maintenance work while the engine and the rotor were running.

tions can filter out sensitive data from the data stream. Norway wants Lockheed Martin out of the loop, and because of further delays in the promised provision of such a filter, Norway announced it would start its own project to find ways to stop its new F-35s from transmitting their data back to their former US masters. To this end, Norway has partnered with Italy to co-finance the construction and operation of a laboratory for protecting nationally sensitive data. Another Norwegian speciality in the JSF context is the acquisition of the Joint Strike Missile (JSM) of the domestic manufacturer Kongsberg as the premier standoff weapon for all F-35 users who need such a capability. In the Norwegian case, this shortened version of the NSM (or Nytt SjømålsMissil) is considered a decisive advantage for a strike element for the maritime defence of Norway. However, this aspect of burden sharing in the 21st century benefits all F-35 users, with the Australian RAAF already in the pipeline.

Weaponry

The Norwegian AF - which is also responsible for assets that would be elsewhere - has been operating four P-3C and two P-3N aircraft with 333rd Skvadron from Andøya flystasjon since 1969. The huge national and EWZ waters as well as the danger from new Russian and other foreign underwater and surface ships often send these veterans on extended patrols, where they themselves regularly became "targets" of Russian interceptors. Nevertheless, the RNoAF has never stopped flying its P-3C/N MPAs over its northern areas of interest. They are used to conduct strategic RNoAF patrol missions for submarine detection, search and rescue support, coastal surveillance and protection of economic zones off the coasts of Norway. In contrast to other "Orionists", they were not sent to the Middle East and did not retire prematurely. Until today, their capability is not only held

alive for the underwater domain for all the Norwegian forces, but also is focused on key areas of interest within the region. Nevertheless, the ORIONs often fly in foggy conditions over salty water and they are ageing.

Also in this case, a replacement is already being prepared. In late 2016, the then Defence Minister Ine Eriksen Sørreide confirmed that five Boeing P-8A POSEIDONS would replace the six P-3s and three DA-20

et. The contract was signed on 29 March 2017, and one year later Boeing purchased long-lead items for each of the platforms. The P-8 is of particular. Through the MADL links, the F-35s have the capability to have considerable range within the fleet and process data in real time, while the P-8 maritime awareness platform can also be networked with other Norwegian, American and British platforms to create an important element for shaping a kind of air-sea



The F-16 maintenance facility at Ørland

FALCON surveillance aircraft. The press release then read: "The P-8A is an excellent platform for monitoring our oceans and will provide a solid basis for decision-making for both Norwegian and allied civil and military authorities. To maintain an MPA and ISR capability able to meet current and future challenges, the government has put forward a proposal to acquire five P-8A POSEIDONS for the armed forces. In addition to the aircraft itself, the contract includes advanced sensors, surveillance systems, new anti-submarine weapons and support systems". The aircraft will be delivered in 2021/22, and with the additional intelligence equipment the cost will be NOK-10Bn (US\$1.29Bn). Part of this amount will come from the country's intelligence budg-

integration that both Norway and NATO need to meet the evolving challenges on NATO's northern flank.

Meanwhile, the remaining service life of the P-3C/Ns has been transferred to IMP Aerospace. On 5 June, the Canadian company announced that it had received a multi-year contract from the Norwegian Defence Logistics Organisation (NDLO) for the maintenance of RNoAF's P-3 MPA fleet. All work beyond the maintenance inspections will be carried out at the IMP facility in Halifax, Nova Scotia.

Between 2008 and 2010, the RNoAF acquired four C-130J SUPER HERCULES aircraft. In March 2012, however, one HERCULES crashed into Mount Kebnekaise near Kiruna in Sweden. An investigation found that the fatal CFIT accident was the result of the experienced pilots not recognising the shortcomings in the clearance issued by Swedish air traffic control, which placed them outside the controlled airspace and below the height of the surrounding terrain. The pilots' decision to configure the aircraft in tactical mode without being in tactical use contributed to the accident. Therefore, TAWS did not work.



An NH90 of the Norwegian Coast Guard

Photo: Kystvaktt

Rotary Assets

It seems that the Nordic gods have not blessed the Night Watch when it comes to modernising Norway's rotary assets. Earlier

this year, the National Defence Research Institute (FFI) concluded that the RNoAF fleet of 14 NH90 NFHs (New Frigate Helicopters) would generate only 2,100 flight hours per year instead of the 5,400 required to support anti-submarine warfare (ASW) and fishing and border-control missions. Instead of splitting the fleet – six for ASW operation and the rest for coastguard – FFI recommends that all 14 be deployed in the role of naval support. However, a subsequent updated FFI study has shown that "the fleet can produce up to 5,400 hours per year under certain conditions." Those conditions require the availability of spare parts, sufficient aircraft for maintenance scheduling and a sufficiently large overhaul capacity.

After the FFI's turnaround, the MoD then reversed course and found that it could use its fleet of 11-tonne NH90 helicopters both for the Navy (Sjøforsvaret) and the Coast Guard (Kystvakt). However, the NH90 helicopter is recognised as a challenge for the Coast Guard and the frigates, but the aim is still to complete phasing-in by 2022. This is a considerable delay, as the type was already ordered in 2001. There are currently six in operation, eight of them on order. According to the FFI, 3,900 flight hours would be possible, which would cost around NOK470M (US\$57M) more than forecast. The Ministry of Defence seems to accept the delay, because the current Defence Minister Frank Bakke-Jensen says: "Experience so far shows that the operating costs of the NH90 are much higher than planned. Nevertheless, the NH90 is tailored to our conditions and the needs of the Coast Guard and Navy. There is no other helicopter on the market today that offers equivalent capabilities. The expected increase in operating costs and the needs of the armed forces must be addressed in the next long-term plan."

Another rotary segment needing improvement are the 16 AW101s purchased in 2013 for US\$1.63Bn for the Norwegian All-Weather Search and Rescue Helicopter (NAWSARH)

programme of the Norwegian SAR (Norske Redningstjenesten). They also carry the RNoAF symbol and replace the 12 ageing SEA KING Mk 43B search and rescue aircraft that have been in service since 1973. The agreement includes an option for six additional aircraft as well as 15 years of technical support, spare parts and training services, with the option to extend these for a further five years. AgustaWestland began delivering the helicopters in November 2017 and 12 more are now expected by 2020. The aircraft will be assembled at AgustaWestland's Yeovil (Leonardo) factory in the UK.

During the maintenance work on the ground at Stavanger's Sola Air Base shortly afterwards, the first aircraft '0268' tipped over to the left side while the engine and rotor were running. The helicopter suffered considerable damage. Fortunately, this happened without injuring a crew member. Leonardo confirmed the plans to repair the damaged aircraft at its Yeovil plant, but pointed out that there had been no further problems since then with the aircraft that were delivered.

A frequently highlighted advantage of the AW101s is their ability to switch between 3G and 4G networks, much like the iPhone of an average person can. These helicopter capabilities are provided by a cellular geolocalisation system from Smith Myers Communications and are able to locate and track a distressed person's smartphone in a remote area that the SAR agency might be searching. When the phone is turned on, the AW101 sets up its own mobile network to not only identify its location but also send text messages or instruct the phone to display to the aircraft exactly where the person is. It can even instruct a smartphone to turn on its GPS and report its position.

So let us all hope that the Northern Watch will remain vigilant, and more or less on course, when introducing its various procurements. In the last season of GoT, in the end, the medieval guards and their ice wall are overwhelmed by the dark forces. However, the RNoAF men's and women's daily job around the North Cape, the Finnmark or the Barents Sea is not fiction, but daily reality. It is a "public service" that is rendered by them for us residents in the south. "Tusen takk!" ■

IMU

TACTICAL GRADE



1:1 scale

STIM300 is a tactical grade Inertial Measurement Unit, IMU, for demanding guidance and navigation applications.

- ITAR free
- Small size, low weight, power and cost
- Insensitive to magnetic fields
- Low gyro bias instability (0.3°/h)
- Low gyro noise (0.15°/√h)
- Low accelerometer bias instability (0.05 mg)
- Excellent performance under vibration and shock
- Fully calibrated and customer configurable to the specific application
- 3 inclinometers for accurate leveling
- Weight 55 grams, volume <2cu.in, power 1.5 W

STIM300 is field proven in **Military Land navigators, Missile systems, Target acquisition systems, Airborne surveillance, DIRCM, Remote Weapon Systems, Launch vehicles and Satellites.**



When size, performance and robustness matter

sales@sensoror.com • www.sensoror.com

Tragedy at Dawn: Norwegian Frigate Collides with Tanker

Guy Toremans

Early on Thursday morning, 8 November 2018, the Norwegian frigate KNM HELGE INGSTAD collided with the Maltese oil tanker SOLA TS in the Hjeltefjord north of Sotra near Bergen.

Shortly after departing the Equinor's Sture Oil Terminal at Øygarden, the SOLA TS, sailing at 7 kn, spotted the KNM HELGE INGSTAD which was transiting at 17 kn to Haakonsvern Naval Base after participating in NATO's major exercise 'Trident Juncture 2018'. The SOLA is a gigantic ship; with a length of 250 m, a width of 44 m and a draught of 10.7 m, the "Suezmax" crude oil tanker displaces some 112.939 tonnes. The tanker was built in 2017 at the Daewoo Mangalia Heavy Industries Shipyards in Romania.

Photos: Royal Norwegian Navy



The impact tore a large hole in the KNM HELGE INGSTAD's starboard side. Listing badly, with her stern sitting very low in the water, the frigate's commanding officer made the decision to run the ship onto the rocky coastline.

An audio log revealed that the frigate, although repeatedly warned to alter course, failed to take action. The Fedje VTS – the Norwegian vessel traffic service centre and pilot station on the island of Fedje – stated that KNM HELGE INGSTAD was called over VHF both by the tanker and traffic centre to determine her intentions.

The tanker had contacted Fedje VTS to ask for confirmation that a ship was heading their way. Two minutes after this initial call, Fedje VTS informs the SOLA TS that it is the KNM HELGE INGSTAD. Hereupon, the tanker demands the frigate to turn to starboard in order to avoid a collision. The responses from KNM HELGE INGSTAD's bridge team appear confused. The frigate acknowledges the request, but seems to offer an alternative course of action, using the word "blokkene" (which literally means "blocks"), at one point saying that if they altered the course it would take them too close to the shoals. This could have meant that, whoever was at the helm of KNM HELGE INGSTAD was concerned about hitting the shore if turning to starboard. It is possible that the frigate initially tried to move in the other direction in order to eliminate the need to cross in front of the tanker. Unfortunately, due to the maritime



The giant gash in the frigate's starboard side. These images indicate that the frigate is seriously damaged and will require major repairs, if not being beyond repairs.

Author

Guy Toremans is a freelance naval journalist based in Belgium.

traffic in the channel, it could have become apparent that there was not enough space to manoeuvre on the other side of the tanker. This prompted MS SOLA TS to respond that they had to do something or a

collision would be unavoidable. Contributing to the confusion, the INGSTAD appears to have been transiting with its Automatic Identification System (AIS) switched off. It was only after the collision that the frigate



The almost completely submerged KNM HELGE INGSTAD, with only the vessel's radar protruding above the water.

It is a mystery why the state-of-the-art and highly manoeuvrable frigate could not avoid the collision. The weather was good and the waters in the area have real-time navigation control systems and radio contact. An official investigation has been launched by the Marine Department at the Norwegian Accident Investigation Board (AIBN), in collaboration with the Defence Accident Investigation Board Norway (DAIBN). The Marine Safety Investigation Unit (MSIU) of Malta is also participating in the investigation. US Navy personnel are being questioned for their role on board KNM HELGE INGSTAD when it collided with the tanker SOLA. According to the Norwegian newspaper

turned on her AIS transponder so that she could be easily located, thereby corroborating the sudden appearance of her AIS signal on commercial tracking services. At 04.26 am, the tanker slammed into the KNM HELGE INGSTAD's starboard side, penetrating the engine room and injuring eight crewmembers. Listing badly, with her stern sitting very low in the water, the frigate's commanding officer made the decision to run the ship onto the rocky coastline. Numbering 13 watertight compartments, she is designed to stay afloat with two adjacent compartments flooded. There were reportedly dry compartments still on the ship when it was abandoned. By Thursday afternoon, KNM HELGE INGSTAD's list increased to such an extent that her starboard side weather deck and flight deck were under water. On Friday (9 Nov) and Saturday (10 Nov), after welding several fixing points to her hull, the frigate was connected with ten powerful steel wires and bolts to the rocks onshore. In the meantime, having made some emergency repairs, the SOLA TS was allowed to continue to Hull, UK, on Saturday. In the night from 12 to 13 November, KNM HELGE INGSTAD slid off the rocks despite being securely attached to the land and sank almost completely under water, with only the SPY-1F radar mast and part of the helicopter hangar and the stern remaining above surface. The reason seems to be that some of the steel ropes broke.

Norway seems determined to salvage and repair the frigate. The Norwegian BOA Offshore AS services company has already started preparatory work for the salvage of the frigate. The plan is to gradually lift the vessel onto a semi-submersible barge and transport it to the Norwegian Navy's naval base in Haakonsværn. The salvage operation is scheduled to begin in December 2018. Once lifted, it will be possible to conduct a thorough damage assessment



On 9 November, the frigate was secured with powerful steel wires and bolts to the rocks onshore.



The tanker SOLA TS that slammed into the frigate HELGE INGSTAD.

But realistically, it may no longer be repairable. It is possible that KNM HELGE INGSTAD will never be put back into active service.

Facing the loss of one of its premier warfighting assets, the disaster may have far-reaching consequences for the Royal Norwegian Navy, especially in times of growing tensions with Russia.

Bergens Tidende, the Norwegian Accident Commission has sent a letter to the US Navy Forces Europe because a US Navy officer was onboard as part of a "Personnel Exchange Programme" (PEP). This officer could be questioned as part of the investigation. For the reason of the investigation, the US Navy does not want to comment on the case. ■

NATO's Centre of Excellence for Cold Weather Operations

Author Team: NATO CoE - CWO

Since 2005, Norway has had responsibility for NATO's Centre of Excellence – Cold Weather Operations (COE – CWO). The Centre is located at Camp Terningmoen in Elverum, a small city about 110 km north of the capital Oslo.

The climate of Norway varies widely depending on location and time of year. Winters are harsh, and even the few summer months can be comparatively chilly. Geographically, approximately one-third of Norway's land mass lies to the north of the Arctic Circle. Nordic Lights notwithstanding, it is a challenging and overall inhospitable environment. At the same time, it is an environment that the Norwegian Armed

It was put under the command of and physically located with the National Joint Headquarters. Allied Command Transformation (ACT) formally approved the COE – CWO in 2005.

Our official mission statement reads as follows: "The COE – CWO mission is to support SACT with the efforts of transforming NATO in the field of cold weather operations. COE – CWO will serve as the main

der serves as the benchmark for our training and overall dealings with Cold Weather Operations. In the framework of our courses and training, we focus on practical application of skills and emphasise responsibilities of the leader that are particular to operating in the cold and the extreme cold.

The fact that the average July temperature in Bardufoss, where the biggest part of the Norwegian Army is based, is +12° Celsius highlights just how common "cold weather" in Norway is. In fact, what some countries might call "a military operation in cold temperatures", members of the Norwegian Armed Forces would simply call "a military operation". The upside of that is that the interaction with the environment has resulted in large amounts of knowledge and practical skills, which the COE – CWO unifies and shares with NATO member states and Partnership for Peace (PfP) countries. The people working at the COE – CWO all have extensive personal experiences from operating in the Cold Weather environment. Serving in all branches of the Armed Forces (the Army, the Navy, and the Air Force) their combined knowledge and skills complement, and thereby, we hope, mutually improve each other.

The COE – CWO has a core staff of only 16 peace establishment (PE) posts. To make the COE – CWO work with only these sixteen (16) people, we base the operation on a network concept that gives us the possibility to use training areas, infrastructure, manpower, skills, and knowledge from all branches of the Norwegian Armed Forces, the Norwegian Defense Research Establishment, NATO, the Partnership for Peace (PfP) Cold Weather community, and civilian academia.

The COE – CWO is, as of now, an entirely nationally sponsored COE. That means that the staff comprises Norwegian military personnel only. However, this might be subject to change, and we are currently exploring the possibilities of creating a network that would connect other NATO member states



Photos: Forsvaret

A winter course delivered by the Norwegian School of Winter Warfare

Forces are very familiar with. We operate in it at any time of year, and at any time of day. The expertise of individual unit members as well as institutional knowledge makes Norwegians natural cold weather experts, and Norway the obvious location for the COE – CWO.

The history of the COE – CWO in Norway is a long and intricate story. It was established in 2005, and at that time it consisted of 3 staff officers, one staff member each from the Army, the Navy, and the Air Force.

provider and coordinator of expertise in the area of cold weather operations in NATO. COE – CWO will provide NATO and Partner nations with the necessary competence in order to operate under arctic, sub-arctic and cold weather conditions."

Beyond technical language, however, the unofficial mission statement reflects the grit an Arctic environment demands: "If you can fight and survive in the extremes of the Arctic, you can fight anywhere in the world." The statement from a visiting unit comman-



An all-female Norwegian Special Operations unit during winter training.



German officers at the COE – CWO, where they learn how to survive in winter conditions, learn to ski with and without pulk, sleep outdoors in a tent and undertake basic winter training.

and PfP countries to the COE - CWO. In practical terms, such a change would enable international staff to work on a specific project or document at the Centre's facilities in Elverum for shorter or longer periods. Once they conclude their stay, they would return to their respective countries, while remaining available to work at the COE –CWO on a new project. The network concept of the COE – CWO also gives us other advantages. Since the COE – CWO is collocated with (and is in fact part of) the Norwegian School of Winter Warfare (NSWW), we are contributing to the continuous developments in the field of Cold Weather equipment. At the moment, we are realising several projects that develop particular items, such as uni-

forms, mittens, gloves, tents, skis, sleeping systems, or burners. These projects further improve our particular competence and in-depth knowledge. The outcomes of the projects will, of course, be made available to NATO member states and PfP countries. At the COE – CWO, we have also started to reorganise our work in the field of 'Lessons Identified/Lessons Learned', in order to preserve relevant knowledge and effectively take past experiences and incidents into account when designing future Cold Weather Operation. Our goal is to set up a functional and up-to-date depository of experiences that will inform further developments of materiel, procedures, and training. We expect that this database will also be useful for NATO members and PfP

countries when they are planning exercises and operations in cold climates.

Today, our most notable contribution to NATO are our courses and training. In the 2017/2018 season, we organised four Cold Weather courses for allied units. One of them was an 'avalanche warning' course, while the remaining three were 'PR SERE' courses. This means that our staff was tied up in different courses and training for a total of 26 weeks of an approximately 30-week winter season. However, our work and NATO contributions reach beyond our courses and training. Some deserving mention include the following from 2017:

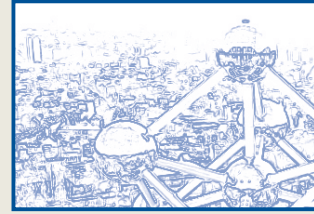
- supporting the 'NATO Doctrine' revision (ATP 3.2.1);
- supporting the 'NDPP Capability Requirement' review; and
- starting to revise our Cold Weather Operations handbooks.

Additionally, activities from 2018 include the following:

- cooperating with the Centre of Excellence – Mountain Warfare (COE – MW) in Slovenia on avalanche risk management standards;
- continuing to revise our Cold Weather Operations handbooks;
- developing and revising PR-SERE handbooks;
- updating our Cold Weather Operations education programmes and making them more standardised, so as to ensure comparable training for visiting units;
- developing and revising PR-SERE education programs;
- holding a 'Cold Weather Operations Seminar' in Trondheim;
- starting to plan a 'Commanders' Winter Warfare Course' for 2019;
- providing Mobile Training Teams (MTT) for different allied units on the subject of basic winter training.
- participating in the planning of the exercise "Trident Juncture 2018" with a focus on providing support for participating foreign units related to Cold Weather Operations; and
- providing SME support to EXCON for the CPX/CAX part of 'Trident Juncture'.

Other major previous and current tasks of the COE – CWO cover a wide range of themes. For example, we are involved in the identification of aspects of nutrition for military operations in the Cold Weather Environment (lead organisation: Norwegian Defense Research Establishment), and we are developing a 'food for thought' paper on developments in the Arctic region until 2040 (status: not finished; lead organisation: Norwegian Defense Research Establishment). ■

The Brussels Backdrop



Macedonia One Step Closer to NATO and EU Membership

Joris Verbeurgt

Anyone familiar with NATO or EU documents knows that the asterisk following the abbreviation "FYROM" indicates Turkey's recognition of the former Yugoslav Republic of Macedonia under its constitutional name, the Republic of Macedonia. This oddity, intended as a compromise to reduce the national sensitivity of NATO allies Turkey and Greece, will soon be a thing of the past. The country will change its name to "Republic of North Macedonia" to settle the name dispute with Greece and improve Southern Balkans relations that have been soured since the end of World War II.

When the partisan leader Josip Broz became the dictator of Yugoslavia at the end of 1945, he called Macedonia the southernmost region of One territorial claims against the neighbouring Greek province of Macedonia. During the dissolution of Yugoslavia in 1991, Macedonia declared its independence and became a member of the United Nations in 1993 under the provisional name "Former Yugoslav Republic of Macedonia", which has since been used by most international organisations. In 1995, under the auspices of the United Nations, negotiations began between the former Yugoslav Republic of Macedonia and Greece to resolve the name issue. On 12 June 2018, Macedonian Prime Minister Zaev and his Greek counterpart Tsipras concluded a historic agreement on the Macedonian shore of Lake Prespa: it would be acceptable for Greece if the Republic of Macedonia were renamed the "Republic of North Macedonia".

Many Macedonians (as well as Greeks) are against the Prespa deal. Zaev had a referendum held on the new name before officially changing the name of the country. The referendum took place on 30 September and although 91% of voters voted for the proposed name change, turnout was only 37% and the constitutional requirement for a 50% turnout was not met. Under pressure from the US and the EU, Zaev ended the political stalemate by announcing that he would



push the agreement forward and ask the Macedonian Parliament to vote on the issue. The name change was discussed in Parliament on 15 October. In the 120-seat Parliament, a total of 80 MPs voted in favour of renaming the Republic of Northern Macedonia. The two-thirds majority required to initiate the constitutional process and officially change the name of the country was thus narrowly reached. Both NATO and the EU congratulated Macedonia on this major step towards solving the decades-old problem.

The Future Member State

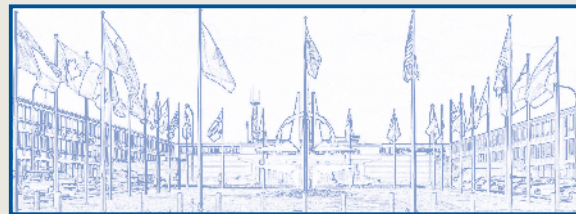
The Republic of North Macedonia is a landlocked country bordering Kosovo to the northwest, Serbia to the north, Bulgaria to the east, Greece to the south and Albania to the west. It accounts for about one-third of the larger geographical region of Macedonia and also includes the bordering parts of Greece, Bulgaria and Albania. The mountainous region has just over 2 million inhabitants, a quarter of

whom live in the capital Skopje. Three quarters of the Macedonian population are ethnic Macedonians, while the other 25% are mainly ethnic Albanians, Turks, Roma, Serbs and Bulgarians.

The history of Macedonia goes back to antiquity. Alexander the Great (4th century BC), who conquered the Persian Empire and laid the foundations of the Hellenistic world, began his career as "King of Macedonia". The territory of Alexander's Macedonia, however, differed from today's Republic of

North Macedonia – his birthplace Pella is today in Northern Greece; the question of Alexander's "nationality" has also fuelled the name dispute. From the 14th century Macedonia was occupied by the Turks. After the Balkan Wars of 1912 and 1913, Macedonia came under Serbian rule, which lasted until 1991, when Macedonia peacefully broke away from the Socialist Federal Republic of Yugoslavia.

From an economic point of view, the Republic of (Northern) Macedonia has come a long way: In 1991, it was the poorest



of the six Yugoslav republics. Large-scale privatisations have strengthened the country's economy and in recent years have led to one of the highest growth rates in Europe, averaging 4%. Although Macedonia is still one of the poorest countries in Europe, it has made significant progress in developing an open, market-oriented economy. Two-thirds of the economy consists of the provision of services, while industry accounts for 25% and agriculture for 8% and a GDP of US\$31.5Bn in 2017. Although unemployment rates are falling from year to year, one in five Macedonians in 2017 had no real employment, which is a major concern for the government. By 2020, Macedonia will receive €1.3Bn a year from the EU to push ahead with the necessary political and economic reforms.

The Macedonian armed forces comprise the army, the air force and the special forces. Some 8,000 active personnel are supported by a 15,500-strong reserve component. Although most of the heavy equipment (such as the 31 T-72 tanks, most armoured combat vehicles and all combat helicopters) is of Russian origin, the Macedonian Ministry of Defence is making great efforts to ensure interoperability with NATO and EU forces. Macedonia spends 1% of its GDP on defence and has participated in operations such as ISAF, EUFOR Althea, Iraqi Freedom, K-FOR and UNIFIL.

EU and NATO Membership Talks

Macedonia, which is already a member of the United Nations and the Council of Europe, is keen to become a member of NATO and the EU. And as Russia reappears as a power in the Balkans, NATO and the EU have become more open to Macedonia's accession. Macedonia has been a candidate for EU membership since 2005, and accession talks have long been on the agenda for future enlargement. But Greece has always blocked any proposal to start official negotiations. Following the signing of the Prespa Agreement, Greece lifted its veto and the EU agreed to start formal negotiations. They are due to start in mid-2019.

The path to Macedonian NATO membership is very similar. Macedonia joined the Partnership for Peace programme in 1995 and launched its Membership Action Plan in 1999, at the same time as Albania. In 1999, it participated in NATO's intervention in the former Republic of Yugoslavia

cession talks at NATO headquarters in Brussels. The formal accession talks cover detailed aspects of membership, including political, military and legal issues." By agreeing on the name change, one hurdle was taken for Macedonia to become a member the EU and of NATO. But other



Photo: US DoD

US Defense Secretary James N. Mattis and Macedonian Minister of Defence Radmila Shekerinska pass by military members in Skopje, Macedonia, during the Secretary's welcome to the nation, 17 September 2018. Mattis made the trip to express US support for Macedonia's Prespa Agreement with Greece and the country's ambition to join NATO.

(now two separate countries, Serbia and Montenegro). In return, NATO supported Macedonia in dealing with refugees fleeing war-torn Kosovo. When Macedonia was temporarily destabilised in 2001 by an Albanian rebel uprising, NATO troops joined forces with the local military to disarm rebel troops following a ceasefire agreement. Macedonia proved to be a reliable partner for NATO, but Greece blocked Macedonia's accession to NATO at the Bucharest Summit in 2008. This veto was lifted after the Prespa Agreement was signed, and on 18 October NATO and Macedonia began talks on the Republic's accession to NATO. In a statement on its website that day, NATO said: "The former Yugoslav Republic of Macedonia made an important step on its path to NATO membership on Thursday (18 October 2018) when it launched two days of formal ac-

cession talks at NATO headquarters in Brussels. The formal accession talks cover detailed aspects of membership, including political, military and legal issues." By agreeing on the name change, one hurdle was taken for Macedonia to become a member the EU and of NATO. But other

hurdles remain before the change can be formalised. Several voting rounds will follow, and the procedure is expected to be completed by January 2019. The Greek Parliament will also have to vote on the deal. Defence Minister Panos Kammenos, who heads a small right-wing party that props up the government in the legislature, has threatened to quit the coalition if the Greek vote goes ahead. As soon as the question of the name has been clarified, the talks can officially begin. It will then be up to Macedonia to continue the reform process in order to meet NATO and EU membership requirements. If the requirements are met, Macedonia will become the 30th NATO member and the 28th EU member (when the UK has left). And knowing what FYROM* stands for will become a curiosity of the past, useful only to quiz fanatics.

The Swiss Army

Peter Jenni

Over the last few decades, the Swiss Armed Forces have been restructured and consistently reduced in rapid succession. A few keywords illustrate the situation. Army 51 was followed by Army 95, then Army XXI, the development step 2008/11, and the latest product is now the Further Development of the Army (WEA). The Swiss Armed Forces currently consist of 100,000 to 140,000 persons. In the 1990s, the effective strength was still around 800,000.

Basis

The basis for the existence of the Swiss Army is enshrined in Article 58 of the Federal Constitution. Paragraph 1 reads: "Switzerland has an Army. It is organised on the militia principle"; and Paragraph 2 reads: "The Army serves to prevent war and contributes to the maintaining of peace; it protects the country and its people. It supports the civil authorities in the averting of serious threats to internal security and in the overcoming other situations which occur outside the scope of service. The law can provide for further tasks".

In Article 1 of the Federal Law relating to the army and the administration of the militia, the task of the army is described as follows: "The armed forces serve to prevent war and contribute to the maintenance of peace, protect land and people and protect Swiss airspace. It supports the civil authorities when their resources are no longer sufficient, in the prevention of serious threats to internal security, in coping with disasters or other exceptional situations, in the protection of persons.... and in particular infrastructures.... and contributes to the maintenance of international peace". The principle of general compulsory military service and of armed neutrality which has been practiced for centuries are two significant aspects of the Swiss military presence.

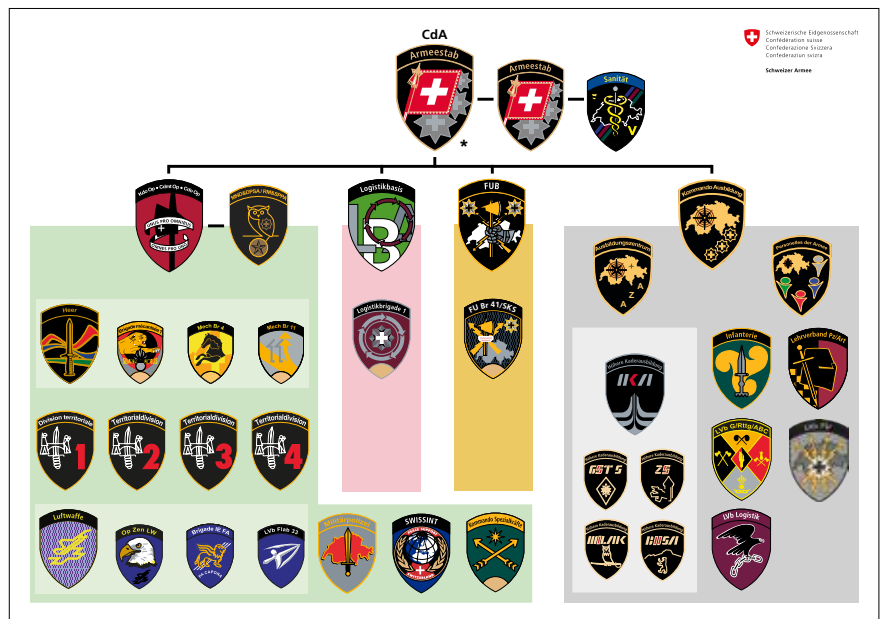
Author

Prior to his retirement, **Peter Jenni** worked for several companies as director of communications. Since 2004 he has been responsible for the "Armament & Technology" segment of "Schweizer Soldat". He served in the Swiss Army as an officer of the militia, including positions as unit commander and intelligence officer in a Brigade as a Lieutenant-Colonel.

Metamorphoses

It goes without saying that an army which is based on the situation of security policy must constantly adjust to changing situations. These adjustments, however, must be carried out in particular with an appraisal of the militia in Switzerland. This aspect has not always been taken into account with the neces-

"Army 61" was tailored to the Cold War. It was continually being adapted and improved, and it lasted for more than 30 years. With "Army 95", it was believed that account had to be taken of the massive changes in Europe in 1989. Personnel levels were reduced in particular, as well as large quantities of fixed installations and materiel, which today, in part at least, are sadly missed.



New structure of the Swiss Armed Forces as of 2018

sary care during the structural reforms which have been referred to. The members of the militia form the element of the army which carries the main burden. During their service, they provide the army with knowledge acquired in civilian life. Thanks to this interaction, the professional part of the army can be kept relatively small in terms of numbers. At the same time, thanks to this system the army is, as before, firmly anchored in the population; it is not an alien presence within the country.

As early as the turn of the century, a further reform was set in motion: this involved "Army XXI". Again, this project was based on the situation in terms of security policy. The change in society as a whole was also taken into account, and, in particular, the constantly diminishing financial resources forced those in charge to reflect on how the mission set down in the Constitution could continue to be fulfilled. This resulted in the motto "Security through cooperation." The Swiss Army shifted its focus from independent defence to international cooperation in

Photo: Schweizer Armee



Photo: Ltpcb

Grenadier of the Swiss Army, equipped with the Assault Rifle 90

order to ensure security. It was in this connection that the Partnership for Peace (PfP) was decided on.

With the "Development Step 2008/11", a further reduction in the formations of the army took place. The reason given was a changed analysis of the threat situation since the beginning of the 1990s. Expenditure for the conventional army of defence was cut still further, while subsidiary commitments at home and abroad gained in importance. The increase in military cooperation in Europe within the framework of the EU and NATO held out the promise of enhanced security and provided further grounds for renewed reduction measures. Hardly had one of the recently adopted reforms been put into effect to any degree, than the next one was already being pushed forward.

Switzerland was not alone in these reduction measures. With these reforms the country was following the tendencies prevailing among the countries of Europe as a whole, and, as a consequence of the collapse of the Soviet Union at the start of the 1990s, the efforts towards maintaining a strong army declined still further. Even the compulsory military service was in part done away with, materiel deemed superfluous was sold off wholesale, or simply destroyed. The trend was clearly towards a smaller professional army, but one which today is in part short of personnel, equipment, and training. This unsatisfactory situation in the security policy context in Switzerland has led to the "favourable security policy situation", referred to in the "Security Policy Reports" of 2010 and 2016, no longer existing. Added to this is the fact that Russia has not hesitated to increase armament expenditure and military personnel training over the past few decades, in combination with developing an aggressive foreign policy.

Reconstruction

Under the acronym "WEA" ("Further Development of the Army"), the attempt is now being made in Switzerland to make up

for the sins of the past. The aim of "WEA" is to put the army in a position in which it will be capable in the future of defending and protecting the country and its people effectively against the threats and dangers of the modern world. As from 2018, the preparedness of the army is being increased, training and equipment continually improved, and the important regional anchoring bond enhanced. It will take years, however, before the implementation



Photo: Andreas Schwarzkopf

Swiss soldiers on military bicycles during a parade in Basel 2011

of the concept adopted will be completed; moreover, the undertaking that has been set in motion is not without its critics. It should, indeed must, be implemented in important sectors by the beginning of the 2020s. By 2020, according to the government, CHF5Bn will be provided for army materiel per year. This must be approved every year, however, in the context of the budget debate in parliament. And, depending on the situation in parliament, there is the risk that this sum may not be set down in stone. Such expenditure frameworks only acquire force of law with the annual estimate being approved. The politicians responsible are faced with a challenge.

For the urgent replacement of the existing resources for air defence, the Federal Council has earmarked a budgetary framework of CHF8Bn. It is generally known, moreover, that in the coming 10 to 15 years, for example, the replacement of the main systems of the artillery and the mechanised units will fall due. It is evident that with the present financial framework for national defence, these gaps cannot be filled. The government has therefore made provision, from 2020, to increase the annual budget for the army continually from the present 0.7 percent of gross national product (GNP). In real terms, the intention is to apply a 1.4 percent increase. This should result in the proportion of outlay for military national defence rising to around 0.8 percent of GNP. In the view of the parliamentarians, this should allow for the new combat aircraft and ground-supported anti-aircraft defence (Bodluf) to be replaced, as well as, to some extent, the other main systems of the army.

In order for all this to be done, the issue now and in the future is that the army and the Military Department (VBS) make the use and importance of the investments in the army clearly understandable to parliament and to the public in general. This needs a merger of all those militia organisations in the country which are of interest to the army, and which have an understanding of the significance of the security of the country. The expenditure on national defence in Switzerland is in direct competition with the state's outlay for social welfare, agriculture, training, and development aid, to cite just a few examples.

Strong Backing

Since 1999 the Military Academy and the Centre for Security Studies of the Swiss Federal Technical College in Zürich have annually conducted a representative survey among around 1,200 citizens with the right to vote on the subject of security. In the latest re-

port on the 2017 survey, it transpires that the Swiss in general feel very secure (95 percent of those asked). A majority consider the defence of security by the army to be necessary. They are prepared to forego certain liberties if the issue is to combat terrorism. This positive ground swell in the country is something which should encourage the government and parliamentarians responsible not to impede the financial resources for the security of the country, but to approve them.

Three Forms of Performance

The WEA needs to fulfil three forms of performance of the army: To be provided permanently are the maintaining and further development of the capabilities to fend off a military attack, the safeguarding of airspace with sensors, and normal air police service; what are viewed as basic performance services, such as the support of the civil authorities, the operation of the guidance network of Switzerland, and support for the police and the frontier force.

In order to provide these services within the framework of foreseeable commitments, for conferences and the protection of buildings, 8,000 members of the Swiss Army (Angehöriger der Armee; AdA) are available, and 2,500 AdA for safeguarding airspace with reinforced air police services. Within a matter of days, they can be called upon to provide assistance abroad or make contributions to humanitarian aid. Within weeks or months, up to 500 AdA can be called up for peace-keeping duties. In the event of unforeseeable engagements, within the framework of the reintroduction of the mobilisation organisation, within ten days there could be 35,000 AdA available. With this scaled stand-by system, the performance levels described can be restored.

It has unfortunately become clear that, with the materiel and means provided for, the mission of the army as outlined in the Constitution cannot be fulfilled, or only to a limited degree. The protection of what is referred to as critical infrastructure alone, such as airports, power stations, and so on, over a sustained period could only be provided in individual locations and for limited periods of time, which is why some critical observers see the WEA as only a temporary solution.

The New Organisation

The new Swiss Army has a modular structure. The basic modules are battalions, departments, and squadrons. Based on the mission and the situation, these modules are joined together within the modular system



Photo: Bern Files

Swiss Army infantry squad and Mowag PIRANHA ATC. The white ribbon on the rifles is used to seal weapons that are aimed at people for training purposes.

for commitments as composite formations tailored to the specific situation. In the basic structure, the Swiss Army is divided into the Army Staff, the Operations Command (military intelligence, three Mechanised Brigades, four Territorial Divisions, the Military Police Command, the Air Force with the Operations Centre, the Air Force Induction and Training Brigade, and the Training Unit for Aircraft Defence, the Peacekeeping Command, and the Special Forces Command), the Training Command, the Logistics Base of the Army, with the Logistics Brigade and the Medical Corps, the command support base with the corresponding brigade, the troop formations such as battalions and airfield commands, and troop units such as companies and batteries, and so on.

The Army Management

The chief of the army is responsible for the military strategic management and further development of the army, and reports directly to the minister of defence. He is supported by the Headquarters of the Army, the Operations Command, the Training Command, the Logistics Base of the Army, and the command support base.

The Headquarters support the chief of the army in the further development and management of the army. Attached to the Training Command are the Higher Cadre Training unit, all the training formations, and the personnel planning of the Militia.

The Operations Command is responsible for the planning and management of commitments, but also for the refresher courses. Attached to this are the Land Forces, the Air Force, and the Territorial Divisions.

The Logistics Base of the army and the Medical branch provide the army with logistics and support services. They also ensure the operation of army infrastructure, plus the provision of medical care for the army and the operation of the army pharmaceutical service.

The command support base provides the management capability of the army and of national crisis management. For this purpose it can commit information technology, telecommunications, infrastructure, and specialist personnel.

Service Models

Conscripts for Swiss compulsory military service undergo traditional basic training (recruit school) between the ages of 19 and 25. As a rule, this takes place after initial training for a civilian occupation. Recruit school lasts 18 weeks, and 23 weeks for members of the Special Forces. In the years following, there are a further six three-week refresher courses which must be attended annually. There are exceptional rulings for special functions. Personnel referred to as continuous service recruits perform their military service in one single period. This period of service lasts 280 days. The training of these personnel is focused on subsidiary commitments to the benefit of the State and the Cantonal authorities. Per year a maximum of 15% of an annual recruit intake (including women) have the possibility of carrying out national service in one period.

Training is provided by cadre members who are already very well trained. Those responsible are obliged to win over the best candidates for further training, and then prepare them for their future tasks. The skills acquired are then enhanced and consolidated in practical service, as was formerly done during an entire recruit school period.

An ordinary soldier is required to serve for 245 days, continuous service personnel for 280 days, a non-commissioned officer for 440 to 459 days, a senior non-commissioned officer for 510 to 680 days, a subaltern officer for 680 days, and a captain for 240 days after promotion. As a rule, members of the militia are discharged from the Swiss Army at the latest after reaching the age of 42. ■



International Exhibition and Demonstration for Defense, Homeland Security, Cyber Security, Safety & Security and Aerospace



5th Edition

Exhibition Organizer



April 10 - 12, 2019
Split, CROATIA



Organized with the
support of the Ministry
of Defense of the
government of Croatia

For stand bookings and additional information: Tel.: +1 703 406 0010, e-mail: asda@tntexpo.com
www.AdriaticSeaDefense.com

Casualty Treatment in the War in Eastern Ukraine

Alex Horobets

The fighting in Eastern Ukraine revealed the weaknesses of Ukrainian military medicine. That is why Ukraine has made huge efforts to raise medical care for war-disabled soldiers and civilians to NATO levels.

As a rule, in modern armed conflicts the number of civilian victims exceeds the number of military victims. Unfortunately, we see the same statistics in the conflict in Eastern Ukraine. Huge losses were suffered not only by the armed forces of Ukraine, the Security Service, the State Border Guard Service, the Ministry of Interior and the

253,716 explosive objects since the beginning of the Donbas war. According to UNICEF, anti-personnel mines, unexploded ordnance and other explosives cause 2/3 of deaths and injuries to children. The zone along the 500-kilometre-long contact line that separates state and non-government controlled areas is one of the



Photo: Ukrainian MoD

Eastern Ukraine, more than 2,540 civilians have lost their lives and up to 9,000 people have been injured. According to the General Staff of the Ukrainian Armed Forces of 28 October 2017, since the beginning of the anti-terrorist operation in Eastern Ukraine, the combat losses of the armed forces have amounted to 10,710, of which 2,333 have been fatal; a further 8,877 have been reported wounded and injured in action. Following the outbreak of hostilities in Eastern Ukraine, a number of problems were identified at various levels relating to the treatment and rehabilitation of the wounded and injured. These include the adaptation of legislation, the provision of treatment under conditions of destroyed infrastructure, the transport of the wounded to medical facilities and the provision of medical equipment and medicines. The chances of recovery for the victims depended on the proper functioning of this entire chain.

In the midst of the armed conflict, the medical troops had to adapt quickly to solve urgent problems in the treatment of the injured. Already in the first years of the war, doctors wrote scientific articles and did research on this subject. In 2015, the Ukrainian Neurosurgical Journal published an article by A.G. Sirko, a doctor at the hospital in Dnipro named after I.I. Mechnikov. This hospital has contributed a lot to the medical support of the anti-terror operation. The study was conducted on the basis of the treatment results of those admitted to the Dnipro Regional Hospital from 25 May to 31 December 2014. The author concluded that the introduction of more aggressive principles for treating the wounded led to a decrease in mortality to 7.3%. It is also necessary to mention the 2017 scientific article by V.V.Voronenko, M.D.Bliznyuk,

Photo: UN Ukraine



Volunteer doctors of the Ukrainian Red Cross in Eastern Ukraine during a meeting with the United Nations, 18 September 2014

voluntary battalions defending the territorial integrity of the country, but also by the people living in the zone of the anti-terrorist operation (which was later renamed Joint Forces' Operation).

The hostilities in the Luhansk and Donetsk regions caused infrastructure damage, enormous material losses and social problems, the consequences of which cannot be mitigated in the short term. For example, on 3 November 2018, the Ukrainian MoD reported that its explosive ordnance disposal (EOD) troops had neutralised

most heavily mined areas in the world. UNICEF also reports that, according to its data for January-November 2017, one child per week fell victim to the armed conflict. The most frequent deaths occurred when children picked up explosive objects from the ground. According to the UN Children's Fund, this poses a threat to the 220,000 children living in these areas. The statistics of the OSCE Special Observer Mission confirmed 442 civilian victims in 2016 (88 dead) and 388 civilian victims in 2017 (68 dead). In August 2018, the OSCE's first Deputy Head of SMM in Ukraine, Alexander Hug, reported that 161 civilian casualties were recorded in Donbas in January-July this year (29 deaths). The United Nations Office for the Coordination of Humanitarian Affairs said in April 2018 that, since the outbreak of hostilities in

Author

Alex Horobets is an analyst for international and Arctic affairs based in Kyiv, Ukraine.



Photo: OSCE Special Monitoring Mission to Ukraine

OSCE staff monitoring the movement of heavy weaponry in Eastern Ukraine, 4 March 2015

V.P.Pechiborshch and A.Yu. Shuryhina titled "Characteristics of medical care of the population and troops in the ATO zone. Realities and prospects for the creation of a single medical space." The article described the system of medical evacuation measures of the anti-terror operation, including the provision of medical help for self-help and mutual help, with further treatment in the medical units of military bases, deployed mobile military hospitals, the military hospital Dnipro, the Military Medical Clinic of the Northern Region, 17 central district hospitals in the combat zone and the Mechnikov Regional Hospital in Dnipro.

After receiving the necessary medical care and stabilisation, the wounded were evacuated to military hospitals and other clinical facilities of the National Academy of Medical Sciences of Ukraine. The study identified two important medical evacuation targets from the ATO zone:

1. Preferably from Luhansk region to Kharkiv;
 2. Preferably from Donetsk region to Dnipro.
- Later, a third medevac destination was set up, to Zaporizhia.

Given the protracted military conflict itself, the large number of wounded as well as the medical personnel of Ukraine's armed forces and other available formations, it was impossible to fully cover the full range of medical care. As a result, civilian medical institutions were involved in the treatment and evacuation of the wounded and a coordination headquarters of the Ukrainian Ministry of Health and the National Academy of Medical Sciences was established for this purpose. In 2015, the Civil Defence Coordination Centre for Medical Assistance was also established at the Ministry of Defence of Ukraine.

In establishing the above-mentioned headquarters for medical assistance to civilian and military victims, a coordination point was established between the Ukrainian MoD, the Ministry of Interior, the Ministry of Health, the National Academy of Medical Sciences, the State Service for Emergency Situations, the Security Service of Ukraine and voluntary organizations.

On 7 February 2018, a decree of the Ukrainian MoD and the Ministry of Health established a mechanism for the provision of specialised and highly specialised medical care to soldiers participating in the ATO. The decree approved the mechanism for organising the listed types of medical care for members of health care institutions, as well as a list of institutions involved in medical care.

We cannot but mention the support of foreign partners in the treatment of the wounded by that of Ukraine. Lithuanian President Dalia Grybauskaitė was the first to offer assistance in the treatment and rehabilitation of wounded soldiers. Soldiers injured in combat were sent to countries such as Hungary, the Czech Republic, Poland, Bulgaria, Belgium and others. In general, these are the 16 NATO allies. In 2016, a NATO Trust Fund was established to treat, rehabilitate and provide medical equipment to Ukrainian hospitals.

Germany shows a consistent policy of support in the treatment and rehabilitation of the Ukrainian military. Since the outbreak of hostilities in Eastern Ukraine in July 2018, 102 Ukrainian wounded troops have been transported to Germany for treatment.

In Eastern Ukraine, the International Red Cross (ICRC) is providing ongoing assistance. Red Cross employees supported the doctors in active phases of hostilities. About 60 clinics and medical centres on both sides of the contact line receive basic medical equipment, surgical kits, bandages and key medications from the organisation. Among other things, the ICRC supports blood banks and helps restore medical facilities affected by hostilities. The armed conflict in Eastern Ukraine has shown that many problems of the civilian population need to be solved. With the support of the Renaissance International Foundation and the US State Department (within the framework of the Justice for Peace in Donbas Coalition), a press conference was held on 7 February 2018, as part of the project "Monitoring, Documentation of Violations and Protection of the Rights of Civilians in Eastern Ukraine", on the topic "Protection of the Rights of Civilians in the ATO Zone: The Need to Formulate a State Policy to-

wards Citizens Who Have Been Injured and Disabled".

At the press conference, population groups were identified who are particularly in need of assistance because of the military conflict in Eastern Ukraine. Among them are:

1. civilians who were in captivity and subjected to violence and torture, but who did not become disabled;
2. civilians captured and disabled;
3. civilians injured in an armed conflict but not handicapped;
4. civilians injured and disabled during an armed conflict; and
5. disabled family members of civilians who died in captivity or in hostilities.

The chairman of the board of the Public Committee for the Protection of the Constitutional Rights and Freedoms of Citizens, Mykola Kozzyrev, said there has been no coordinated social policy regarding these categories so far. In addition, questions remain on the statistical recording of war victims and on adequate social assistance for the civilian population concerned. For this reason, the Ukrainian law "On the Status of War Veterans and Ensuring Their Social Protection" is intended to define additions to the above-mentioned population groups. On 24 February, 2018, the Law "On the Status of War Veterans and Ensuring Their Social Protection" was amended to allow civilians injured in the anti-terrorist operation zone to be included in the list of persons disabled as a result of the conflict in Eastern Ukraine. In view of the fact that, since the first days of the anti-terrorist operation in Eastern Ukraine, the question of the interaction of the medical services of various formations and civil medical institutions has been raised, it was considered that solving this question would ensure timely medical care for both military and civilian populations. To maximise the efficiency of the simultaneous efforts of military and civilians in the MoD, a draft of the military medical doctrine of Ukraine was developed. On 31 October 2018, the Ukrainian Cabinet of Ministers approved the document. The doctrine introduced uniform approaches to the organisation of medical care for military personnel and their treatment and rehabilitation and it also introduces NATO standards for medical care at the legislative level.

In this way, Ukrainian doctors succeeded in improving the quality of medical care for the wounded in Eastern Ukraine. Volunteers' contribution and improved coordination in the evacuation of the wounded, in turn, significantly shortened response times. Medical support for soldiers participating in the Joint Forces operation was given a more precise organisational form that could form the basis for the further introduction of NATO medical standards. ■

Thermal Sights for Infantry Weapons

Tamir Eshel

Night vision technology evolved in the 1960s as a transformational capability that enabled US soldiers and later NATO forces to effectively operate at night.

The first applications of man-portable night vision systems used image intensification (light amplification) devices that provided useful imagery at a reasonable weight, size, and power consumption for dismounted use. Wearable applications were restricted to night vision goggles used for navigation and orientation, while weapon sights employed bulkier Star-Light-Sight (SLS) scopes. Although quite large and heavy, military

forces quickly adopted these solutions for the great advantage they offered, as they could manoeuvre and fire at night without relying on artificial lighting, which made them particularly effective for covert special operations.

Image Intensifiers

The image intensifier (I2) uses existing ambient light reflected from objects to

view a night scene. The light may be moonlight, starlight or artificial light from vehicles and streetlights or infrared illuminators. The I2 tube collects light photons on one side, turns them into a flow of electrons amplified into a clear, visible picture when it hits a phosphor screen placed on the other end of the tube.

Image intensification has evolved into useful and versatile night vision capability. While its use is limited to night-time, it is dependent on night light conditions and would not function at dark nights, inside buildings or underground and is vulnerable to 'blooming', when a strong light jams such imagers. Evolved generations of I2 tubes overcome some of these problems in different ways.

Parallel to the evolution of I2 tubes, Low-Light-Level TV (L3TV) technology was introduced. A solid-state CCD camera sensitive to wavelengths above the normal visible band (0.4-0.7 microns) allowed the sensor to operate in extremely low light conditions where the naked eye could see nothing. Both I2 and L3TV are limited to operation in darkness and would not work in daylight. Both sensors rely on light illumination reflected from the objects they observe. They are sensitive to obscurants such as fog, dust, and rain and would be deceived by standard camouflage that hides and scatters light reflections from the objects they mask.

Once laser aiming lights were introduced, team coordination at night became relatively easy, as compatible imagers, lasers, and ID patches were deployed to mark friendly forces. The use of laser target lights enabled the troops to shoot more intuitively, as a laser marked the line of fire for the shooter and the entire team. With the evolution of latest-generation tubes, I2 matured to deliver much better imagery, even at lower light levels, improving night vision and image resolutions for goggles and sights. Performance enhancements derived from gating ensure tubes are not damaged by strong light that would have blinded the sensors in the past. The introduction of miniature CCD cameras operating in low light level

Photo: US Army



Raytheon's PAS-13, here mounted on a CARL GUSTAV recoilless rifle, is a typical thermal weapon sight.

Photo: US Army



The clip-on mounted FWS are the most advanced thermal weapon sights fielded with US forces.

conditions enabled the miniaturisation of I2 imaging systems and reduction in weight and size for wearable systems such as helmet goggles and weapon sights.

Cooled and Uncooled Thermal Imagers

Thermal sensors use a different imaging concept because they capture the heat emitted by objects and view the scene from tiny temperature differences between these objects and their background. As such, they do not require illumination and can show a clear picture of a scene even in total darkness.

Thermal imagers utilise three operating bands: the Long-Wave IR (LWIR) at 7.5–14 μm is typically used by uncooled IR cameras; Medium-Wave IR (MWIR) at the 3–5 μm wavelength is used by cooled thermal imagers and Short-Wave IR (SWIR) at wavelengths of 1–3 μm are used in active illumination night vision technology. Longer waves (with lower energy) travel further through environments containing large particles. Hence, uncooled devices designed for

devices supporting 3–5 μm imagers perform better on long-range surveillance and observation.

They can operate in day and night and do not suffer from blooming when illuminated on. Thermal vision is not affected by environmental obscurants such as dust, haze, and smoke, although under some conditions they are degraded by incendiary activity such as burning and pyrotechnics. They perform great in snow and cold environments and some types would penetrate a limited depth of fog and rain.

The first generations of thermal imagers were too heavy and bulky for dismounted use; night vision equipment and weapon night sights could only use Image Intensifiers (I2). This required soldiers to carry different sights for day and night operation, which were also dependent on the level of moonlight and cloud coverage.

Thermal cameras use either uncooled or cooled sensors to detect electromagnetic radiation (photons) in the infrared band. Originally, cooled thermal cameras keep their detectors in a vacuum, using cryo-

Photo: US Army



A clip-on sniper sight (CoSNS)

8–14 μm wavelengths are better suited for dusty or foggy environments. In the medium wavelength region, conversely, photons have more energy, hence cooled

genetic cooling to maintain operating temperatures as low as 60 K. Without such cooling, the sensors would be 'blinded' by their own radiation. Cooled thermal imagers deliver high sensitivity that provides



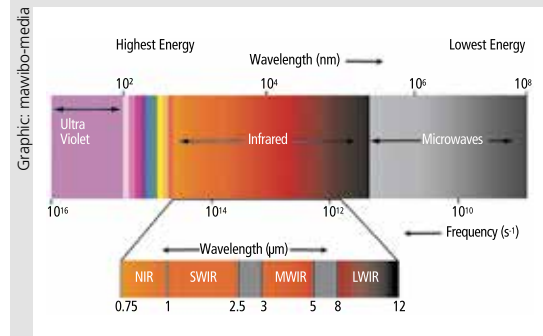
Photo: US Army

A clip-on thermal weapon sight

The Infrared Spectrum

The infrared spectrum constitutes only a part of the whole electromagnetic spectrum (as shown in the graphic) and itself has three effective ranges depending on the wavelength:

- Long-Wave IR (LWIR) (7.5–14 μm)** – typically used by uncooled IR cameras;
- Medium-Wave IR (MWIR) (3–5 μm)** – typically used by cooled IR cameras;
- Short-Wave IR (SWIR) (1–3 μm)** – typically used in active illumination night vision technology



longer target detection and recognition distances and better image resolutions, compared to uncooled sensors. But this performance comes at a high cost - cooling is both energy-intensive and time-consuming, making imagers heavier, power-dependent and slow to show the first image once activated.

Miniaturisation has dramatically transformed uncooled thermal imagers into smaller and lighter devices, with each generation improving sensitivity, image resolution, and performance. Apart from the smaller size, lower power consumption and reduced weight, a major advantage of the uncooled sensor is the system's fast startup, reduced to seconds instead of the minutes required by cooled systems. This trend introduced thermal weapon sights in two forms – a standalone (inline) version used as the weapon's primary sight or a clip-on thermal imager placed in front of the weapon's day sight – for example, on the Picatinny rail carrying the optical scope. With uncooled thermal imaging cores manufactured in 25, 17, 12 and now 10-micron pixel size, modern bolometer thermal detectors are available in 384x288, 640x480 and 640x512-pixel arrays offer-

ing high-definition thermal imagery with detail levels similar to monochromatic daylight imagery. Thermal images can be set to depict hot white or black hot, improving image definition. Unlike I2 tubes that couple the sensor and display in the same unit, thermal imagers produce digital imagery that can be displayed locally on a miniature video display on the sight or be recorded, transmitted and displayed remotely. This capability simplifies the integration of fire controls and moving reticule, and adaptation to different weapon types is possible using software modification.

Such sights are currently available from major US providers including Raytheon, L3 Insight Technology, DRS, BAE Systems and FLIR Systems and Trijicon as well as numerous international vendors including Sagem, Thales, Qioptiq, Thermoteknix, Opgal, Elbit Systems, Meprolight and Troya Tech, to name only a few.

With new classes of sensors introduced every few years, the performance of thermal sights is improving with time. Current generations utilise sensors fabricated in 17-micron pixel size technology, with thermal cores using the 12-micron technology available on the market since 2014 and 10-micron cores announced this year. Smaller pixels deliver higher-resolution, sharper, and more detailed images. They are designed to deliver higher performance in a compact and efficient package. These smaller sensors come with a more powerful image processing enabling more sophisticated 'tricks', such as edge detection and the ability to display images in several grey levels, not just black and white. These user-selectable modes help displays become clearer and provide more image fusion options.

Thermal Weapon Sights

A typical thermal weapon sight is Raytheon's AN/PAS-13B, introduced in 1998. The first generation of this sight employed cooled detectors. They delivered the benefits of day and night visibility and could see through smoke, fog or dust, but these benefits came at the cost of weight, power consumption and the long activation time required for the cooling process. Those sights are used with medium-calibre weapons, such as the M2 Browning (.50 calibre) machine guns and automatic grenade launchers. To meet the weapon's range sights they are equipped with magnifying optics providing X10 or X5 magnification. A programmable reticule enables the use of a single sight with different weapons,

including M2 or GAU-21 heavy machine guns, M60, M249, and M240 machine guns, the MK19 AGL, the M24 sniper rifle, as well as M16/M4 assault rifles. A new variant introduced in 2006 employed uncooled thermal imaging sen-

grated Circuit (ASIC) and optics to deliver a 'camera on a chip' solution. The complete camera runs at 60 Hz frame rate and requires half a watt for operation. The camera weighs only 5.1 grammes and consumes less than three cubic cen-



Modern sights allow switching between different polarity levels.

sors. These sights are lighter, smaller and more versatile, with the smallest model designed for assault rifles weighing only 800 grammes (1.8 lbs). An even smaller version designed as a 'clip on' device mounted in line with existing day sights / close combat optics adds thermal vision capability when required while retaining the original weapon alignment.

Advanced Thermal Cores

While some of those systems derive from the commercial market, weaponised applications need special adaptations. Since 2011, DARPA has been supporting defence-related research and development of miniature thermal cameras under the Low-Cost Thermal Imager – Manufacturing (LCTI-M) programme to meet future military applications. In the future, miniature, more capable thermal cameras developed under the LCTI-M initiative will embed with sights, helmets, spectacles, miniature aerial systems, and unattended sensors to enhance vision and targeting. Adding networking functions is evolving as one of the essential capabilities which enables miniature cameras to evolve and provide shared situational awareness under all weather and visibility conditions. One of the products that came out of LCTI-M is BAE Systems' 'chip camera' called Stacked Modular Architecture High-Resolution Thermal core (SMART). It is a Long-wave Infrared (LWIR) focal plane array (FPA) bolometer packaged on a 12-micron wafer. SMART uses an integral multi-stack Application Specific Inte-

timetres of space.

The Short-Wave Infrared (SWIR) portion of the spectrum offers other capabilities, often complementary to LWIR and MWIR imaging. Imaging in SWIR uses reflected light, much like the slightly shorter wavelengths of the visible spectrum, so scenes, objects and persons look very similar to how they look in visible light. SWIR can be used on its own or fused with other thermal imaging to deliver a 'Hinted SWIR' image, as certain objects from the LWIR are displayed in colours to highlight areas where the user might want to focus on detecting and identifying targets.

The Family of Weapon Sights

The next generation that is currently being delivered to US forces is known as 'Family of Weapon Sights' (FWS). It consists of thermal sensors using the latest 12-micron cores operating in the 8–14 µm wavelength region. This family includes three types of sights optimised for carbines and Close Quarter Battle (CQB), crew-served weapons and long-range sniper operations.

The FSW family are the most advanced thermal weapon sights being fielded with US forces. Designed for use with the M4 Carbine and M249 squad automatic weapons, this third-generation thermal image provides more than a sight – on a clear night man-sized targets would be detected at 1,000 metres away, or 300 metres when viewed through smoke and other obscurants,

which is well beyond the effective range of the carbine.

A different design known as FWS-CS is used with crew-served weapons (M240, M2, and MK19). This sight enables weapons to recognise targets at 2,400 metres on a clear night, or 500 metres through smoke and obscurants. The sight is integrated with an HD day camera, a laser rangefinder, all wirelessly connected to the helmet-mounted display, providing a fire control solution ensuring effective, first fire bursts on target at extended range. Wireless imaging capability enables the gunner to take cover while operating the weapon, thus improving protection and combat efficiency.

A third variant provides the first thermal clip-on sight designed exclusively for snipers and marksmen, the TWS-S (Sniper) developed by N2 Imaging Systems placed in line with the sniper's day optic on the M110, M2010, M107 and Compact Semi-Automatic Sniper Rifle (G28). The device integrates a remote-controlled focus adjustment and couples with the Small Tactical Optical Rifle Mounted (STORM) micro-laser rangefinder to produce the firing solution. Utilising a thermal core based on 10-micron pixels TWS-S will extend the sniper's night firing lethality to 1,800 metres. This is over three times the range obtained with current sights based on I2 technology. The new thermal sight will also enable snipers to see targets under camouflage and penetrate through 600 metres of smoke and obscurants. The US Army plans to field over 5,000 such sights.

Enhancing Soldier Vision and Performance

Image fusion is the next big thing in thermal vision for warfighters. Current imaging systems have a narrow field of view and narrow wavelength sensitivity with limited resolution. Integrating sensors operating in different wavelengths and fields of view would offer a more intuitive picture. Several such programmes are already in the making. DARPA's Pixel Network for Dynamic Visualization (PIXNET) programme seeks to integrate several imagers, each operating in different IR wavelengths into a multi-spectral sensor that renders a single, fused image in real-time. For a start, thermal imagers operating in the 8–14 micron wavelength are combined with reflective light imagers operating in the Near Infrared (NIR) band and using sensors such as Night Vision Complementary Metal Oxide Semiconductors (NV-CMOS) and SWIR. The fused

image provides an enhanced view of living objects in both stationary and moving situations, highlighting the presence of humans or animals to the user. The sensors are integrated wirelessly, combining the weapon's sight view and the head-mounted night vision device eyepiece. The user can select the original goggle's view, thermal vision or the fused image, to explore the situation, highlight targets or improve vision in a confined and dark space such as indoors or underground. Currently, troops use two different devices – a helmet-mounted night vision

device for situational awareness and a weapon-mounted thermal sight for targeting. This method requires a soldier to identify and acquire his target through the goggle system and then raise the weapon sight into his field of view to engage. Since the two sensors have different fields of view and display the scene in different ways, this process risks a soldier losing sight of a target, particularly in situations where smoke and other obscurants limit visibility.

ENVGIII/FWS-I is the first example of a fusion-based soldier vision application.



Photo: US Army

Close Quarter Battle (CQB) at night seen through modern FWS sights



Photo: US Army

The Enhanced Night Vision Goggle (ENVG) allows several thermal inputs to be fused into a single image.

It combines two state-of-the-art products – the Enhanced Night Vision Goggle III (ENVG-III) and the Family of Weapon Sights – Individual (FWS-I), combined into a single wearable system that enables soldiers to navigate and rapidly acquire and engage targets in all light levels and visibility conditions. The wirelessly connected devices enable the soldier to see

With the ENVGIII/FWS-I ensemble soldiers can look around corners, above walls or through narrow positions with just their weapon, quickly acquire targets and fire. The advantages over the enemy as well as the added safety of troops are significant, as the system can be used in the same manner to look for set traps with minimal to no exposure of their location.

rifles, machine guns and rocket launchers. This new-generation digital sight incorporates uncooled IR technology (8–12 μm) with a day camera. Safran has already received initial orders for 6,000 such sights as part of the French Felin programme.

While not supporting full fusion capability at this time, the MEPRO NYX-200 multi-spectral sight from Meprolight combines a thermal imaging sensor and low-light level CCD to offer high-resolution day/night visibility and enhanced night situational awareness as well as operation in full darkness, in all scenarios, including CQB. The thermal imager uses a 17-micron pixel core, 480x640 in size operating side by side with a 1280x640 low light level or day camera. Both are displayed on the integral screen and connected to an external display or digital video recorder for mission debriefing.

A future trend in weapon sights is the introduction of the 'Computational Camera', a multi-sensor sight combining rangefinder, ballistic computer, and moving reticule enabling the shooter to aim the weapon and fire only when the weapon is aligned to hit the target. Using a wireless link to other elements on the battlefield, such a sight can serve as a friendly target identification function, to reduce the chance of fratricide events. Such a system is available with the 'SMASH' sight from the Israeli company Smartshooter. The sight currently uses a low light level imaging technology but may soon add thermal imaging.

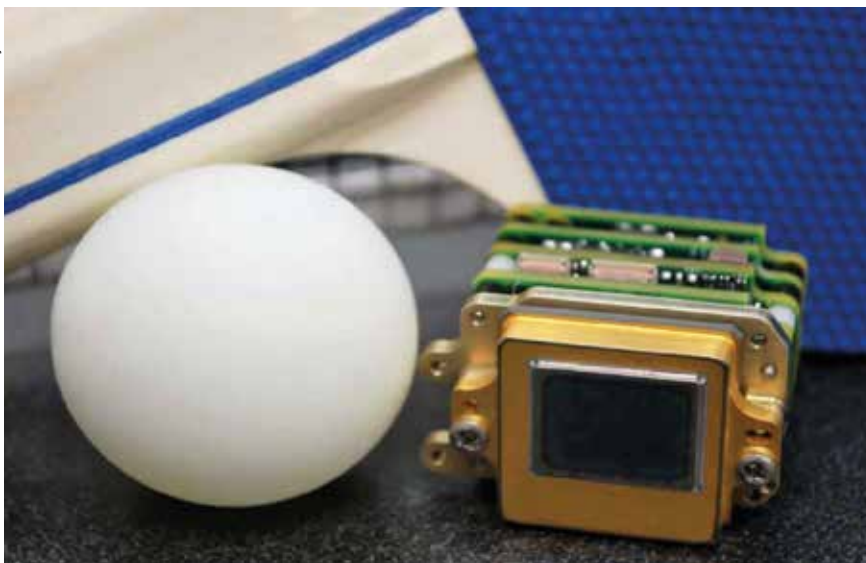
Once exclusive to the US and a few NATO members, thermal imaging systems and weapon sights are currently available throughout the world. With an abundance of commercial applications, the control of thermal imaging technology cannot be as tight as before. One of the leading suppliers, FLIR Systems, maintains an international distribution network offering sights and imagers for recreational and paramilitary use. Companies from Europe, Turkey, and Israel offer indigenous products based on imaging cores developed in-house. Weapon-grade thermal vision systems have also appeared in China and Russia and proliferated to Iran, tapping loosely controlled export regulations in China. With the flow of material from Iran and the collapse of military forces in Libya, Syria, Iraq, and Yemen, modern military equipment has reached the black market and is now used by terrorists throughout the region. Therefore, the technologically advanced militaries should prepare for it and expect to meet advanced thermal vision technology on the battlefield. ■

Photo: Qioptiq



DRAGON-S12 is the new state of the art 640x480 In-line Thermal Sight from Qioptiq, providing snipers with 24hr surveillance and target engagement capability.

Photo: BAE Systems



BAE Systems' micro ir-12u camera cores

the weapon's sight superimposed on the goggle's wider field of view, with the aiming crosshair aligned, to enable instinctive firing from the hip, without the need to raise the rifle for a traditional firing position. This new capability called Rapid Target Acquisition (RTA) allows soldiers to quickly acquire a target and accurately fire the weapon, even from behind a corner, well before an adversary response.

In 2015, the US Army selected BAE Systems to deliver this capability, under a five-year US\$434M contract. Following initial production orders worth US\$35M and US\$13.5M for each of the systems, BAE Systems received a major order worth US\$97M, for complete ENVGIII/FWS-I systems. Other systems integrate multiple sensors on the device without image fusion. An example is Safran's SWORD T&D – a thermal day/night weapon sight designed for assault

New Developments in Lightweight and Heavy Torpedoes

Luca Peruzzi

The growing number of submarines, whether nuclear or conventional, in particular air-independent propelled and midgets, is forcing the world's navies to reinforce their sub-surface warfare deterrence by modernising or acquiring new torpedo systems.

To address the latest threats, industry and research institutions are looking for new technologies for batteries, sensors and life cycle cost reduction. The article discusses Western solutions in both the heavy and light torpedo segments.

Heavyweight Weapons

Atlas Elektronik's latest iteration of its Heavyweight Torpedo (HWT) family, the SEAHAKE Mod4 is based on the technology of the DM2A4 introduced in 2004 by the German Navy and which has since then been delivered to seven countries worldwide such as Pakistan, Spain, Israel and Turkey. Building on the success of a 45-year tradition of Atlas torpedoes currently used by 18 navies on more than 150 submarines, the SEAHAKE Mod4 features a modular battery concept (with either two, three or four zinc/silver oxide batteries) with inherently safe chemistry and very short activation time ("snap shot capability"), and an electronically commutated permanent magnet motor that, in its more powerful configuration with four combat batteries, can reach speeds in excess of 50 knots and a maximum range of over 50 km.

Atlas Elektronik

The SEAHAKE Mod4 incorporates a hydro-acoustically optimised homing head with a sonar conformal array with extended angle of view, fibre-optic wire guidance, wake homing sensor and digital broadband signal processing offering better tracking and manoeuvring capabilities, reduced self-noise and cavitation with superior target/jammer/decoy classification and discrimination in active and passive mode, documentation reports. With a length of 6.9 metres including the guidance wiring dispenser in the most capable four-batteries

configuration and an insensitive warhead, the SEAHAKE Mod4 has been integrated with Type 209, 212A/214, S-80 and AGO-STA 90B submarine families.

Based on SEAHAKE technology, Atlas developed an extended range (ER) version with ranges exceeding 140 km, directed beyond the fibre-optical cable length via a communication section, including a GPS navigation antenna and satellite communication. Atlas has also been driving R&D in the field of battery technology since the DM2A4 introduction, aiming to produce a Li-ion battery for training purposes. Based on lithium iron phosphate technology, the latter battery was qualified by the German Navy and delivered in the meantime to two undisclosed customers. Intrinsically

The SEAHAKE Mod4 extended range (ER) version can be controlled beyond the fibre-optical cable length, thanks to a GPS navigation antenna and satellite communication suite.



Photo: Atlas Elektronik

delivered between the 1970s and 1990s and still in use by nine navies worldwide with approximately 400 weapons in service, under the SEADEVIL HWT solution. The existing body and propulsion system of the older HWTs can be integrated with the SEAHAKE Mod4 electronics and sonar head in order to extend the lifetime of these torpedoes for another 20 years. The SEAHAKE Mod4 Open Architecture and the SEADEVIL solutions are proven systems already delivered to two undisclosed customers, reportedly including India.

Leonardo

The latest generation of Leonardo's BLACK SHARK HWT, already in service with the Chilean, Portuguese, Malaysian and an undisclosed South-East Asian navy, identified by ESD as the Republic of Singapore, has completed the certification process and is currently under series production for the Italian Navy and potential foreign customers in addition to being produced as upgrade kit for current BLACK SHARK customers. Known as BLACK SHARK Advanced (BSA), this latest iteration has been developed in response to the challenging requirements of the Italian Navy to replace the current A184 Mod 3 weapon

under the national MoD's Nuovo Siluro Pesante (NSP) programme. In December 2017, the Italian MoD's Naval Armaments Directorate awarded Leonardo a contract for the delivery of warshotBSA, with additional (optional) lots and logistic support for an undisclosed number of munitions. The BSA differs from the successful export-oriented BLACK SHARK by its interchangeable battery section (either warshot or exercise), a new insensitive munition (IM) 250 kg warhead provided by RMW equipped with a low-energy exploding foil (LEFI) igniter and a new reinforced fibre-optic cable dispenser, in addition to customised tactical software with enhanced acoustic counter countermeasures (ACCM). Capable of reaching 50+ kn speed and with a range of over



Photo: Leonardo

Leonardo's BLACK SHARK Advanced torpedo



Photo: Naval Group

Naval Group's F21 FTL ARTEMIS

50 km (depending on speed), the NSP or BSA-named weapon system comes in two new different configurations: a commercially-based lithium-ion polymer (LiPo) rechargeable battery-equipped version for training and crew efficiency activities, already in service with the Italian Navy, and a new single-shot battery-equipped version under production for the Italian Navy. The lithium-ion polymer (LiPo) battery produces 70% more energy and 100% more power than silver/zinc (Ag/Zn) batteries, with a longer lifespan (5–6 years vs. 12-18 months), without maintenance discharge, and offering five times higher firing/recharging cycles vs. Ag/Zn-based batteries. The new single-shot aluminium-silver oxide (Al-AgO) battery features an electrolyte circuit with reduced 'operating' acoustic signature, which limits the opportunities for detection by an adversary submarine during the attack phase. During the development and certification phases carried out jointly by the Italian Navy and Leonardo, the service conducted around

100 launch trials (in addition to previous industrial trials) with both the rechargeable and single-shot batteries. The Italian

Navy is now carrying out the Test and Evaluation Campaign (OT&E) which will lead to entry-into-service in 2019, being conducted by two Type 212A submarines with series-production configured weapons. The weapons are certified by the Italian Navy's Joint Armed Forces Advanced Munitions Centre (CIMA) which supports all naval weapon systems in service. In addition to the Italian Navy's new torpedoes, the BSA is under production as an upgrade kit for other customers such as the Portuguese and Chilean navies.

Naval Group

One of the most recent HWTs to enter the market is the F21, which has been developed by Naval Group for the French Navy. The F21 HWTs are to replace the F17 Mod2 torpedoes on board both the current and new-generation SSBN and SSN platforms under the FTL ARTEMIS programme and which have been procured by the Brazilian Navy for its new SCORPENE class submarines. The ARTEMIS programme was awarded to Naval Group in January 2008 and developed the F21, which is now qualified and in production. The first batch of ammunition is due to be delivered to the French Navy in 2019. Main subcontractors are Thales and Atlas Elektronik. Six metres in length, weighing 1.5 tonnes and equipped with a new-generation silver oxide–aluminium (AgO-Al) primary battery, the F21 has a maximum range of 50+ km, a speed of 50+ kn and an operational depth from less than 10 to over 500 metres. Equipped with a new acoustic head by Thales and an advanced mission system, "both with extremely high computing power allowing real-time combined complex signal and



Photo: US Navy

The US Navy has restarted production of the M48 Mod 7 HWT with deliveries planned for 2019.

data processing”, the Naval Group press release reads, “the F21 maintains a clear picture even in the most confined coastal areas and against the most sophisticated torpedo defence systems”. The torpedo is equipped with a new generation (AgO-Al) primary battery manufactured by Saft which, together with a silent electric propulsion provided by Atlas Elektronik (together with fibre-optic wiring guidance and dispenser assembly), wake homing sensor, and new acoustic head and mission system widen significantly the F21 operational employment in times of both war and crisis, according to Naval Group. In addition to the seawater-activated primary battery with a new electronic closed loop electrolyte circulation system, the F21 features a B2211D insensitive explosive 250 kg warhead which, together with the French Navy’s stringent SSN and SSBN weapon integration requirements, makes the F21 an inherently safe weapon system. The exercise version features a Saft-provided lithium-ion rechargeable secondary battery with limited energy but sufficient endurance for training purposes, in addition to the same top-speed as the combat version and at least 50 recharging cycles over five years. This significantly reduces the F21’s life-cycle cost. In addition to logistic support and a first batch to be delivered in 2019, next year’s defence budget provides for 93 torpedoes to be integrated on the RUBIN class SSN platform. Both the French and Brazilian navies use the MIGAL fire-control system interface cabinet for SSNs, SSBNs and SCORPENEs.

Lockheed Martin

After two decades of hiatus, the US Navy has returned to procure the Mk 48 HWT, with deliveries to begin in 2019. The Mk 48 entered service in 1972 and was operational with the navies of Australia, Brazil, Canada, the Netherlands, Taiwan and Turkey. The Mk 48 HWT was built in different versions, the latest being the Mod 7 CBASS (Common Broadband Advanced Sonar System), which was developed jointly by the US Navy and the Australian Navy and which entered service in 2006. The CBASS upgrade kit offers improved capability in shallow waters and has improved countermeasures discrimination thanks to the ability to transmit and receive over a wider frequency band while taking advantage of broadband signal processing techniques to improve targeting and tracking capabilities. Under the so-called Mk 48 Restart Program, in 2016 the US Navy awarded Lockheed Martin and SAIC (Science Applications International Corporation) con-



Photo: UK MoD

A SPEARFISH Heavyweight Torpedo (HWT) being loaded onto a Royal Navy submarine



Photo: Saab

The new Saab Tp47 LWT was designed from the ground up with a modular design to integrate new technologies throughout its lifetime.

tracts with the option for five years of production of the guidance and control and afterbody/tailcone sections of the Mk 48 Mod. Together with the warheads and fuel tanks provided by the US Navy, up to approximately 250 torpedoes will be assembled at the maintenance facilities of the Undersea Warfare Center. The contracts also include the options for the other mentioned countries to order Mk 48 components. To keep the Mk 48 up to date against new threats including shallow water warfare, which is considered a critical operating theatre for older Third World diesel submarines, the US Navy continues to work on new software and hardware technologies. The Mk 48 Mod 7 APB6/TI-1 HWT programme is an evolutionary

upgrade consisting of new software called APB 6 and hardware upgrades known as TI-1. It should be available as of 2023. The hardware upgrade includes a new guidance and control section upgrade featuring a new sonar assembly in addition to advanced processing algorithms leveraging on the Mk 54 LWT programme and counter-countermeasures capabilities to improve the torpedo’s effectiveness, a redesigned warhead electronics system and an improved post-launch communication system, which will replace the current copper guidance wire with a fibre-optic wire and payout system. The US Navy’s Office of Naval Research (ONR) has also launched a programme to develop a prototype of an improved propulsion system designed

to extend the range of the Mk48 HWT by looking at alternative Otto fuel, advanced battery or stored chemical energy propulsion.

BAE Systems

The Royal Navy’s SPEARFISH HWTs, which went into service in 1994, are the subject of a modernisation programme, which was transferred to the original equipment manufacturer BAE Systems in 2014 in order to keep the torpedoes in service after 2050. The SPEARFISH Mod 1 upgrade aims to eliminate obsolescence, improve capabilities and reduce through-life costs. BAE Systems is reusing the torpedo hulls and Sundstrand 21TP04 thermal propulsion systems but introduces a number of enhancements including a fully digital weapon architecture, a new ruggedised fibre-optic wiring guidance to replace the current copper/cadmium cable and a new insensitive munition (IM) compliant warhead. The upgrade will transition the Mod 1 weapon to a single-fuel propulsion system that will offer cost and safety benefits over the current dual-fuel (HAP-Otto) system. According to the “Defence Equipment Plan 2017”, the first upgraded SPEARFISH HWTs have been fired from

Light-Weight Torpedoes

Due to the increasing threat from underwater platforms in the delicate Baltic Sea, the Swedish Navy commissioned Saab in 2016 to develop and produce a new generation Lightweight Torpedo (LWT). The torpedo Tp 45 currently in operation was developed in 1995. Known as Ny Latt Torped/New Light Torpedo (NLT) and already purchased by Finland, the Saab Dynamics Torpedo System 47 (Tp 47), as it is called in Sweden, has a diameter of 400 mm and is designed for operation in the shallow waters of the Swedish archipelago and the Baltic Sea.

Saab

The new torpedo is intended for Swedish submarines and VISBY class corvettes, and it comes with a system suite, the interface and launch and communication units. The weapon is also being prepared for helicopter integration. The Tp47 has a modular design that can integrate new technologies and features over its lifetime. The near-neutrally buoyant wire-guided torpedo will feature a fully acoustic homing head, high-performance COTS-based processing in guidance and control, an insen-

sive munition (IM) compliant warhead, a new two-way data communications protocol in the wire-guidance link based on galvanic wire (as already being used in current Swedish torpedoes) to pass the platform sensors’ information on to the torpedo, a rechargeable lithium iron phosphate (LiFePO4) battery with over 100 charging/recharging cycles for exercise and warshot

uses, and an electronically commutated DC propulsion motor coupled with a pump-jet propulsor to reduce the acoustic signature. The 340 kg weapon will have a speed ranging between 10 to 40+ kn and a 20+ km range. According to the Swedish MoD, Saab and Swedish Defence are about to finish the second prototype which will have all the features of final product. In-water testing will start in early 2019. Series production is to start in 2020 and the plan is to achieve initial operational capability in 2022. In 2018, the Finnish Ministry of Defence was the first export customer to procure the NLT.

Raytheon

Developed to replace the Mk46 NATO standard weapon which has been acquired by more than 25 countries, Raytheon designed the Mk54 MAKO LWT for optimal performance against advanced and quiet diesel/electric submarines. The design includes the Mk50 sonar, COTS guidance-and-control assembly, a Mk 46 warhead, a variable-speed version of the Mk46 propulsion system and advanced software algorithms developed for the Mk50 and Mk48 Mod 6 HWT. As the first all-digital LWT, the Mk54’s open architecture and COTS use allows it to be cost-effectively upgraded to incorporate the latest technology to counter evolving threats. Having reached initial operational capability with the Mod 0 version in 2004, the Mk54 Mod 1 adds a new sonar with a 112-elements array assembly and improved processing capability, expanding the torpedo’s capabilities in shallow waters to allow countermeasures against present and future threats. While low-rate initial production kits procurement for both versions extends to FY 2020, further development continues to provide improvements in shallow waters performance via software Advanced Processor Build (APB) and hardware upgrades in common with the Mk 48 HWT. In parallel, Boeing is involved in the development and low-rate production of the High-Altitude Anti-Submarine Warfare Weapon Capability (HAAWC) programme for an air-launched accessory (ALA) that allows for employment of the Mk54 by the US Navy’s P-8A POSEIDON maritime patrol and reconnaissance aircraft (MPRA) at high altitude with stand-off ranges, and with the ability for precision guidance to the intended water entry point without affecting the in-water operation of the LWT. A full-rate production contract and system fielding is expected in FY 2020, according to FY 2019 budget documentation. To be launched from surface and airborne platforms, the Mk54 has been or is under

Photo: US Navy



The Mk54 MAKO LWT being loaded on a Boeing P-8A POSEIDON MPRA

submarines during the 2016/17 period, and the UK MoD continues to support submarine trials as part of the programme. Key subcontractors include MBDA TDW (insensitive warhead), Atlas Elektronik (fibre-optic and signal processing) and Altran (safety electronic unit). Deliveries are expected to start in 2020 and be completed by 2024.

sive munition (IM)-compliant warhead, a new two-way data communications protocol in the wire-guidance link based on galvanic wire (as already being used in current Swedish torpedoes) to pass the platform sensors’ information on to the torpedo, a rechargeable lithium iron phosphate (LiFePO4) battery with over 100 charging/recharging cycles for exercise and warshot

acquisition in either Mod 0 and 1 also by international customers including Canada, Australia, UK, Taiwan, Turkey, Denmark, Norway, The Netherlands, India, Mexico, Spain and Thailand.

Leonardo

Developed as a fire-and-forget weapon and conceived in the Cold War era to cope with any type of nuclear or conventional submarine – even acoustically coated, deep-diving, fast evasive and deploying torpedo effectors – the MU90 IMPACT advanced LWT maintains the leadership in its segment. Developed by the EuroTorp consortium (Leonardo, Naval Group and Thales Underwater Systems), the MU90 has been produced in over 1,000 units and sold to major NATO, allied and friendly nations including France, Italy, Germany, Denmark, Australia, Poland, Morocco, Algeria and Egypt. The MU90 is powered by an aluminium-silver oxide seawater-activated battery using dissolved sodium dioxide powder as the electrolyte and incorporating an advanced closed-loop electrolyte recirculation system, which, together with an electronically-controlled high-RPM brushless motor driving a skewed multi-blades pumpjet propulsor, allow the weapon to operate between 29 and 50+ kn, with a range of 12+ km at max speed without limitation of salinity and temperature in water



Photo: Leonardo

Leonardo is offering an enhancement package for its A244/S LWT system based on advanced technologies developed for the BLACK SHARK Advanced (BSA) HWT.

Based on the HWT and LWT development heritage, Leonardo is proposing the new generation BLACK ARROW LWT design product. The BLACK ARROW is a top performer thanks to a rechargeable battery with lithium-polymer technology as used by the BLACK SHARK, a new skewed multiblade pump-jet propulsor, sophisticated navigation and platform

retrofit of the existing A244/S or new-production enhanced LWT providing a wider operational envelope, improved functional performances and drastically reduced life cycle costs. The new package requires resizing the technologies of the different elements of the propulsion section of the heavier BSA weapon to the 324 mm body of the A244/S LWT.



Photo: Luca Peruzzi

The BLACK ARROW combines Leonardo's experience in HWT and LWT torpedoes.

depths in excess of 1,000 metres and as shallow as 25 metres, retaining navigation capability up to 3 metres. The MU90 is equipped with an advanced acoustic seeker with multi-frequency, parallel processing and simultaneous acoustic modes operation allowing multi-target tracking capability, high engagement distance and performance in very shallow waters, and immunity to most advanced anti-torpedo countermeasures. The insensitive munition direct energy charge warhead adds the capability to kill double hull submarines.

control suite and an insensitive munition warhead, and it comes at a reduced training and life-cycle cost. Sold to 16 navies worldwide with the most important customers being India, Singapore, Malaysia, Indonesia, the UAE, Chile and Colombia, Leonardo is offering an enhancement package for its A244/S LWT system with the insertion of advanced technologies in the propulsion and manoeuvrability derived from the bigger in-service BLACK SHARK Advanced (BSA) HWT. Leonardo is proposing an upgrade package for

Leonardo has successfully completed a "robust design and performance review" of an upgrading kit which replaces the aft section of the A244/S with a new battery, engine and navigation control – all based on an advanced technology package derived from the BSA. Thanks to the "robust design review", Leonardo is now in the position to propose its upgrading kit, which can be added to the in-service torpedoes to extend the operational life/envelope and enhance performances at reduced life cycle costs. ■

Railgun Programmes – a Status Report

Jack Richardson

Railguns are weapons that use electromagnetic forces to transfer very high kinetic energy to a projectile. Regardless of the advantages, railguns are still at the research stage, and it remains to be seen whether or not they will ever be used as military weapons.

In the aftermath of the Second World War, heavy guns were usurped by guided missiles as the primary long-range weapon for militaries all over the world in land, sea and air warfare. This took many forms. The SA series of surface-to-air-missiles were used by the Soviet Union to defend strategic sites from Western bombers whilst said bombers

pan-European METEOR continue to develop this field. Despite considerable advantages over traditional guns, such as greater range and accuracy, guided missiles continue to have drawbacks, which include high cost, limited carriage capacity on most launch platforms and reliance on complex guidance systems which are vulnerable to jamming.

Advantages

This has clear advantages. Firstly, not needing to store the propellant and ammunition means that large parts of the logistics chain of the weapons system is eliminated. Theoretically, this reduces costs and increases the number of locations and platforms from which a railgun can be deployed and could also improve safety for those operating the system. The main advantage however comes from the utility of the weapon. The performance inherent in the system means that the target range is very broad. This means that it can effectively engage tactical and strategic targets in both the land and maritime domain. Additionally, the range and speed of the projectiles enable the railgun to engage and neutralise airborne targets (potentially including ballistic and cruise missiles). Potentially, this could prove a game changer in providing austere land sites protection from aerial threats, meaning smaller and less expensive naval vessels can give air cover to task groups and key strategic areas.

Disadvantages

However, railguns do have disadvantages. Despite dating back over one hundred years, the technology behind them has yet to be proven and even when it is, the device will require a large amount of electricity-generating capacity. This threatens to cancel out the wide range of land-based applications for railguns and in the naval environment, will for now limit their use to large ships able to produce the required electricity. There is the added obstacle of the sheer velocity involved in these weapons discharging their rounds that the barrels wear out, potentially limiting the number of projectiles that can be launched, increasing vulnerability to saturated missile attacks. However, this latter disadvantage is less relevant because the mere presence of a railgun in a strategic area could act as an effective deterrent against hostile forces. In this vein, states

Photos: US Navy



One of two electromagnetic railgun prototypes on display aboard Joint High-Speed Vessel USS MILLINOCKET (JHSV 3) in port at Naval Base San Diego on 8 July 2014

prepared to use standoff missiles, such as the British BLUE STEEL, to fulfil the nuclear deterrence mission. At sea, TARTAR and SEA SLUG, EXOCET and HARPOON became the weapon of choice for anti-air and anti-ship combat respectively. Meanwhile, famous missile types such as the US SIDEWINDER and Soviet ALAMO dominated air-to-air combat and new innovations such as the

To avoid these disadvantages, various governments and defence companies are looking at a high-tech alternative.

The electromagnetic railgun operates by firing projectiles using a highly charged electromagnetic surge instead of a traditional gun-powder propellant. Such is the velocity of the projectile that it relies on the momentum of the impact upon the target, rather than a traditional explosive warhead. This is because it is claimed these projectiles can travel at up to seven times the speed of sound. In terms of range, this would mark a definite game changer over conventional 5-inch guns whose maximum range of 11 nautical miles (NM) compares to railguns achieving up to 87 NM (the latter at 10 rounds per minute).

Author

Jack Richardson is a professional UK-based author and a regular contributor to ESD specialising in defence and security.

and companies around the world are seeking to exploit the potential of railguns and, in the process, overcome the continuing technical challenges.

In Search of a Platform

A prominent example of programmes built with novel systems such as this in mind is the controversial ZUMWALT class destroyer. This futuristic class was initiated at the turn of the 21st century as a long-term replacement for the ARLEIGH BURKE class destroyer, currently the backbone of the US Navy's escort fleet. From the outset, the ZUMWALT class sought to lever futuristic technologies. They have high levels of automation, a stealthy bow (swept forward in the style of 19th-century pre-dreadnoughts), highly advanced surface and sub-surface sensors, a large guided missile capacity (in launchers concealed down both sides of the vessel) and room for three MQ-8 FIRESCOUT rotary wing UAVs alongside the MH-60 ROMEO anti-submarine helicopter. The key feature of the vessels, though, is the two Advanced Gun System (AGS) mounts forward of the stealthy superstructure. These were intended to fire the Long Range Land Attack Projectile (LRLAP) at ranges of up to 80 km, potentially enabling the ZUMWALT class to offer a capability not seen since the IOWA class battleships were decommissioned at the end of the Cold War. However, the cost and complexity of the ZUMWALT class meant the number to be procured fell from 32 to three. As a result, at US\$800,000 per round, the LRLAP became unsustainable and was cancelled, leading to the US Navy fitting the ZUMWALT class with the SM-6 anti-air, ship and land attack missile, and making their key role anti-surface warfare. The first two ships of the class, USS ELMO R ZUMWALT and USS MICHAEL MAN-SOOR are now largely complete, but there have been proposals to fit a railgun device to one of the AGS mounts on the third ship of the class USS LYNDON B JOHNSON. Although the vessel's construction is too advanced to fit the system now, there is capacity for the ships to be fitted with railguns later in their lives. This is by virtue of their large size, powerful sensor suite but crucially, integrated electric propulsion, where the ship's gas turbine engines drive generators which feed electricity into a central pool. From here, all of the vessel's systems can draw their power from the electric motors driving the propellers to the many powerful sensors. Crucially however, this innovation provides the high power capacity upon which future railgun systems will rely. Therefore, these vessels



The Office of Naval Research (ONR)-sponsored railgun at Naval Surface Warfare Center Dahlgren Division (NSWCDD)

will be able to prosecute a wide range of targets over large distances in a variety of scenarios, from escorting carrier battlegroups to covering amphibious assaults and operating on solo deployments.

The BLITZER

To make these systems a reality, since 2005, the Office for Naval Research (ONR) have been working with international defence contractors BAE Systems and General Atomics to develop a railgun for the US Navy. For a time, this collaboration yielded results. In December 2010, a land-based railgun prototype successfully fired a 33 MJ round. During a real-life scenario, this would equate to launching a projectile 110 NM at a velocity of Mach 7. BAE Systems stated at the time that this would enable the US Navy to deliver effect far inland by destroying strategic targets, offer tactical effect through providing support to US Marines during amphibious operations and grant wide area defence to the fleet

from air threats (including ballistic missiles). In parallel, General Atomics have produced the BLITZER railgun solution, marketed as a rugged and deployable system not only from ships, but also austere land positions. The company claims that the solution not only removes reliance on logistics chains (with ensuing safety considerations) but the need for a dedicated fire-control system. Using national assets such as satellite networks for guidance, which can help avoid interference from hostile jamming devices, BLITZER can be readily deployed to forward locations from which it can engage a wide array of targets from ICBMs to cruise missiles and low-end unguided missiles fired from mobile launchers. Artists' impressions depict it being deployed on existing US Army vehicles, commanded from a HUMVEE and the necessary power being provided by units carried in logistics trucks. The munitions themselves are shown deploying a large number of darts when coming into contact with the target in order to increase lethality. It is potentially these munitions



The Office of Naval Research Electromagnetic Railgun located at NSWCDD fired a world-record-setting 33 megajoule shot, breaking the previous record established on 31 January 2008.

though, which could undermine the railgun. Despite the great potential they could offer in 21st century warfare, there are signs some of the early progress made by the US on railguns has stalled.

This is because of the large costs involved in developing the systems, both directly and indirectly (the latter through having to provide the supporting infrastructure and equipping ships with the necessary power generation) and the emergence of cheaper alternatives. Ironically, the system in question is derived from the US railgun programme in the form of the ammunition developed for it.

Projectiles

Termed the Hypervelocity Projectile (HVP), this is a small, finely manufactured round that seeks to couple advanced guidance systems with high levels of lethality derived from the sheer velocity of the railgun. BAE

System (50 NM) and six rounds per minute from 155mm Tube Artillery (43 NM). The fact that this solution can be fired from the aforementioned guns, which the US military operates in large numbers, with high levels of performance, but without the cost associated with railguns (though performance is still reduced), has recently attracted new attention from the US defence establishment. Although the US officially remains committed to railguns, they are now competing with the HVP and other solutions to such an extent that their current status is now uncertain. As this debate goes on, however, it is not only the US seeking to exploit the opportunities of railguns.

In 2017, images surfaced of a Chinese landing craft modified with a large gun system with a particularly wide barrel. Analysis shows that this is likely to be an experimental railgun with the large space onboard the vessel utilised to house the necessary

believed that the latest Chinese Type 55 destroyers, currently entering service with the People's Liberation Army Navy (PLAN) have the required capacity to support a railgun type weapon. Additionally, it is believed these vessels will operate alongside future Chinese aircraft carriers, giving China the potential to challenge US naval supremacy in the region.

The potential of railguns has not gone unnoticed by a near neighbour and potential adversary of China; Japan has acknowledged a project to develop a similar weapon. Though smaller in size than its US and Chinese counterparts, this weapon could potentially have similar range and applications. If perfected, it is claimed that a similar, production standard weapon could be applied to the new MAYA class destroyer, derived from the latest version of the ARLEIGH BURKE class. Accordingly, it has been reported that these ships have been designed with the necessary power generation capacity to support both railguns and LDEWs. As the theory behind the operation of a railgun goes back around fifty years, it recently emerged that there was a Franco-German project to develop a railgun in the late 1980s with a test facility established on the border between the two nations, in order to develop the weapon for a variety of land and naval applications. It is believed that research has continued to make railguns a reality in the future, predominantly in the naval context. This particular theatre has also been of interest to the UK's Royal Navy. At the 2015 edition of Defence Security Exhibition International, then First Sea Lord Admiral Sir George Zamballas announced that his service would be exploring the potential of next-generation weapons, including railguns. This included making public the knowledge that UK personnel have been on exchange postings with the US Navy to build railgun expertise, with the hope that these weapons could free up sailors for more manpower-intensive tasks.



Photograph taken from a high-speed video camera during the record-setting firing of an electromagnetic railgun (EMRG) at Naval Surface Warfare Center, Dahlgren, Va., on 31 January 2008, firing at 10.64 MJ (megajoules) with a muzzle velocity of 2,520 metres per second

market this product as having a 100 NM range (when fired from a railgun) with a rate of fire of 10 rounds per minute. The small size and low drag of this round not only means it provides ships with deeper magazines but, combined with its compact design, enables launching from existing gun systems. These range from the 5-inch gun fitted to most existing US Navy escort combatants to the 155mm PALADIN howitzer operated by the US Army and Marine Corps. The performance offered by the HVP when fired from these weapons is 20 rounds per minute from the Mk 45 Mod 4 Naval Gun

power systems. Strategically, this would fit with China's emerging doctrine of Anti-Access/Area Denial (A2/AD) where US and other allied warships and aircraft are prevented from entering Chinese territorial waters, allowing Beijing to control and gradually expand beyond its near abroad. Research makes the point that this could give China the edge over the US, because retrofitting the US Navy's existing ARLEIGH BURKE class destroyers would be prohibitively expensive, and a similar railgun, if fitted to Chinese surface combatants, could threaten US aircraft carriers. To this end, it is

Outlook

As the potential of railguns becomes more greatly appreciated around the world, international governments and militaries are increasingly competing to field them first as a means of both defence and offence. However, significant technical challenges still remain and it has not yet been seen whether the political will and financial resources are available to overcome these. However, it is likely that the need for states trying to gain an operational advantage over others will lead to the perfection and operational deployment of a railgun. ■

TF-X – Turkey's Indigenous Stealth Fighter

Georg Mader

Domestic and foreign policy developments have always influenced defence programmes. This is all the more true for major prestige projects, such as the Turkish TF-X stealth fighter, a symbol of national pride sponsored by President Recep Tayyip Erdoğan.

His ambitions and those of his industry almost go as far as to create a second F-35, which Ankara also wants to procure. Sweden and the UK have supported this project so far, but as the Turks have recently confirmed their acquisition of the Russian S-400 GBAD system, it remains to be seen whether or how long the Western powers will continue to support the ambitious TF-X programme. Furthermore, the question increasingly arises as to whether the struggling Turkish economy, under the influence of Erdoğan's AKP party, can bear the considerable burden of the 'Sultan's Stealthy Spear' and realise the launch of a second F-35.

Walking through the Turkish Air Force Museum (Türk Hava Kuvvetleri Müzesi, THK) in Yesilköy (a district of Istanbul) one realises that for decades THK was dependent on Western (mostly American) partners to buy aircraft such as the F-86, F-102, F-104 and F-4. This changed in the 1980s, when the government signed a contract allowing the licensed production of the General Dynamics (now Lockheed Martin) F-16 FIGHTING FALCON 4th-generation fighter. This provided engineers with the basis for building and expanding local aviation knowledge and production experience.

To this day, this has developed into an independent company with constantly growing capabilities for Turkey. TUSAS Aerospace Industries, for example, was a Turkish-American corporation established in 1984 to supply F-16 C/D (Block 40/50) to THK under the "Peace Onyx" I and II programmes and as well to the Egyptian Air Force under "Peace Vector" IV. Until December 1994, a total of 160 F-16 Block 30/40 had been



Turkish TF-X impression in a TAI brochure for the EURASIA Airshow 2018

delivered, followed by 80 Block 50 from mid-1996 on. Since then, the Turkish Aircraft Industries Corporation (TAI) has been in charge of maintenance for these aircraft, and it also developed into a maintenance hub for F-16s from Pakistan or Jordan. Both Pakistan and Jordan praise the quality delivered. In the long term however, Turkey wants to end its licence status and its dependence on foreign military providers, and it has developed an indigenous, ambitious concept of a 5th-generation fighter jet which is seen as a "spear of national pride and achievement", as the author has been told in Dubai. The TF-X programme would elevate Turkey into the "elite" of the handful of nations such as the USA, Russia, China, who have afforded a 5th-generation fighter armament programme. The main goal of the Turkish programme is to find a domestic successor for the excellent F-4 PHANTOM II and early Block F-16 platforms and at the same time to complement the F-35 LIGHTNING II, of which THK wants to procure 100 aircraft.

Origins

On 15 December 2010, the Executive Committee of the Turkish Defence Industry (SSIK) decided to develop and manufacture a next-generation domestic air fighter that could replace the Turkish F-16 fleet and cooperate with the F-35. A two-year design phase implemented by TAI has received funding of US\$20M. The first two-year concept phase began in 2011. In March 2013, Saab of Sweden was called in to support the design, development and production. TUSAS Engine Industries (TEI) was commissioned to produce an engine. Initially, Ankara – with Saab's assistance – had drafted three different models or layouts, one of which was to be selected. The TF-X concept, which was presented to the top management of the country's arms procurement agency, the State Secretariat for the Armaments Industry (SSM), and the THK leadership, is today THK's favoured twin-engined all-weather aerial superiority design with blended wing-to-fuselage

Author

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

lines, a forward-set single- or twin-seat cockpit and conventional main-and-tail wing appendages, like in the F-22's unique diamond shape. Of course, a commitment to a twin-engine fighter increases procurement and maintenance costs over the life cycle but, in turn, also provides for higher performance and a larger internal weapons bay. While the single-engine alternative looked very similar but smaller, the third – and most radical – concept was a canard delta planform along a single-engine hull designed for high agility, similar to the TY-PHOON, RAFÁLE and GRIPEN.

Specifications and Timelines

In December 2017, Turkish Aerospace Industries (TAI) released the official specifications of the Milli Muharebe Uçağı (National Combat Aircraft), as it also is called. As listed on the TAI website, the TF-X will have a maximum take-off weight (MTOW) of 27,200 kg, a length of 19 m and a wingspan of 12 m, an operational radius of over 1,100 km, a flight ceiling of over 16,700 m (55,000 ft) and a maximum speed of Mach 2. The project implementation schedule started on 17 September 2018, and according to TAI the production of the first prototype of the latest Turkish fighter aircraft could start in 2020. The first prototype is expected to make its maiden flight in 2023 and mass production to start between 2032 and 2035. TF-X is expected to remain in service in the TurAF inventory until 2070 and be interoperable with other critical TurAF assets such as the F-35As.

Photo: TUSAS



Turkish President Erdoğan in a trainer cockpit

All TF-X concepts share 5th-generation-fighter qualities, including a combination of blended and faceted surfaces, stealthy skin coatings and an active electronically-scanned array (AESA) scan/fire-control-radar. Regardless of the engine model, the concept is designed to demonstrate supercruise capabilities in supersonic operation without thirsty afterburners. Additional internal volume will be used for internal weapons, as featured in developments such as the F-22, F-35, J-20 or Su-57.

Another ambitious goal is the integration of the cockpit and accompanying UAV via a protected data connection. For the air-to-ground role, an adaptation to the F-35 can be provided; as a supplement to the F-35, however, a tendency to the air dominance role is more likely.

That being said, the final product will ultimately rest on the capabilities of the Turkish aerospace complex, regardless of foreign technical assistance. In the meantime, TEI will probably not produce a completely new engine through an expensive and lengthy

design and development project, but will rely on an existing foreign engine from Europe, the US or perhaps even from Russia. Turkey has close historical ties with all three regions.

It is foreseeable that, similar to recent European aircraft programmes, the TF-X programme will need another technical/financial assistant to help with design, development and production. When the TF-X comes into effect, THK will buy approximately 200 to 250 aircraft. From the outset, care has been taken to offer the TF-X to export partners without US-initiated ITAR restrictions and the high price of the F-35. This has already been discussed at length in the Pakistan Defence Forum. Pakistan's Minister of Defence Rana Tanveer Hussain revealed that Turkey even had invited Pakistan to participate in the TF-X programme and that Turkey had sought support from the fairly modern Pakistani aviation complex in Kamra for the "integration side" of the programme.

Initial European Partnerships

Initially, the government-sponsored engine producer TUSAS Engine Industries (TEI) was charged to come up with a 10-year roadmap for the design, development and manufacturing of a local air-

Alienation from Main Supplier USA

For some time now, the USA has been openly threatening not to accept its future important air element alongside an important Russian system. Accordingly, the US Senate took a first step on 19 June with the adoption of the National Defence Authorization Act (NDAA) to block the delivery of F-35 jets to Turkey two days before the handover ceremony in Ft Worth. An amendment prohibits the sale of F-35 jets to Turkey unless POTUS Trump certifies that Turkey does not threaten NATO, does not buy Russian defence equipment or detains US citizens. The passage claimed that the purchase of the S-400 system from Russia increased the risks to NATO, while the intention to buy the Russian system is also sanctionable under US law.

With the F-35 Ankara wants to increase its defence capabilities in the midst of threats by Kurdish and Islamic fighters at home and abroad (but all have no air force) and in conflicts across its borders in Syria and Iraq. The imprisonment of US citizen Andrew Brunson, a Christian pastor, has contributed to tensions between Turkey and the US. He was threatened with up to 35 years imprisonment in Turkey for terrorism and espionage. He was nevertheless released on 12 October and returned to the USA. A secret report from the Pentagon to Congress on 16 November describes the possible delays that the F-35 programme would face if Ankara were sanctioned. Defence officials quickly pointed out that the report would not affect military relations with Turkey.

craft engine with the aim of powering the TF-X. TEI is a sister company of TAI, the prime contractor of the TF-X programme. In October 2015, a memorandum of understanding was signed between Turkey and the UK engine-giant Rolls-Royce for technological know-how and a production unit. Rolls-Royce will set up a state-of-the-art production and technology centre in Turkey – the company's eighth unit worldwide.

In October 2016, Rolls-Royce proposed a joint production partnership with Turkey to drive forward planned Turkish platforms and potential sales to third parties. To achieve this, the Turkish KALE Group (which also assembles the P&W F-135 for the F-35) and Rolls-Royce announced their joint development of the engine for the Turkish fighter programme with the joint venture company TAEC Uçak Motor Sanayi AS, which holds 51% of the shares for KALE and 49% for RR. The UK company's proposal included a production unit in Turkey to manufacture engines for the TF-X, probably based on the TY-PHOON EJ-200 engine. The British company and the Turkish government signed a letter of intent to finalise negotiations for the engine programme by 31 July, and EUROJET Turbo GmbH's Managing Director Clemens Linden explained to the author an EJ-200 with a inlet diameter based thrust growth of up to 25 or 30% which later might be available for retrofitted Typhoons.

Suddenly, it is General Electric

At the moment, however, it seems that the British plans for the TF-X engine will lead nowhere. On 31 October, the Turkish aviation authorities said that they had suddenly chosen General Electric's F110 engine family to power the prototype and an unknown number of the first TF-Xs. It has not yet been decided whether it is the F110-GE-129 or the F110-GE-132 engine. As this choice would compromise the aircraft's camouflage capabilities, it was quickly emphasised that it was an

"emergency solution" until a domestic aircraft was available. Turkey then plans to switch to an engine developed by TRMotor, another national engine consortium. Other well-known engine manufacturers are also welcome again.

Aside from the engine issue, in January 2017 the UK and Turkey signed another contract worth more than £100M (US\$137M) to redesign the Turkish fighter aircraft together. The study continues to be heavily guarded in Warton and has influenced BAE's latest 6th generation TEMPEST study.

On 26 April this year, two local prime contractors of the TF-X programme, military electronics specialist ASELSAN (Turkey's largest defence company) and TAI signed a Memorandum of Understanding (MoU) to cooperate on the aircraft. Under the MoU, both state-controlled companies will work together to develop critical subsystems for the TF-X, including radar, electro-optical systems, mission control systems and the integration of these systems into the future aircraft. On the same day, the Turkish government invested LIT4.817Bn (US\$1.178Bn) in the conception phase of the TF-X programme as part of a state incentive programme.

In March 2018 TAI purchased a 10,000 core "supercomputer" which has sufficient calculating power to shoulder the detailed design of TF-X and its subsystems. And at the EURASIA Airshow 2018 in Antalya, Lorenzo Mariani, Chief Commercial Officer of LEONARDO, said that the company wanted to cooperate with TAI in TF-X as an

avionics system provider for the national provider ASELSAN. At the same event, Turkish officials expressed their hope that a prototype of the new aircraft could fly until 2023, the 100th anniversary of the modern Turkish Republic.

Although there is the requirement for THK itself, the TF-X will also focus on the broader export market. Since the production of the F-22 has been discontinued, the F-35 has been optimised for attack and the other options are midlife upgrades of the three Eurocanards, it is possible that the TF-X could become an export success for countries looking for a fifth-generation aircraft from the mid 2020s on.

Basic technical features of TF-X:					
Engine Thrust Class	> 2 x 20,000lb				
Service Ceiling	> 55,000ft				
Max Speed	2 Mach				
Combat Radius	> 600nm				
MTOW	> 60,000lb				
Length	19m (60ft)				
Wing Span	12m (39ft)				
Wing Area	~ 60m² (670ft²)				
Maximum Take-off Weight (MTOW)		Turbofan Engine			
	lb	Kg	Number of Engine	Engine Type	Thrust Level
J-20A Black Eagle J-20B Black Eagle	80.001	36.288	2	AI-31F WS-15	27.600 on 8 prototypes, 5 LRIP 44.000 on Production Models
J-31/FC-31 Gryfalcon	61.729	28.000	2	RD-93 WS-13E	19.000 on 3 Prototypes 22.500 on Production Model
MMU / FX-1	60.000 70.000	27.215 31.751	2	N/A	22.000 on 7 Prototypes 27.000 on Production Model
KF-X/IF-X	53.000	31.751	2	F414-GE-400 F414-GE-400-EE	22.000 on 6 Prototypes 26.400 on Block III Version
F-35A Lightning II	70.000	31.751	1	F135-PW-100	43.000
F-22A Raptor	83.500	38.000	2	F119- FW-1000	35.000
Su-57/T-50 PAK FA	81.571	37.000	2	AL-41F1 Izdelye-30	33.000 on Prototypes & LRIP 39.566 on Production Model

Basic technical features of the TF-X

Project name	MMU TF-X	F-35A CTOL	HAL_AMCA	KF-X / IF-X	Shenyang J-31	Chengdu J-20	F-22 Raptor	Sukhoi Su-57	X-2 Shinshin
Country	Turkey	USA	India	Korea	China	China	USA	Russia	Japan
Length	19 m (60 ft)	15.67 m (50.5 ft)	17.20 m (55 ft 25 in)	15.6 m (51.18 ft)	17.3 m (56 ft 9 in)	20.4 m (66.8 ft)	18.92 m (62 ft)	19.8 m (65 ft)	14.174 m (46 ft 6 in)
Wingspan	12 m (39 ft)	10.7 m (35 ft)	11.80 m (38 ft 7 in)	10.7 m (34.77 ft)	11.5 m (37 ft 9 in)	13.5 m (44.2 ft)	13.56 m (44 ft 6 in)	13.95 m (45 ft 10 in)	9.099 m (29 ft 10 in)
Wing Area	60 m² (670 ft²)	42.7 m² (460 ft²)	39.9 m² (486.5 ft²)	?	40 m² (430 ft²)	78 m² (840 ft²)	78.04 m² (840 ft²)	78.8 m² (848.1 ft²)	?
Max takeoff weight	60,000 lb	70,000 lb	79,366 lb	53,000 lb	61,729 lb	80,001 lb	83,500 lb	77,160 lb	?
Range	600 NM	1,200 nm	1750 miles	?	?	?	1,600 nm	930 mi	1,802 mi
Maximum speed	2 M	1.6+	2.5+	1.97	1.8	2M	1.82	2.1	2.25
Service ceiling	55,000 ft	50,000+ ft	59,200 ft	?	?	?	65,000 ft	65,000 ft	?
Engine Thrust Class	2 x 20,000 lbf	28,000 lbf	?	2 x 13,500 lbf	2 x 19,000 lbf	2 x 19,500 lbf	2 x 26,000 lb	2 x 24,300 lbf	2 x 11,023 lbf
first flight	2023	2006	2025	2022	2012	2011	1997	2010	2016

The Turkish TF-X in comparison with other 5th-generation fighters

Economic Background

As early as 2013, officials from the TAI defence industry in Dubai told the author that the construction of eight TF-X prototypes would cost Ankara between US\$11Bn and US\$13Bn. Their estimate for the final Turkish order – if the programme succeeds – was 200 to 250 aircraft. This

failed coup d'état and recorded growth of only 3.2%. Nonetheless, this growth rate was still higher than that of emerging markets such as China and India. On the other hand, in early May, the rating agencies S&P and Moody's lowered Turkey's credit rating even deeper into the so-called junk bond segment, in which the country has been lingering for some

While Erdoğan carried out a number of important reforms in the early years, strengthening civil rights and bringing more stability and growth to the economy, most Western nations believe that Turkey is moving away from its former democratic orientation after the failed coup in 2016, and this path to more autocracy has economic consequences. The uncertainty led to a decline in foreign direct investment by a good third to around US\$10Bn per year. At the same time, Turkey's current account deficit increased from 3.8% to 5.5% of GDP in 2017. For the Turkish economy, this means an annual outflow of around €42Bn, which must be paid for with an ever weaker lira. Since 2013, for example, the Turkish currency has lost about half its value against the € and the US\$, the currencies of exactly those partners with whom progress in TF-X was or is sought. This may also be a reason why General Electric suddenly entered the stage.

While surpluses of up to 1.3% of GDP were achieved in the years before the coup, this picture has reversed since last year. According to the EU, Turkey's budget deficit was 2.4% in 2017 and will remain at this level in 2019. It seems increasingly clear to the AKP leadership that the inflated economic boom is not sustainable. In mid-April, Erdogan surprisingly had the 2019 parliamentary and presidential elections brought forward one and a half years to this June. The reason has not been stated openly, but it is obvious: The elections should take place before a possible collapse of the Turkish economy. In the meantime, he has won the elections and further consolidated his influence on society and monetary policy. By October 2018, however, Ankara's inflation rate had risen to 25% and reached a 15-year high. The increased price of white goods, food, fuel and housing forced the government to lower its economic growth targets. Financial analysts expect that the state-controlled central bank will probably resist the pressure to raise interest rates because it fears that the recession will worsen after the lira lost almost a third of its value against the US dollar this year.

Photo: BAE Systems



Impression of the Turkish TF-X from BAE Systems

means that Turkey must spend US\$31Bn to US\$33Bn on the fighter it wants to design, develop and produce. The Turkish Republic, whose aircraft fleet since 1983 consists of 240 mostly license-built F-16 aircraft, intends to acquire up to 100 American F-35A LIGHTNING II aircraft parallel to the TF-X from 2019 onwards. However, it remains doubtful whether the Turkish budget can finance two such major projects.

time. S&P cited as a reason the economic development of deficit expenditure, which from the rating agency's point of view tends to overheat: "The government's economic stimulus measures have led to an overheating of the economy, with warnings of an increased risk of an external shock as part of Turkey's downgrade." The rating agencies cited the high deficit, the growing foreign debt and the increasing political risks

Photo: TAI



The Turkish Air Force's vision until 2027

At the end of March, the Turkish statistical authority TURKSTAT reported that the economy grew by 7.4 % in the previous year. This figure was significantly higher than in 2016, when Turkey had to contend with the consequences of the

as reasons for their move. Immediately after the 2016 coup and the subsequent state of emergency, S&P, Moody's and Fitch had already lowered their ratings, which frequently serve as a guiding light for investors in the industry.

Geopolitics Comes into Play

The most recent currency depreciation was triggered by an unprecedented diplomatic conflict with the USA. Up until summer, it looked as though Turkey would receive the first two F-35 aircraft by 21 June. But some US senators have called for an export ban and accused Erdoğan of steer-

ing Turkey as an important NATO ally and secular system out of the democratic arena, pointing to the recent case of American priest Andrew Craig Brunson, who was arrested and indicted in Turkey at the time. At the same time, Turkish colleagues warn of the "danger" of over-dependence on the US (Lockheed Martin) due to the reporting logic of the F-35's ALIS main-

Turkey – A Key Supplier for the F-35

Members of the Trump administration such as Defense Secretary Mattis warned that such action against the US and NATO could backfire as Turkey holds a valuable share in the production of the F-35 jets. They pointed out that

has gained further ground and caused a frown in NATO was the Turkish-Russian contract for the acquisition and deployment of the Russian S-400 long-range GBAD system on Turkish soil last December. This contract has a volume of about US\$2.5Bn and Turkish officials say that there could be a follow-up order for the further developed S-500 system, which VKS is currently introducing and which has not yet been approved for export.



Photo: TUSAS

F-35 and S-400 in One Military?

While certainly a tempting in-country scenario, US and NATO military leadership are not amused. When last November the USAF's CENTCOM general was asked if Abu Dhabi might operate the F-35 alongside the earlier considered Su-35, Lt Gen Jeffrey Harrigan said: "There's a whole litany of things that would impact beyond just the policy problem you're going to have. You can figure out a way to do it, but we're protected with what's coming off the F-35. To try and introduce it into something that we don't operate it with, to combine it with a key adversary's systems, is not some place I would expect we're going to go. At the end of the day, it's protecting our capabilities so that if your son or daughter is in that airplane, we haven't given something away via an export in the past that an adversary could use against us in the future. Frankly, I'm really not sure it's doable..."

In January 2017, TAI and BAE Systems signed a memorandum of understanding to collaborate on the first development phase of TF-X.

tenance/support system, although most Turkish F-16 fighters modernised by Lockheed Martin, such as the F-35, are designed for US technology input. Only the older F-4s, formerly modernised by Israel, and the oldest F-16s modernised by Turkey, are free of this influence. However, these older aircraft are expected to be decommissioned around 2020.

On 6 May 2018, Turkish Foreign Minister Mevlut Cavusoglu warned the US against blocking planned weapons sales to his country, insisting that Ankara would respond to such an action with reprisals. Cavusoglu's comments came in reaction to a 4 May release of the annual defence policy bill by the US House of Representatives. The US\$717Bn bill includes a provision that foresees temporarily halting weapons sales to Turkey which Cavusoglu dismissed as inappropriate for NATO allies. "If the United States imposes sanctions on us or takes such a step, Turkey will absolutely retaliate," he remarked and continued: "Turkey is not a country under your command, it is an independent country. Talking to such a country from above, dictating what it can and cannot buy is wrong and is not part of our alliance." President Erdoğan said on CNN: „Hey, we paid for them.“

the Turkish company Ayesaş is the sole supplier of two major components, the panoramic cockpit display and its missile remote interface unit. And about 10 Turkish companies build various components of the aircraft. "Turkey will take legal action if measures are taken to seriously prevent delivery," Mattis said, adding that Turkey "is not a country that can be easily done without".

All these unpleasant developments are seen in Turkey as a boost for a "wholly national" TF-X programme, but it remains to be seen whether Western governments would stick to its earlier commitments and let BAE and Rolls-Royce – or now General Electric – go ahead with the TF-X when the Russians suddenly appear on the horizon. So far the Russians have stayed away, but at the latest EURASIA air show in Antalya Viktor Kladov, Director of International Cooperation at the Russian technology group ROSTEC, expressed interest in developing a new engine for the TF-X. Turkish procurement officials and diplomats, who describe political relations with Russia as "excellent", have confirmed this Russian interest, but stressed that everything is up in the air. But what

Conclusion

There are many 'ifs' with this project – if it is financially feasible, if Erdoğan remains in office and if Western partners stick to the programme. On the other hand, it is important not to exaggerate this deal too much, as the stated contract volume of US\$100 million per aircraft is insignificant in the total budget for a modern stealth project, which may easily exceed \$25 billion. Turkey will, of course, continue to try to produce and develop as much technology as possible itself.

As far as Victor Kladov's "We could supply an engine" is concerned, it must be mentioned that Russia recently lost India as a sponsor for its domestic stealth fighter Su-57 of the 5th generation called FGFA after 11 years of laborious partnership. In any case, Erdoğan and his advisors must take a deep breath, as the TF-X might fall victim to events or developments beyond Turkish influence or to sudden budget shortages. ■

Japan's Next Attack Helicopter

Shinichi Kiyotani

With Japan's helicopter fleet in a precarious state, the country is looking for cost-effective solutions but does not know where to start.

The Japanese Ground Self-Defence Force (JGSDF) is currently looking to replace its ageing AH-64D and AH-1S attack helicopters in as part of its next Medium-Term Defence Programme (FY2019 to FY2023). Japan's older AH-1S helicopter fleet is in poor shape; only 59 out of 90 helicopters are still operational, and a JGSDF source told ESD that "the number of airworthy AH-1S is around 45 which are half of the fleet. In addition, no upgrades have been implemented on the AH-1S; so its capabilities are outdated."

ber of obstacles. Due to budgetary constraints, Japan will procure only about 30 to 40 new helicopters.

There are several potential candidates: Mitsubishi Heavy Industries (MHI) will offer its licensed Sikorsky UH-60JA with a Lockheed Martin weapon package for integration into the existing UH-60JA fleet. Kawasaki Heavy Industries (KHI) proposes a light attack helicopter based on its OH-1 Observation Helicopter. SUBARU will offer an armed version of the UH-X (next light utility helicopter) based on Bell B412EPI.

rise. The reason for the high unit price was not only the license costs, but also the fact that JGSDF had demanded to reconfigure the AH-64D for firing Stinger AAM and to adapt it to locally manufactured radios as well as to downgrade its network capability to the requirements of JGSDF.

An Opaque Procurement System

However, the biggest obstacle to modernising Japan's airframes is the country's weird procurement system which differs vastly from those of other countries. Frequently, ATLA does specify neither the quantity nor the procurement period but the MoD presents the quantity and budget for each fiscal year to parliament. As a result, no one really knows the period of procurement and the total budget. Under this procurement system and without a long-term contract for the supply of spare parts, it is impossible to upgrade the helicopter fleet and to maintain it over a 30-year period.

Faced with the sudden capability loss, the JGSDF staff office panicked and tried to buy ten AH-64D in a year, but the cost was too high and the Ministry of Defence did not yet have a mass buying system at that time. The JGSDF staff unit therefore decided to stop the procurement of AH-64D. The shutdown of the AH-64D assembly line was a problem for SUBARU, as the company distributed the initial costs for building the production line to each aircraft. If JGSDF stopped procuring AH-64D, the company would not be able to amortise its initial investment. However, in 2007, JGSDF refused to reimburse SUBARU for the initial investment because the MoD and SUBARU had not signed a contract over the total amount of 62 AH-64D; in fact, the procurement contract was concluded as a "gentleman agreement". That's why SUBARU sued the Japanese government and won; the Supreme Court ordered the MoD to pay JPY35.1Bn to SUBARU. Since then, the MoD has reimbursed the initial investment to the contractors, but it has not yet reformed the procurement process. But there are other issues as well: JGSDF



Photos: Shinichi Kiyotani

A Japanese AH-64D

But it is not only about the decrepit condition of Japan's helicopter fleet but also about numbers: Originally Japan wanted to buy 62 AH-64D helicopters but bought only 13 before terminating procurement. As Boeing will phase out maintenance for the AH-64D in 2025, the wear of key components will begin as early as 2019. This means that from 2019 a number of AH-64D helicopters will undergo capability degradation and a declining operability. To modernise its helicopter fleet, the Japanese Acquisition, Technology & Logistics Agency (ATLA) initiated the procurement programme AH-X (next Attack or Armed Helicopter) which has been facing a num-

Foreign companies also offer their products: Boeing presents its AH-64E, Bell the AH-1Z and Leonardo the newly developed A249. However, as JGSDF is considering reducing its helicopter types, foreign candidates with the exception of the AH-64E will have difficulties.

Another reason for Japan's AH-X programme is the failed adaptation of the AH-64D to replace the AH-1S. In 2002 SUBARU began license-producing the AH-64D. After purchasing the tenth AH-64D, JGSDF discontinued procurement because the US AH-64D had been shifted to the AH-64E configuration which impeded the supply of spare parts and caused the unit price to

has serious problems with older helicopters that could affect the AH-X programme. The UH-X programme is intended to replace the UH-1J, which was selected in 2014 and is based on Bell 412EPI. The development will cost JPY26.3Bn billion and is expected to be completed by March 2019. SUBARU and Bell are going to offer an armed version for the UH-X. The two companies won the competition over Kawasaki's X9, a co-development with Airbus Helicopters. The MoD demanded a unit price of JPY1.2Bn for the UH-X, which is the price of the single-engine SUBARU UH-1J helicopter, and an industry source said: "The unit cost of the UH-X will exceed JPY2Bn."

In January this year, Bell Japan rejected Hokkaido's (the local government of northern Japan) tender for a B412EPI disaster relief helicopter with a budget of JPY2.4Bn because the cost of manufacturing the helicopter would have exceeded the allocated budget; it is impossible to produce a twin-engine helicopter for a unit price of JPY1.2Bn, but obviously JGSDF's headquarters insisted on such a low price.

The Japanese MoD had introduced a cost review system that contained something similar to the US Nunn-McCurdy Amendment of 2015. This means that the MoD can review procurement (for example, reduce the number of units or discontinue the programme) if the unit price is more than 150% higher than initially planned. Japan does not apply the clause as strictly as the Pentagon, but perhaps the Japanese Ministry of Finance insists that the UH-X programme be terminated.

Despite the change in 2015, the Ministry of Defence intends to procure six UH-X helicopters for a total of JPY11Bn (unit price JPY1.83Bn) and it wants an additional JPY5.2Bn for the 2019 budget. And the unit price for the helicopters could increase even further if one refers to the above mentioned price of B412EPI for the local government. The Ministry of Finance may refuse or challenge this purchase.

In this case, SUBARU would not offer an armed version of its UH-X helicopter and the UH-X programme would start from scratch. Since there is not enough time to develop a new helicopter, a standard solution would have to be chosen as an alternative.

But the project poses another risk for SUBARU: The project needs JPY26.3Bn for the development costs. The Ministry of Defence will pay half of the amount, but SUBARU will have to pay for the rest. SUBARU planned to sell at least 150 UH-X on the export market, but the industry considers this too optimistic as with Bell's B412EPI there are currently two helicopters competing in the civil market.



An OH-6D recon helicopter

In February 2018, the Philippine Air Force considered buying SUBARU's UH-X but eventually bought Bell's B412EPI helicopter. If SUBARU does not sell significant quantities of UH-X on the market, the company cannot collect the development costs for the UH-X. In this case, the UH-X programme may be in the red and might be cancelled. If this were the case, SUBARU's helicopter business would consist only of the maintenance of V-22 for JGSDF and for the U.S.M.C. in Japan and the maintenance of existing JGSDF helicopters which would make it difficult for SUBARU to continue its helicopter business.

Observation Helicopters

JGSDF's observation helicopter fleet is also in dire straits; the number of OH-6 observation helicopters has been decreasing

steadily. In 1995, Japan had 189 units but in 2017 that number was down to 44, according to the Defence White Papers, which is why the old OH-6 helicopters were up for replacement with new OH-1 manufactured by KHI. The OH-1 has a weight of 3,550kg (max 4,500kg), a payload of 132 kg, equipped with two MHI 844 hp TS1-M-10 turbo-wave engines with a speed of 220km/h and a range of 550km. The armament consists of 4 Type 91 MANPADs. Originally JGSDF wanted to acquire 250 OH-1, but ultimately bought only 34 (with 4 prototypes) because the unit price rose from JPY700M to over JPY2Bn. All OH-1 have been on the ground for more than two years due to engine trouble, and only two are available for training. What is worse, the observation capability of the OH-1 is obsolete because it has no data connection, and no one knows when the



The UH-X programme is intended to replace the UH-1J.

problems will be solved. "It will take 9 years to repair all OH-1 after all tests are completed," said an ATLA insider. At the moment, OH-1 procurement has halted and no alternative plan has been made.

UAVs

The same applies to UAVs. In 2004 the VTOL UAV "Flying Forward Observation System" (FFOS) was to be introduced as an observation system for artillery and in 2010 the upgrade version "Flying Forward Reconnaissance System" (FFRS). Both UAVs were not in use during the Great East Japan Earthquake 2011 and the Big Earthquake of Kumamoto 2016 due to lack of reliability. Today the procurement of both systems has been discontinued.

After the earthquake in central Japan, new UAVs were tested. Candidates were the SCAN EAGLE from Boeing-Insitu and the Japanese UAV B-1 from Fuji Imvac. In February 2018, JGSDF opted for the SCAN EAGLE, but procurement has not yet begun, which is why JGSDF has too few airborne reconnaissance platforms.

Attack Helicopters

JGSDP is also looking for new combat helicopters. JGSDF would prefer a cheaper armed transport helicopter to an expensive attack helicopter, as the fleet faces significant budget constraints, particularly in terms of maintenance and training. In addition, transport helicopters have a higher priority than attack helicopters because they can also be used for natural disaster relief. The JGSDF staff office therefore has the idea of arming transport helicopters in order to save costs, expand the mission profile and reduce the total number of helicopters. "KHI is going to offer an attack helicopter based on the OH-1 but KHI is pessimistic when it comes to price and performance," an industry source said; this is why KHI (with Airbus Helicopters) might offer an armed version of the BK117/H145M or a H135M equipped with Airbus Helicopters' "H Force" armament kit. For logistical reasons, JGSDF does not want to increase its variety of helicopter types. If the UH-X programme were cancelled, BK117 would be an attractive choice, although its payload is slightly lower than required by UH-X.

MHI wants to offer an armed version of the UH-60JA, which would lower the cost. Armament can also be installed as a roll-on/roll-off system, allowing both attack and transport missions to be performed on the same aircraft, but this would reduce the transport capability of



A Kawasaki OH-1 helicopter

the UH-60JA fleet. No aircraft can perform both tasks at the same time. Converting 40 units of the Japan's UH-60JA fleet would decrease the transport capability. Allegedly, the newly introduced 17 V-22 OSPREY are intended to compensate for the decline in transport capacity, but are not sufficient to compensate for the transport capacity of 40 UH-60JA helicopters.

That's why the JGSDF can hardly do both transport and attack roles, even with a roll-on/roll-off weapons kit, and a new UH-60JA helicopter with a unit price of JPY5Bn is too expensive. The unit price of an armed UH-60JA is as high as that of the AH-64E. As JGSDF would order only a small number of helicopters - around 30 to 40 units - the actual unit price including development cost will extremely high. It is also difficult for crews to do training on both armed and transport helicopter.

Japan's Costly OSPREY

JGSDF has purchased a total of 17 V-22 OSPREY. The cost of the aircraft and the initial costs are estimated at JPY360Bn. The annual budget for the air fleet is approximately JPY30Bn, which means that the OSPREY comes at a cost of 12 annual budgets, and maintaining the 17 OSPREY eats up two thirds of the maintenance budget of the air fleet. In addition, the Japanese government has decided to introduce two AEGIS Ashore Radars for JGSDF for more than JPY200Bn. This will place an additional burden on the budget.

If the focus is on cost reduction, an armed helicopter based on an observation helicopter would make sense, as it is smaller than transport helicopters such as the UH-X and UH-60, and using the same platform for both roles would reduce the price and

life cycle cost (LCC). In this case, JGSDF should consider buying new helicopters to replace the current OH-1 and OH-6D and import these helicopters instead of more expensive production.

If JGSDF were to introduce the twin-engine Airbus H135M helicopter to replace the OH-1 and OH-6D, this would reduce the LCC. An armed version of the H135M is available from Airbus Helicopters, and the civilian version of the H135, known as the TH135, is often used for helicopter training. The single-engine OH-6D and the armed version AH-6i are a cheaper solution, and overhauling the existing OH-6D would be even cheaper. And if JGSDF needs more helicopters, they can buy more OH-6D or AH-6i and use the existing training and maintenance infrastructure of the OH-6D.

Limited Network Capabilities

Japan's air force is also struggling with limited network capabilities. According to the National Defence Programme, the expected conflict scenario is not the mass landing by the enemy, but the protection of the remote islands of Japan and the defence against guerrilla forces on the mainland. It is difficult to respond to this scenario with a primitive armed helicopter without a data link system and poor ISR capability. Japan's AH-64D, the Type10 MBT, the Type 16 Manoeuvre Combat Vehicle (MCV) and the AAV7A, - all these platforms have limited network capabilities, and Japan's artillery units still use radio communications and paper maps for locating.

Turboprop COIN aircraft such as the SUPER TUCANO are suitable for remote island protection. The unit price of these aircraft (US\$1.2 - 1.5Bn) and the operating costs of US\$1,000 per hour are lower than for armed helicopters. The U.S. Air

Force is considering such COIN aircraft for the OA-X programme. But the range of the plane is not sufficient to protect Japan's remote islands. Network and ISR capability is required to protect remote islands, but JGSDF's network and ISR capabilities are outdated; the platforms can hardly communicate with AWACS, Japan Air Self-Defence Force (JASDF) units, surface combatants, patrol aircraft or even headquarters and not even with their US counterparts. Worse still, U.S. forces are banning friendly forces that lack networking capability from entering combat theatres to prevent blue on blue casualties (friendly fire), which means that JGSDF or the integrated Japan Self-Defence Force (JSDF) joint units cannot participate in joint operations with allied forces.

Protection of remote islands requires low and medium altitude attack helicopters equipped with Link 16, Common Data Link (CDL) and satellite communication systems. The most suitable platform for this purpose is currently the AH-64E or the AH-1Z, possibly the A249, but when it comes to risk and cost efficiency, the AH-64E would be the best choice because



The Airbus H135M is a candidate to replace the OH-1 and the OH-6D.

the implementation costs are lowest and the U.S. Army will use the AH-64 by 2060, which means that JGSDF may maintain interoperability for the next 40 years.

"I think the current AH-64D should be converted to AH-64E, and we should import more AH-64E to set up another squadron. A total of 2 squadrons is our

final goal for the AH-X," said a senior official of JGSDF. According to an industry source, the unit cost to upgrade an AH-64D to AH-64E level is JPY3Bn and a brand new AH-64E is JPY5Bn. In this case one should not opt for license production; it would be overpriced like the previous AH-64D production. ■

NTSA THE WORLD'S LARGEST MODELING & SIMULATION EVENT



Why IITSEC?

- ▶ 16,200 attendees
- ▶ 485 exhibitors
- ▶ 186,000 sq ft exhibit hall
- ▶ 1,800 international attendees, from 50 countries



WWW.IITSEC.ORG ▶ DECEMBER 2-6, 2019 ▶ ORLANDO, FLORIDA



Russian Drones on the Rise

Eugene Kogan

In 2012, President Vladimir Putin announced investments of US\$12Bn for the development of UAVs by 2020, and a year later the Ministry of Defence ordered the speed of research and development and the procurement of UAVs to be doubled.

The result was the deployment of UAVs initially to eastern Ukraine and later to Syria, but without combat capabilities, as the Russian fleet of UAVs has so far lacked these capabilities. In addition to the design and development of UAVs, the Russian Navy has been creating UAV squadrons and regiments since 2014. As a next step, Russia will probably also create an anti-UAV/UCAV force, but this will take some time. According to Sergei Shoigu, Russian Defence Minister, "the number of UAVs operated by the armed forces has increased from 180 in 2011 to more than 2,000 in 2017". Five different types operate over Syria, but none of them are armed. Shoigu told the Russian State Duma that the army operated 600 modern UAVs in 2017, but none were armed.

Russian UAVs over Syria

The most widely used UAV in Syria was the ELERON 3SV aircraft with a single thrust propeller. It can follow a pre-programmed trajectory at altitudes between 50 and 5,000 metres or be controlled by commands from the ground. Mission equipment is a relatively simple optical payload, which is why it is used by reconnaissance units. It has a take-off weight of 3.5 kg and can fly between 90 and 120 minutes. Both ELERON and the ORLAN-10 mentioned below are used to detect artillery fire. The Russian MoD declared in May 2018 that: "Military representatives in Kazan have begun to accept ELERON-3 UAVs. According to the current state defence procurement programme, the production facility will hand over 30 such UAVs to the ministry." The ORLAN (also called LEER) was built by the Special Technological Centre in St. Petersburg. This UAV uses an 18 kg ORLAN-10

vehicle with a tractor propeller. Unlike the ELERON-3, it has a gyro-stabilised platform for sensors including a high-resolution camera, a video camera and an infrared imager. The ORLAN can be used at night and in

The third type used in Syria was the 450 kg FORPOST, a licensed copy of the IAI Searcher Mk II. This model, as far as known, is the only UAV model that performs conventional takeoffs and landings

Photo: Vitaly Kuzmin



The Russian-made ELERON 3SV UAV

adverse weather conditions, typically flying at an altitude of 5,000 metres at a speed of up to 150 km/h for up to 16 hours. For an uninterrupted transmission of images in real time, the UAV should not fly more than 120 km from its base. In autonomous mode, however, the Orlan-10 can follow a pre-programmed flight route 600 km outside its home base. The Russians have designed the UAV for several missions, not only for visual reconnaissance, but also for electronic warfare (EW). A single KAMAZ heavy-duty truck controls three ORLANs, one of which acts as a communication relay, while the others carry both airborne jammers and disposable jammers which can be dropped to the ground. The entire system can shut down a cellular network, selectively disturb only a few phones, or send text messages to deceive and demoralise.

at the Russian Khmeimim Air Base in Latakia, Syria. This model is the most important UAV of the Russian armed forces. In March 2017, it was reported that Russia was developing payloads and data links for the UAV FORPOST. Some Russian companies have already received orders to supply the necessary systems, and it appears that the United Instrument Manufacturing Corporation of Rostec State Corporation will be the prime contractor. The improved UAV will be able to communicate not only with a ground control station, but also directly with other aircraft and helicopters so that the crew can evaluate the information collected with their sensors and transmit real-time data to ground or air forces. By 2019, Uralskiy Zavod Grazhdanskoy Aviatsii (Ural Works of Civil Aviation or UZGA) in Ekaterinburg is

Author

Eugene Kogan is a defence and security expert based in Tbilisi, Georgia.

scheduled to begin production of a modernised FORPOST-M with attack capabilities using Russian components.

Another type used in Syria was the UAV ZALA-421-16, manufactured by Zala Aero Group, a member of Kalashnikov Concern of Rostec State Corporation. This dual-function system developed in Russia was commissioned in November 2014, initially by the Ministry of Emergency Situations (MChS) as a means of land monitoring. It was put into service by the armed forces in 2015. The aircraft weighs between 8 and 11 kg and flies at an altitude of up to 3,600 metres at a speed of up to 110 km/h.

The smallest designs used in Syria were hand-launched GRANAT 1/2 UAVs with electric motors and a flying time of 78 minutes. These UAVs are used by the SOFs to enable battlefield reconnaissance, the detection and illumination of targets for fighter jets and artillery, and the detection and killing of terrorists.

There is no doubt that the use of UAVs in Syria has provided insights and encouraged various Russian companies to further develop the systems.

A Crop of New UAVs is under Development

At MAKS 2017 (in July 2017), visitors were able to see the new MALE UAV ORION produced by the Kronstadt Group (KT). It has a total weight of 1,200 kg and can fly for 24 hours at altitudes of up to 7,500 metres. The fuselage and wings are made of composite materials, but the on-board systems are purely electric, without pneumatics or hydraulics. At present it is only designed for reconnaissance missions, however there is potential for developing an armed version. ORION can carry an active electronically scanned array radar (AESA) for mapping and target acquisition, as well as equipment for locating enemy air defence and radio objects. The collected data are transferred in real time to a container transportable by road, which serves as a control station for four to six UAVs. KT has developed the current version of the UAV under a contract with the MoD signed in 2011 and unnamed company officials said the UAV is ready to go into production. At MAKS, KT signed a contract with Rosoboronexport to market ORION for export. The company has developed an exportable reconnaissance version with imaging sensors for foreign customers. So far, no exports of the ORION system have been reported.

The largest strategic UCAVs will be integrated into Russia's C2 systems for net-centric warfare. The artificial neural net-

Photo: MoD Russia



The ORLAN 10 UAV

work for this is currently being developed by Millennium Design Bureau. The first UCAV to be integrated into this network is the KORSAR reconnaissance system (its launch weight is 200 kg) developed by the Rybinsk Luch Design Bureau, a member of the Roselectronika Group, which reports to Rostec State Corporation.

The UCAV KORSAR can accelerate to 120-150 km/h and reach an altitude of 5,000 to 6,000 metres and stay there for 10 hours. It can be armed with 9M120 ATAKA ATGMs. The KORSAR is intended for round-the-clock air reconnaissance in search of land and sea targets, kinetic attacks and carrying payloads to assigned

Photo: Kremlin



A parade of Russian soldiers during the visit of President Putin to the Russian Khmeimim Air Base in Latakai, Syria, on 11 December 2017

targets. It has completed state acceptance testing and, according to an announcement of Rostec State Corporation in May 2018, series production of the KORSAR will be established. General Yuri Borisov, Deputy Defense Minister of Procurement, said in May 2018 that: "We will procure it in large quantities" without further elaborating on it. In addition to KORSAR, Borisov said that the MoD would procure the rotary-wing KATRAN UCAV.

load of 450 kg and remain in the air for up to 30 hours. ALTIUS would be Russia's first heavy-load UAV. The Kazan-based Simonov Experimental Design Bureau designs the ALTIUS UAV. With a weight of 5 tonnes, it delivers a payload of 2 tonnes and is powered by two front-mounted diesel engines from RED Aircraft in Germany. The dependence on engines manufactured in Germany makes ALTIUS UAV vulnerable to arms embargoes. There-

target acquisition information for combat aircraft. According to news released by the MoD on 10 November 2017, the air forces were due to receive about 20 ORLAN, ELERON and TAXION UAVs by the end of 2017. These UAVs will be used for optoelectronic and radio-technical reconnaissance, detection and target acquisition for artillery and fighter aircraft fire. A confirmation of the delivery has not yet been published.

According to Russian Naval Headquarters, the first two UAV units were formed in 2015 at the Northern Fleet Headquarters in Severomorsk and at the Pacific Fleet base on the Kamchatka Peninsula. Another UAV unit was formed in Crimea. These units were restructured into squadrons and became an integral part of Naval Aviation between 2014 and 2015. Another UAV squadron was formed between 2014 and 2015 with the Baltic fleet. The main purposes of UAV squadrons are reconnaissance missions and target acquisition for artillery fire, missile or air attacks. Relay formations were restructured into aviation regiments in 2015. Moreover, Izvestia reported that the Russian Strategic Rocket Forces (or RSVN in Russian) received their first ELERON, GRANAT and ORLAN UAVs on 12 July 2018.

Nezavisimaya Gazeta recently reported that the MoD intends to establish a counter-UAV and counter-UCAV programme to be implemented in all branches of the Russian armed forces as Russia has experience in dealing with foreign UAVs and UCAVs in Syria.

In conclusion, it can be said that the Russian military, despite having belatedly recognised the benefits of UAVs on the modern battlefield, is currently catching up with the West. Cooperation with Israel has given the Russian defence industry the necessary impetus to learn the know-how of modern UAVs and to take a leap forward in the design and development of the system. Even if the Russian UAVs/UCAVs are not yet as sophisticated and deadly as the American and Israeli designs, Russia is on the right track to catch up with the rest of the world. Therefore, Russian efforts should neither be underestimated nor ignored.

The establishment of the UAV operating units shows that the Russian military takes the entire UAV issue seriously and is willing to create the necessary infrastructure – especially within the navy. Whether or not UAVs as such will be integrated into the Russian Air Force remains to be seen, but that would be possible. And the UAVs/UCAVs programme has the potential to morph into a Russian anti-UAV/UCAV force, but this process will take some time. ■

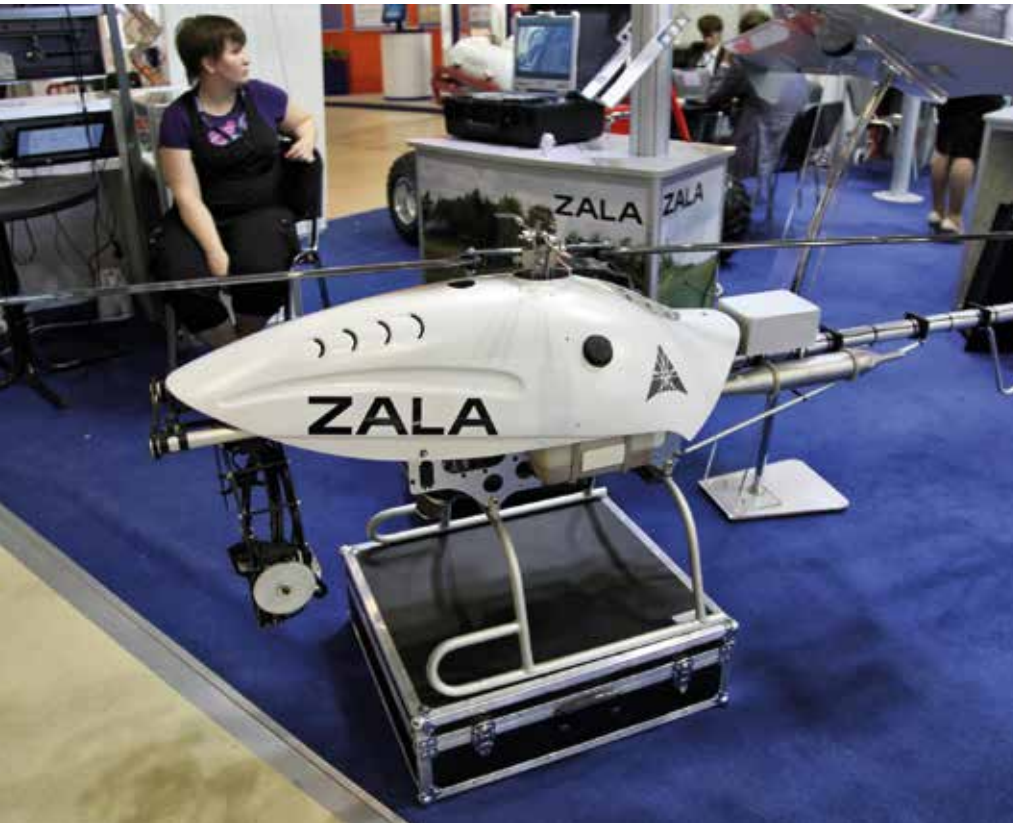


Photo: Vitaliy Kuzmin

The Russian-made ZALA 421-23 UAV

The KATRAN is designed to support SOFs and naval forces as well as reconnaissance and battlefield surveillance with television cameras and thermal images. The UCAV has a take-off weight of 340 kg for best performance, but it can have a maximum take-off weight of 490 kg, carry a 120 kg payload, reach a top speed of 130 km/h and fly at 2,000 meters altitude. With a take-off weight of 340 kg it has a flight duration of 4 hours. The Russian MoD states: "In addition to its ability to conduct reconnaissance and EW missions, the UAV can also carry out kinetic attacks with unguided and guided ammunition". The KATRAN can be equipped with 9M113M KONKURS-M and 9M120 ATAKA ATGMs.

Borisov also indicated that the MoD will complete testing of INOKHODETS and ALTIUS UAVs in 2018 and described them as future assets at the operational level. INOKHODETS is designed to carry a pay-

load, Russia is likely to produce advanced engines domestically.

Despite the many UAVs listed above, the Russian armed forces also have obsolete systems in their inventory that were fit for combat in the Lebanon War of 1982, in Chechnya and during the recent hostilities in eastern Ukraine. This dual arrangement ensures the uninterrupted use of UAVs on the battlefield.

Establishment of Operational UAV Units

In addition to the design, development and deployment of UAVs, the Russian armed forces established military UAV units in 2016. These include two units in the Paratroopers and an indefinite number in the Special Forces which deploy UAVs to detect terrorist infrastructures and movements and to provide accurate

Spain's Defence Industry

Esteban Villarejo

The Spanish defence industry is at a crossroads. Major national procurement programmes and Spain's cooperation in PESCO (Permanent Structured Cooperation) are intended to strengthen Spain's defence companies for the next 30 years.

According to data from the Spanish Defence Industry Association TEDAE, Spain's defence industry grew by 7.1% in 2017 (more than 2.2 times the domestic average, or 3.1%), reached a total turnover of €5.3Bn and employed 22,812 professionals in 388 companies.

The vast majority of these (81%) are destined for export. The economic crisis in Spain made companies look for markets abroad, as the Spanish defence budget was cut by around 30% between 2008 and 2014. Europe (84.6%), the Middle East and North Africa (8.2%) and Latin America (3.57%) were the main export destinations. Most of the defence turnover goes to a number of international consortia involving companies from other countries, including Germany, France, Italy and the United Kingdom. These include programmes such as the EUROFIGHTER, the EJ2000 engine for the EUROFIGHTER, the A400M aircraft, the NH-90 helicopter and the MTR390 engine for the TIGER combat helicopter. Sales by sector show the following distribution in regard to turnover: military aviation (68%), electronics and IT (9.2%), marine (7.7%), land vehicles (6.5%), armaments (5.1%), space travel (1.8%), auxiliary (1.1%) and missiles (0.6%).

The Entire Product Cycle

"Spain currently has defence and security companies with high added-value technologies and products in competitive technological niches of all relevant areas. Efforts made in recent decades have positioned Spain among the few countries in the world that have an industrial fabric with companies present in the complete product cycle, from development to manufacturing, integration and maintenance", Jaime de Rábago, President of TEDAE, told ESD.

Companies like Airbus DS, Airbus Helicopters, Navantia, Indra, Santa Bárbara Sistemas-General Dynamics European Land Systems (SBS-GDELS), EXPAL, Sapa, Urovesa, Thales España, Hisdesat, SENER or INSTA-

LAZA have a consolidated presence in all of Spain's defence sectors. "These companies and others are evidence of the competitiveness of our industry".

This year, the industry was confronted with political instability; there was a change of government after the Socialist Party won a vote of confidence in June and overthrew Mariano Rajoy of the People's Party. Pe-

only large corporations but also small and medium-sized enterprises," said the President of TEDAE.

In just five months, the new government has approved seven large projects worth €5.6Bn: the completion of the future four Navantia S-80 submarines (€1.7Bn), the two new HISDESAT military satellites SPAINSAT and XTAR-EUR (€1.4Bn), the



The Spanish Army can rely on a strong and innovative defence industrial base.

dro Sánchez' new government, however, is sticking to its plan to launch major programmes such as the procurement of the F-110 frigates estimated at €4Bn, the 8x8 armoured combat vehicles and new jet fighters to replace the F-18 HORNET of the Spanish Air Force and the HARRIER of the Spanish Navy, although the last two decisions could wait until the next legislative period.

What initiatives does the Defence Industry Association consider necessary? "We need continuity in defining the new investment cycle. It is crucial for us that the new programmes are activated once and for all: Many companies depend on them, not

procurement of 23 new Airbus NH-90 helicopters (€1.3Bn) and the modernisation of the CHINOOK helicopters (€1Bn). The latter project will be carried out by Boeing in Philadelphia, USA, and will therefore not have a major impact on national industry.

Two Key Programmes for the Industry

These recent budget allocations, however, are only a first step; industry is expecting two other major projects: the procurement of five F-110 frigates and of 348 8x8 GDELS PIRANHA-based armoured combat vehicles.

Beginning in 2022 and until 2030, the F-110 frigates are to replace the six Spanish Navy SANTA MARÍA class frigates (F-80). Military sources reported that the plan is to build five new frigates. This will be the most important military programme of the Spanish Navy in the next decade, along with the construction of the S-80 class submarine.

Spain might participate as an observer in the FCAS project and postpone the decision until next year.

Spain's Seven Champions

After this analysis of the most important programmes aimed at sustaining the industry in the future, let's take a look at the four

in ship repair and modernisation. It also designs and manufactures integrated platform management, fire control, command and control, propulsion and life support systems for all its products.

Navantia currently employs 5,323 people and has a turnover of €850M. In addition to the S-80 submarines and the future F-110 frigates, Navantia is already



Photo: Luis García

The headquarters of Airbus Defence and Space in Madrid, Spain. The company is one of the largest players in the Spanish market.

The F-110 frigates will be built by the state-owned company Navantia. Indra also participates in the programme and will develop the combat management system. At the moment, the F-110 frigates account for about €251.9M of R&D contracts. The government will announce the final contract in the coming months.

According to the defence industry, this major project is essential for the future Spanish shipbuilder Navantia. The entire fleet could be ready by 2027. "The F-110 will be a driving factor for the entire defence industry with an annual impact of €590M on GDP," said Admiral Santiago González Gómez, Director General for Military Equipment and Materials (DGAM). The lighthouse project for the army – the future 8x8 vehicle – is also about to start; together with Indra and Sapa, Santa Bárbara Sistemas-GDELS is considering the development and supply of seven variants and 12 configurations. The PIRANHA 5 will be the platform for the Spanish vehicle. The army is now awaiting the handover of five demonstrators. The production contract could be signed well before the end of 2019.

And, of course, there are still doubts in the defence industry about Spain's participation in the new Franco-German Dassault-Airbus project for the Future Combat Air System (FCAS), which will or will not replace the fleet of F-18s. For the moment,

most important Spain-based companies: **Indra** is the leading security and defence company. The company supplies systems based on proprietary technology to the MoD and Homeland Security.

Indra employs around 40,000 people in 46 countries and has projects in over 140 countries. The company achieved revenue of €3.011Bn in 2017; in the defence sector it mainly focusses on the areas of air surveillance systems, electronic defence, border surveillance, simulation, satellite communications and cyber defence.

Indra participates in many leading European projects such as the EUROFIGHTER, the A400M, the TIGER helicopter, the LEOPARD tank, the LHD ship, the F100 frigates and S80 submarines, the GALILEO system, the COPERNICUS programme and the INGENIO and PAZ satellite systems, among others.

Indra is also participating in the development of the future 8x8 vehicle, the future F-110 frigate, the NH-90 simulator and the Spanish Space Surveillance System, which will have one of the most powerful radars in Europe.

The Spanish Government owns 18.71% of the company's shares.

Navantia is the national shipbuilder wholly owned by SEPI, the government's Spanish industrial holding company. It is a world leader in the design, construction and integration of state-of-the-art warships and

building two Auxiliary Oiler Replenishments (AORs) for the Royal Australian Navy, a strategic customer for Navantia, from which it has received orders worth €2.4Bn in recent years for two Landing Helicopter Docks (LHDs) and three Air Warfare Destroyers (AWDs).

The President of Navantia, Susana de Sarriá, stresses the "pride of Navantia and of the Spanish industry as a whole in the international success of the company in Australia". Lately, however, it was the British shipbuilder BAE who won the recent US\$25.7Bn contract to build nine anti-submarine warfare (ASW) frigates.

But in recent months, more good news has come from the Navantia headquarters: the Saudi Arabian Government has contracted Navantia to build five corvettes for €1.8Bn, the largest export contract in the history of Spain's shipyards. The programme will start in late 2018 and the last ship is due to be commissioned in 2022. In addition, NAVANTIA will be responsible for life cycle management for five years with the option for five additional years.

As far as its impact on employment is concerned, it is calculated that the contract will create almost 6,000 direct and indirect jobs annually for the next five years.

The corvettes for Saudi Arabia are based on Navantia's AVANTE 2200 model, which was sold to Venezuela a decade ago. Na-

vantia has its main production facilities in Ferrol (A Coruña), San Fernando and Puerto Real (Cádiz) and Cartagena.

"The 300-year history of the company results from a profound transformation process that is geared towards the sustainability of the company in the 21st-century market. At Navantia, this transformation, which is essential in the shipbuilding industry, is called "ASTILLERO 4.0" and is based on new digital technologies to radically improve processes, which is possible thanks to a deeply integrated development of all activities," Navantia officials told ESD.

Airbus Defence and Space, the European leader in aerospace, employs the majority of Airbus' Spanish workforce, with nearly 7,700 employees at five sites. Airbus is one of the world's leading manufacturers of military transport aircraft and plays a leading role in the twin-engine EUROFIGHTER combat aircraft.

The San Pablo and Tablada sites in the Seville area are the epicentre of Airbus' military transport business, with final assembly lines for the four-engine turboprop A-400M aircraft and the twin-engine C-295 and CN-235 transport aircraft. Seville is also home to the International Training and Delivery Centre for Airbus military aircraft.

Getafe (Madrid) is the site of the A-330 MRTT Conversion Centre, where the refuelling and military avionics systems needed



Photo: Forsvarsmateriel og Indkøbsstyrelse

The Spanish Army will procure 348 8x8 GDELS PIRANHA 5-based armoured combat vehicles. Depicted is a PIRANHA 5 of the Danish armed forces.

to convert the Airbus A330s into multipurpose tankers will be installed. Airbus also manufactures and assembles some parts for the EUROFIGHTER at Getafe.

The Spanish MoD will determine its participation in the pan-European FCAS project, the purchase of three A330 MRTTs and the replacement of 85 F-18 fighter aircraft over the next 3-5 years. "The EUROFIGHTER (Tranche 3) is the most likely choice to replace these old fighters," the MoD told ESD. The Spanish Government owns 4.17% of the company's shares.

Santa Bárbara Sistemas-General Dynamics European Land Systems (SBS-GDELS) has a staff of over 1,200 highly qualified employees at four locations in Trubia (Asturias), Seville, Granada and Madrid. The product portfolio includes tracked vehicles (ASCOD family), wheeled armoured vehicles such as the PIRANHA, artillery systems (SIAC howitzer) and large-calibre ammunition. GDELS has also received a licence to manufacture the LEOPARD 2E main battle tank or the SPIKE rocket for the Spanish Army.

Vehículos Blindados Españoles



The Transatlantic Partner for Land Defense in Europe

GENERAL DYNAMICS

European Land Systems
Santa Bárbara Sistemas



Masthead

European Security & Defence

Issue 8/2018 - December 2018
ISSN 1617-7983 · www.euro-sd.com

Published by



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: Rolf Clement (rc), Waldemar Geiger (wg), Gerhard Heiming (gwh),
Jürgen Hensel (jh)
Sub-Editors: Christopher Ellaway-Barnard (cb), Christian Kanig (ck)
Correspondents: Rolf Hilmes (Army Technology), Peter Preylowski (Airborne Systems)
Regional Correspondents: Sidney Dean (USA), Tamir Eshel (Israel), Tim Guest (UK),
Alex Horobets (Ukraine), Jaime Karremann (The Netherlands), Beka Kiria (Georgia),
Shinichi Kiyotani (Japan), Yury Laskin (Russia), J. Bo Leimand (Denmark), Jay Menon
(India), Chet Nagle (USA), Korhan Özkillinc (Turkey), Luca Peruzzi (Italy), David Saw
(France), Joris Verbeurgt (Belgium/EU/NATO), Esteban Villarejo (Spain)

Layout:

CREATIVE CONSULTING GmbH, Germany

Production:

Lehmann Offsetdruck GmbH
22848 Norderstedt, Germany

Office address:

Mittler Report Verlag GmbH
Baunscheidtstraße 11, 53113 Bonn, Germany
Phone.: +49 228 35 00 870, Fax: +49 228 35 00 871
Email: info@mittler-report.de, www.mittler-report.de

Director of Marketing

Jürgen Hensel (jh)
Phone: +49 228 35 00 876, Fax: +49 228 35 00 871
Email: juergen.hensel@mittler-report.de

Marketing & Business Development

Dr. Andreas Himmelsbach
Phone: +49 228 35 00 877, Fax: +49 228 35 00 871
andreas.himmelsbach@mittler-report.de

Waldemar Geiger

Phone: +49 228 35 00 887, Fax: +49 228 35 00 871
waldemar.geiger@mittler-report.de

Advertising Representatives:

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
Krasnokholmskaya Nab., 11/15, 132, RF-109172 Moskau, Russian Federation
Phone: 007-495-911-1340, Fax: 007-495-912-1260, Email: yalarm-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
© 2018 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 Photo: RNoAF, China Military Online, Leonardo

Annual subscription rate (8 issues):
€49.80 incl. postage

Recently, this US General Dynamics Corporation company was selected to design and certify various versions of the AJAX armoured combat vehicle technology to be exported to the UK and to work on new versions of the ASCOD PIZARRO II, such as the VCZ engineering vehicle. On behalf of the Spanish Ministry of Defence, SBS-GDELS is conducting research on the new armoured 8x8 wheeled combat vehicles based on the PI-RANHA 5. Under the R&D contract, SBS is conducting research on six different technology projects relating to survivability, situational awareness, forward observers, leadership, mobility and platform integration. SBS-GDELS is cooperating with Indra and Sapa (gearbox) for the new 8x8 vehicle programme.

Antonio Bueno, Vice President of GDELS and Director General of SBS, told ESD: "The VCR 8x8 is a demand and priority for the Spanish Army that should not be delayed. Santa Bárbara Sistemas is ready to respond to the demands of our armed forces and we believe that it is important to continue the development of technologies and products with a Spanish brand".

EXPAL Systems is MAXAM's lead defence business unit and has more than 1,300 employees mainly in Spain but also in other 10 production centres in Italy, Bulgaria, Belarus, Denmark and the US.

EXPAL's portfolio includes weapons systems, ammunition and propellants, systems and technology applications, as well as aeronautical systems maintenance, demilitarisation and clearance of terrains.

The company has one of the largest ammunition portfolios in the market and develops its own family of extended-range (ER) artillery ammunition based on base bleed technology, which provides ranges of up to 20 km with 105mm and up to 40 km with 155mm, depending on the platform. EXPAL's 105mm and 155mm artillery ammunition is used by more than 30 armies and is compatible with all NATO howitzers.

EXPAL's ammunition is fully compatible with the most important naval guns such as 40mm and 76mm in all its variants, as well as the industry-leading 5"/127mm gun mountings.

The Spanish company supplies more than 20 air forces worldwide with MK type ammunition (now in its 80 series), training bombs of type MK-76, BDU-33 and MK-22 as well as the penetration bomb BPG 2000 with an integrated precision-guided system. The company generates a turnover of €250M.

The **Airbus Helicopters** plant in Albacete started operations 11 years ago. Next to production sites in France and Germany, "the Albacete plant will become the company's centre of excellence for the manufacture of large component assemblies, ensuring greater quality and competitiveness as well as long-term visibility of industrial activities in Albacete".

The Spanish plant will specialise in the production and integration of the rear fuselages of all Airbus helicopters for the global market. TIGER HAD/E (attack) and NH-90 (tactical transport) helicopters for the Spanish Army are assembled in Albacete.

The Spanish Government recently approved the acquisition of a second tranche of 23 NH-90 CAIMAN helicopters for €1.3Bn. "This is a key moment for the future of the Albacete plant", company officials told ESD. The first tranche was 22 NH-90s.

The MoD predicts a fleet of 108 NH-90 helicopters – 48 for the army, 28 for the navy and 28 for the air force.

ITP Aero is currently an Original Equipment Manufacturer (OEM) in three important European defence consortia: firstly, in EURO-JET Turbo GmbH (Eurojet), responsible for the EJ200 engine and the EUROFIGHTER fighter jet; second in EPI EUROPROP International GmbH (EPI), responsible for the TP400 turbo-propeller, the world's most powerful propeller, for the long-distance military transport aircraft Airbus A400M; and finally, in MTU

Turbomeca Rolls-Royce ITP GmbH (MTRI), responsible for the MTR390-E propeller for Airbus Helicopters' TIGER, Europe's most advanced attack helicopter.

In 2017, the Spanish Government approved the acquisition of ITP Aero by Rolls Royce. This was seen as a British step with a view to acquiring a military engine manufacturer in case of Brexit.

Since 2003, more than 1,200 engines have been delivered to the fleets of various nations. In addition, ITP Aero is the main supplier for engine maintenance to the Spanish armed forces.

Other Important Actors

In addition to these seven large companies, there are many other companies that play a role in Spanish industry, participate in Spanish programmes or export all over the world. These include:

Thales España, a branch of the French technological giant with more than 1,200 employees in Spain. It is specialised in radio communications for the Spanish Armed Forces and hopes to secure another contract for the future command and control system.

Hisdesat, founded in 2001, is the government's satellite services operator.

Babcock Spain, the former Inaer, was acquired by British Babcock in another pre-Brexit purchase. Babcock Spain modernised the AB-212 helicopters of the Spanish Navy (with SENER) and customised and modernised the AS332 helicopters of the Spanish Army, the COUGAR 532 for UME



Photo: Zarateman

The Indra headquarters in Alcobendas, Madrid. Indra is Spain's largest defence and security company.

(Emergency Unit) and S76C of the Spanish Air Force. Babcock hopes to be contracted for the Spanish Air Force training programme, similar to the French Air Force training programme.

Saes has 25 years of experience in the naval industry and specialises in underwater acoustics and electronics, systems for submarines, ships and anti-submarine warfare air platforms.

Urovesa designs and manufactures off-road special vehicles for the military. Its

primary vehicle VAMTAC has been sold to the Spanish Army and successfully exported to the Middle East and South America. Recently, Portugal signed a contract to buy 139 VAMTAC ST5 for €60.8M.

SENER is an engineering and technology company and the Spanish partner of General Atomics Systems (GA-ASI) in the acquisition of four MQ-9 REAPERS by the Spanish Air Force next year.

Tecnobit is a company active in aviation, optics, tactical communications, secure communications, aerospace and simulation.

INSTALAZA is an Armed Forces supplier with four main products: the ALHAMBRA hand grenades and rifle grenades; the ALCOTAN system for the infantry which is fireable from confined spaces; the C-90 bazooka family and night vision devices.

Escribano is an engineering and manufacturing company and an integrator of systems with 300 employees. A new remote control station, an infrared search and track (IRST) system, guided rocket systems and drone-hunter systems are among its products.

And, last but not least, anticipating the growth potential for the Spanish and European defence industries, the Spanish MoD and the Spanish Defence Industry Association TEDAE have launched the new FEINDEF International Defence Fair in Madrid from 29 to 31 May 2019.

Defence Minister Ángel Olivares said: "Spain must have autonomous defence systems and a strategic defence sector". The new European projects will be of particular importance, according to the statements made at the opening of FEINDEF. ■



Photo: Jose Luis Porta

According to plans currently under consideration, five new F-110 frigates are to replace Spain's ageing SANTA MARÍA class frigates (F-80).

Hamburgs maritimes Herz



...you won't find more!

Experience the history of seafaring through the artefacts of the biggest private maritime collection worldwide at Hamburg's oldest warehouse in the heart of the HafenCity.



Internationales
Maritimes Museum
Hamburg

KAISPEICHER B | KOREASTRASSE 1 | 20457 HAMBURG
PHONE: +49 (0)40 300 92 30-0 | WWW.IMM-HAMBURG.DE
OPENING TIMES: DAILY FROM 10 TO 18H

Belgium Goes for the F-35 LIGHTNING II

Joris Verbeurgt

On 25 October 2018 the Belgian Government officially announced the procurement of a total of 34 F-35 LIGHTNING II Joint Strike Fighters from Lockheed Martin.

The decision ended the procurement procedure for the replacement of the F-16 that was initiated on 17 March 2017 when the Belgian Government published the Request for Government Proposal. Initially, five competitors were in the running for the multi-billion euro contract. On 14 February 2018, only two state agencies made their best and final offer: the American Joint Program Office, representing the Lockheed Martin F-35, and the UK Ministry of Defence, representing Eurofighter TYPHOON.

The F-16 Era is About to End

The Belgian Airforce currently owns 53 F-16 FIGHTING FALCON MLUs, of which 44 are of the F-16A type (single seat) and 9 of the F-16B type (double seat). The majority of these fighter-bombers are dedicated to NATO. They operate from two airbases, Kleine Brogel in the Dutch-speaking northern part of Belgium and Florennes, situated in the French-speaking southern part of the country.

The multifunctional combat aircraft is suitable for offensive, defensive and reconnaissance missions. Between 1975 and 1984, during the Cold War, Belgium bought 160 F-16s to replace the obsolete F-104 STARFIGHTER and MIRAGE 5. During this time, the Netherlands, Norway and Denmark also opted for the F-16 to equip their air forces. At that time, the F-16 was the first fighter jet with a so-called fly-by-wire system, a computer-controlled steering system that reduces the weight of the aircraft and enables control from outside the aircraft as well as more stability during flight. The F-16 was designed as a modular fighter so that parts or modules can be updated regularly. Around 1990, the



Photo: RNoAF

Like Belgium, Norway has opted for the F-35 and has already received its first aircraft. Depicted is the handover of the first F-35 to Norway.

Belgian F-16s received a so-called Mid Life Update or MLU.

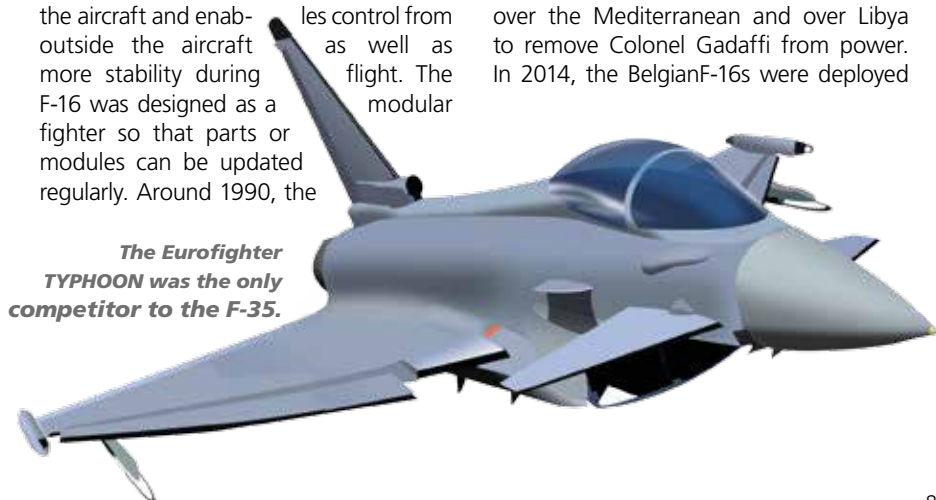
Only after the Cold War were the F-16s actually used in real military operations. The first time was in 1996, when 31 squadrons from Kleine Brogel participated in Operation Joint Falcon over Bosnia-Herzegovina and took off from the Italian airfield Villafranca. Three years later, at the height of the Kosovo crisis, a Belgian F-16 detachment was stationed at the airbase of Amendola in Eastern Italy and flew numerous defensive and offensive actions against Serbian forces. Between 2008 and 2014, Belgian F-16s were deployed at Kandahar Airbase in Southern Afghanistan for the mission Guardian Falcon, fighting the Taliban. The Belgian fighters also participated in mission Freedom Falcon (2011) over the Mediterranean and over Libya to remove Colonel Gaddafi from power. In 2014, the Belgian F-16s were deployed

in Jordan to attack ISIS in Iraq and Syria (Operation Desert Falcon). Belgian F-16s also participate on a rotational basis in the Baltic Air Policing mission, protecting the Baltic airspace.

Although the F-16 is one of the most high-performing and outstanding fighter jets ever made, the planes are getting old. Most Belgian jets have around 8,000 flying hours and in 2013, the question was raised for the first time by the Belgian Ministry of Defence of replacing the F-16 with new machines.

The Largest Military Procurement in Belgian History

Public procurements for the armed forces, especially when large amounts of taxpayer money are involved, are a contentious issue in Belgium. Favouritism, mistrust, hidden agendas, self-interest, envy, personal profiling, extensive lobbying within and without the Defence Department and small-town politics have poisoned nearly every procurement programme for the Belgian Armed Forces in the last decades. Not to mention the passive and active corruption that was often committed to win a lucrative contract from the Belgian Army. One of these affairs had global resonance when, in 1995, Belgian national Willy Claes had to step down as NATO Secretary General, because he



The Eurofighter TYPHOON was the only competitor to the F-35.



Photo: Jerry Gummer

An F-16AM of the Belgian Airforce based at Florennes. Belgium decided to retire its F-16 fleet.

was officially charged with corruption in the so-called Augusta affair. The Belgian Justice Department had found evidence that Claes had been aware of bribes paid by the Italian helicopter constructor Augusta to Claes' fellow partymen. The bribes secured a multi-million deal in the late 1980s when Belgium bought 46 Augusta A109 helicopters, a very questionable deal, as it turned out later. Current MoD Vandepuit is aware of the political and legal difficulties and sensibilities surrounding the biggest military purchase in Belgium ever. At least to the outside world, he practised the highest possible objectivity and transparency with regard to the public

ding the Chief of Staff, Major General Vansina, voluntarily stepped down to enable an independent investigation. E-mails brought forward by the opposition in parliament proved to be false, and no signs of manipulation were found. The procedure could go ahead as planned.

The Competitors

Five companies – two American and three European – showed interest in Belgium's public tender for a new fleet of fifth-generation fighter jets. Via the US Navy Programme Air 265, Boeing proposed

it cannot go along with the high standards set by the Belgian Government". More specifically, Sweden renounced the competition because the tender demands comprehensive after-sales operational support for which there was no foreign policy or political mandate in Sweden at the time. There were rumours in the hallways that Sweden had withdrawn because GRIPEN could not or did not want to offer a nuclear capability. Although the Belgian Government neither denies nor confirms the presence of nuclear weapons on its territory, it is a public secret that several American nuclear bombs are stored on Kleine Brogel airbase and that Belgian pilots are trained to deliver these bombs on target. In the public tender, one looks in vain for a demand for nuclear capability for the new Belgian jets, but it is unlikely that Belgium (or the US) will give up that nuclear capability in the near future.

The third competitor, the RAFALE F3R of the French constructor Dassault, tried to win the deal outside the competition. In June 2018, the French and Germans proposed to the Belgian Government to jointly develop a "fighter jet of the future". France pledged it could deliver 34 RAFALEs while staying within the financial envelope. On top of that, Belgium could make use of France's aircraft carrier CHARLES DE GAULLE. The offer lacked technical details; it wasn't even clear which version of the RAFALE France offered for sale, and



Photo: US Navy

Boeing withdrew its F/A-18 SUPER HORNET one month after the publication of the public tender.

tender procedure for the replacement of the F-16. However, this did not prevent him from ending up in a political and media storm. In the spring of 2018, right after the procurement procedure was officially kicked off, accusations were being expressed that reports, stating the F-16 could last a many more years than officially proclaimed, had been held back by high-ranking Belgian Air Force officials. Belgian politics and public opinion were shocked by these accusations and the MoD ordered an immediate investigation into possible manipulations of the procedure. Top generals of the Belgian Air Force, inclu-

the F/A-18 SUPER HORNET, described as 'an extremely capable and cost-effective' combat airplane. However, one month after the publication of the public tender, Boeing announced that it would not enter the competition, claiming that the tender was unfair and that it failed to provide a level playing field for all competitors. The second competitor to leave the competition was the JAS-39E GRIPEN of the Swedish aircraft constructor and weapons systems developer Saab. In July 2017, the Swedish Government publicly announced that Saab AB would not respond to the public tender "because



Photo: Saab

Saab's JAS-39E GRIPEN was the second competitor to leave the competition.

although the Belgian Prime Minister promised to consider the French proposal, it raised many eyebrows. Bart De Wever, leader of the biggest party in the Belgian coalition government (the National Flemish Alliance) and no fan of French interference in Belgian politics and industry, immediately torpedoed the proposal. The French outside offer was reported for judicial scrutiny and it has not been heard of since.

In the end, only two competitors made their best and final offer: Lockheed Martin's F-35 and Airbus' Eurofighter TYPHOON. Belgium finally chose the F-35 LIGHTNING II. ■

A Further Insight:

“The F-16 will lose its operational relevance”

Interview with Sophie Laurent, Press Officer of the Belgian Ministry of Defence

ESD: Why was the Belgian Defence department looking to replace its fleet of F-16 fighter jets?

Laurent: In the near future, the F-16 will lose its operational relevance. The jet will be able to fly, but it will no longer be deployable in an operational context for missions in accordance with the Belgian level of ambition. The Belgian Government clearly expressed its intention to increase the investments in the security of the country, its people, and its military. The armed forces need to have the equipment it takes to engage in military operations. The most important investment incorporated in our Strategic Vision is the replacement of our air combat capability. This is not surprising, since our country wants to be a loyal and solidary partner of the EU, the UN and NATO. Secretary of Defence Steven Vandepuit therefore passed a defence budget law in parliament providing for the investment of US\$9.2Bn in modern and efficient equipment for the armed forces. All other F-16 nations, with the exception of Portugal, already made the decision to replace the F-16.

ESD: From a technical point of view, the lifespan of the F-16 could be prolonged. Why wasn't that an option?

Laurent: A short prolongation of the F-16's lifespan after 2028 would be disadvantageous from a financial standpoint. The additional cost of a prolongation would amount to US\$520M over a period of six years. After six years, replacement of the F-16 would be required anyway. Above that, Belgium would no longer be in the position to share the costs of the analysis and study stages of a new jet with other countries in case of a prolongation.

ESD: What were the evaluation criteria for the new fighter jet?

Laurent: The evaluation handbook consisted of 53 questions. The following criteria (with ponderation) were used to

evaluate the offers: total ownership cost (33%), operability (21%), partnership and military cooperation (16%), protection of the essential security interests (10%), potential growth and evolution (8%), user convenience and deployability (6%), and operational and technical support (6%). A team of 33 experts from the Ministry of Defence and from the Ministry of Economic Affairs each evaluated a part of the offers.

ESD: What do you mean by the 'protection of the essential security interests'?

Laurent: Belgium has a number of essential security interests it wishes to protect. The competitors for the replacement of the F-16 needed to take this criterion into account. The F-35 programme contains proposals that amount to a total value of €3.6Bn, as estimated by the Ministry of Economics. One-third of the proposals is directly related to the production of the F-35, one-third to the support of the aircraft and one-third is related to other industrial domains in the field of security. The partnership with the US will boost the Belgian industry, allow new techniques and technologies to develop and create jobs. So, this is more than just 'buying jets'. It offers our industry a long-term perspective.

ESD: Why did the Belgian Government choose the F-35?

Laurent: The evaluation of the different offers left no room for doubt: the partnership with the US and the purchase of the F-35 was the best option for our country from a financial, operational, and industrial point of view. The Belgian Government made this decision on the basis of an open and transparent procedure that was launched in March 2017.

ESD: What will be the total cost of the F-35?

Laurent: The Strategic Vision of the Belgian Ministry of Defence budgeted an overall cost of €4.658Bn to replace the F-16 with a state-of-the-art fighter jet. The final cost of the investment is €3.8Bn, payable over a period of 12 years. To anticipate evolutions in the exchange rates, an additional provision of 5% was made, bringing the total cost to €4.011Bn. That is more than €500M lower than estimated in the Strategic Vision.

ESD: That's a lot of money. Can you tell me what is included in that price?

Laurent: For that amount of money, Belgium will receive 34 F-35s, two flight simulation centres, the equipment and the ICT systems for the operational and technical support of the jets (on base as well as on deployment) and high-tech helmet systems for the pilots. For the period 2018–2030, the investment also covers the costs for further evolutions in the weapons systems and the retraining of pilots and technical staff.

ESD: The choice for the American F-35 implies that the European Eurofighter TYPHOON was not chosen. Isn't that a blow to European cooperation in the fields of defence and security?

Laurent: The F-35 has a strong European dimension. A number of European countries joined the F-35 programme from the start. Several NATO members, including European countries like the Netherlands, Norway, Denmark and Italy, will use the fighter jet. Thirty percent of the jet's components are of European origin. There is even a production facility in Italy. The F-35 offers many possibilities for military cooperation with other European nations, as was the case with the F-16. For a small country like Belgium, that is a key aspect.

ESD: The Belgian defence industry has historical ties with France. Why did the Belgian Government not consider the French offer of the RAFALE?

Laurent: We regret the fact that France voluntarily abstained from the obligation to issue an offer within the framework of our open and transparent procedure, as launched by the Belgian Government.

ESD: When can we expect the delivery of the first F-35 to Belgium?

Laurent: Minister Vandepuit will sign an agreement with the US. The first batch of the Belgian F-35s will be delivered in 2023. The F-35s will remain in the US for training purposes. The first F-35s to be stationed on Belgian soil will be delivered in 2025.

The interview was conducted by Joris Verbeurgt.

STM, BAU and Hensoldt Underwater Communication Technologies

(sb) Savunma Teknolojileri Mühendislik ve Ticaret A.Ş. (STM) and Bahçeşehir University (BAU), signed a joint protocol with HENSOLDT at EURONAVAL 2018 as part of the "Project for Underwater Optical Communication between Submarines and Divers" that allows wireless underwater voice communica-



Photo: Hensoldt

tions. Through the directives of Turkish Presidency of Defence Industries (SSB), the optical communication system developed by STM and BAU, which provides a link between submarines and divers, is to be integrated with the optical surveillance system of HENSOLDT. The system, once developed, will be the first of its kind in the world, and the collaboration was announced at the 2018 EURONAVAL naval defence fair in Paris. A subsidiary of the Presidency of Defence Industries (SSB), STM is a long-established organisation with broad naval experience that has been using its engineering capabilities in the development of critical technologies for the benefit of Turkey for more than 25 years. Since its establishment, STM attaches great importance to cooperation with academia, and the underwater optical communication system is a result of such cooperation with BAU. The joint project undertaken by STM with BAU for the development of optical communication systems aims at contributing to security in military communication. STM-BAU has already developed prototype optical communication systems that can provide communication between underwater units, sub-surface to airborne platforms, surface-surface stations and stationary land platforms. It is expected that this technology will complement RF (radio frequency) communication systems in terms of security and redundancy, and will eliminate certain disadvantages of RF systems in terms of interception, eavesdropping, and jamming.

Dutch Submarine Cooperation

(df) Saab and Dutch shipbuilder Damen Shipyards Group announced their new partnership to develop an expeditionary submarine for the Netherlands' WALRUS

Replacement Programme (WRES) at the Euronaval international naval exhibition. The Expeditionary Submarine will build on the capabilities of the Swedish A26 and the experience of the Swedish-designed COLLINS class submarine in service with the Australian Navy. "The Expeditionary Submarine will be equipped with state-of-the-art technology whilst benefiting from de-risking on three submarine classes," Saab announced. "Saab and Damen are thereby creating one of the most modern Air Independent Propulsion (AIP) submarines in the world, which, if selected, will be done in consultation with the customer using a 'design to cost' approach." "Replacing the WALRUS class submarines requires a unique approach," said Gunnar Wieslander, Senior Vice President, head of Business Area Saab Kockums. "Swedish modular submarine design and production techniques coupled with the Dutch shipbuilding tradition bring together the capabilities needed to deliver

Artwork: Saab



an assured operational capability." Hein van Ameijden, Managing Director of DamenSchelde Naval Shipbuilding, added: "The result of the collaboration will be a customer-adapted submarine for expeditionary missions. This will ensure that the Royal Netherlands Navy continues to play an important role in European waters as well as globally."

Cooperation for Safety and Security

(df) Rohde & Schwarz Cybersecurity and Panasonic Business announced their cooperation to offer jointly mobile IT solutions for the highest security requirements. As part of the cooperation, Rohde & Schwarz Cybersecurity is selling the latest Panasonic Android devices – the 5" FZ-T1 handheld with barcode scanner and the FZ-L1 7" tablet - and equipping them with R&S Trusted Mobile, a secure (hardened) operating system based on Android. With this cooperation, Panasonic and Rohde & Schwarz are addressing cybersecurity customers who require hardware security in the form of robust, long-lasting end devices with maximum operational availability, while at the same

time placing particularly high demands on cyber security, like armed forces, police, disaster relief organisations and businesses with corresponding needs.

New Airbus DS Head of Operations

(ck) Airbus Defence and Space has appointed Barbara Bergmeier (50) as Head



Photo: Airbus Defence and Space

of Operations, effective 1 December 2018. She succeeds André-Hubert Roussel (53), who will become CEO of Ariane Group, a 50-50 joint venture between Airbus and Safran. Before joining Airbus DS, Bergmeier was Chief Operating Officer of Dräxlmaier Group, in charge of 50 production sites in 20 countries, and at BMW Group she held various senior management positions. Bergmeier holds a degree in business administration from the University of Applied Sciences in Landshut, Germany.

New CEO at Barrett Communications

(ck) Barrett Communications has announced the appointment of Andrew



Photo: Barrett Communications

Burt as the company's new CEO. Burt has been with Barrett Communications for 22 years, most recently in the role of General Manager – European and Americas Office, which he has held for the past 10 years. Barrett Communications also has recently appointed two new Business Development Managers across the Asia Pacific and African regions and an Operations Manager in the Latin American region.

New BE/NL MCM Consortium

(ck) Barrett Communications has announced the appointment of Andrew Burt as the company's new CEO. Burt has been with Barrett Communications for 22 years, most recently in the role of General Manager – European and Americas Office, which he has held for the past 10 years.

Barrett Communications also has recently appointed two new Business Development Managers across the Asia Pacific and African regions and an Operations Manager in the Latin American region.

Elbit Buys IMI

(ck) Elbit Systems has acquired IMI Systems Ltd. for US\$495M, with an additional payment of approximately US\$27M upon IMI



Photo: Elbit

meeting agreed performance goals. IMI Systems is a defence systems company developing technologies for precision munitions, combat mobility, survivability and protection

systems, armour solutions and HLS and Crisis Management. Elbit's CEO Bezhael Machlis commented: "The synergy between the capabilities of the two companies and the global positioning of Elbit Sys-

tems will enable us to offer an enhanced portfolio and to realise the potential of the technologies of IMI in the international arena, making this acquisition significant to our long-term growth strategy."

Boeing and IAI to Cooperate

(ck) Boeing and Israel Aerospace Industries have signed an agreement for cooperation in civil and military aviation in Israel



Photo: IAI

and other world markets. Under the agreement, Boeing will outsource billions of dollars of work to IAI relating to potential sales of Boeing defence products to Israel, including

new tankers. The Israeli Air Force is reviewing the procurement of Boeing platforms for more than US\$10Bn, including combat aircraft, helicopters and tankers. If Boeing is successful, IAI could win contracts

worth billions of shekels. IAI and Boeing have already collaborated on the development of the ARROW system, and many other projects. The cooperation agreement is intended to put cooperation on a broader basis. IAI CEO Harel Locker said: "IAI has for decades regarded Boeing as a strategic partner in many areas, both military and civil".

Lockheed Martin, Airbus Cooperate on Tankers

(ck) Lockheed Martin and Airbus have signed an agreement jointly to explore ways to meet the growing demand for air-to-air refuelling for US defence customers.



Photo: Lockheed Martin

3rd European GeoInformation Symposium & Exposition

26-27 February 2019 - Berlin, Germany



S.M.A.R.T. GeoInfoSupport - Now and Tomorrow

AFCEA Europe is organising the 3rd GeoInformation Symposium and Exposition on 26 – 27 February 2019 at the NHow Berlin which will be held under the patronage of Dr. Peter Tauber, Parliamentary State Secretary of the German Ministry of Defence and with significant participation of the Bundeswehr GeoInformation Service (BGIS).

Sessions

- Survey and Collection of GeoInformation
- Processing and Management of GeoInformation
- Utilisation/Visualisation of S.M.A.R.T. GeoInformation in Modern Armed Forces

Featured speakers

- **Dr. Peter Tauber**, Parliamentary State Secretary, Federal Ministry of Defence, Germany
- **Lieutenant General Ludwig Leinhos**, DEU AF, Chief of German Cyber and Information Domain, Germany
- **Dr. John Zangardi**, Chief Information Officer, Department of Homeland Security, USA
- **Brigadier General Roland Brunner**, DEU AR, Commander, Bundeswehr GeoInformation Centre and Director Bundeswehr GeoInformation Service, Germany
- **Brigadier General Lars-Olof Corneliussen**, Director of Intelligence Directorate, European Union Military Staff (EUMS), Belgium
- **Brigadier General Dr. Friedrich Teichmann**, AUT AR, Director of Geospatial Institute, Austrian Armed Forces, Austria
- **Mr. Tomaz Petek**, Chair of United Nations Committee of Experts on Global Spatial Information Management: Europe (UN-GGIM), Belgium
- **Dr. Benoît Otjacques**, Head of Environmental Informatics, Luxembourg Institute of Science and Technology, Luxembourg
- **Colonel Philippe Arnaud**, Joint Operations Command, Head of the Office for Geography, Hydrography, Oceanography, and Meteorology, French Armed Forces, France
- **Dr. Thomas Beer**, Copernicus Policy Coordinator, European Space Agency (ESA), Italy



Registration, exhibit and sponsorship opportunities: europe@afcea.org
More information: www.afcea.org/event/GEO19

Update Event programme



The companies will together offer air-to-air refuelling services to address capacity bottlenecks and meet next-generation tanker requirements. Their cooperation will focus on the Airbus A330 Multi Role Tanker Transport (A330 MRTT), and will range from supporting critical short-term refuelling requirements, for example using a fee structure, to designing the tanker of the future.

Winkler Extended at MTU

(ck) MTU Aero Engines' Supervisory Board has extended the contract of CEO Reiner Winkler (57), until 2024. MTU Aero Engines is Germany's leading aero engine manufacturer. The decision was made by a unanimous vote at the Supervisory Board's meeting on 24 October 2018.



Photo: MTU

Klaus Eberhardt, Chairman of the Supervisory Board, said: "Reiner Winkler has done an excellent job running MTU over the past few years and has played a key role in boosting the company's value." Winkler has been the company's CEO since January 2014 and previously served as its Chief Financial Officer since May 2005 when MTU went public.

Naval Group in the Netherlands

(ck) Naval Group has set up a Dutch subsidiary under the management of Mark van Rooij to develop long-term industrial activities. Naval Group Netherlands is a first step towards applications for future marine programmes. The subsidiary is to create a link between Naval Group and the Dutch partners to apply for the WALRUS class submarine replacement programme. The main objective of Naval Group Netherlands is to work with Dutch partners and set up the final assembly of the future submarines using the Dutch industrial and R&D ecosystem.

VTOL UAVs for Naval Group

(ck) Naval Group has selected the Dutch company Atmos UAV for the testing and evaluation of its fixed-wing VTOL (Vertical Take Off and Landing) UAV solution. With this agreement, Naval Group expands its relationships with Dutch industry. Atmos UAV is specialised in UAVs

and their fixed-wing vertical takeoff and landing platform offers key capabilities for navies. "New capabilities such as UAVs will play a key role in future operational requirements, and we believe that by testing them at a very early stage, Naval Group will be able to offer cutting-edge solutions to its international customers", Mark van Rooij, CEO of Naval Group Netherlands, said.

VBMR-GRIFFON and EBRC-JAGUAR for Belgium

(ck) Within the framework of the CaMo programme, Belgium and France will cooperate in the development of solutions for protected mobility. Belgium plans to purchase 382 GRIFFON multipurpose tanks (VBMR) and 60 JAGUAR reconnaissance and combat vehicles (EBRC) from Nexter. These improved vehicles will be identical to those in France, maximising cooperation and enabling interoperability that can lead to integration between the two nations' forces. This procurement is a strategic step in the cooperation between the Belgian and French armed forces and in the development of a European defence system. The final assembly of the GRIFFON will be undertaken by CMI Defense in Belgium and the turret will be manufactured by FN Herstal.

New EMEA Product Manager at Peli

(ck) Peli Products has appointed Pavel Levshin as the new Product Marketing Manager EMEA, located in Peli's EMEA Headquarters in Barcelona. Levshin will be responsible for managing Peli's product portfolio including product life-cycle management



Photo: Peli

and driving local adaptations of new product launches in the EMEA region. Prior to joining Peli, Levshin was with Honeywell Industrial Safety, where he was responsible for Hand Protection/PPE portfolio as Product Marketing Manager. Pavel graduated from Saint-Petersburg State Engineering Institute and also participated in intensive training programmes aimed at Leadership Skills and Strategic Marketing Skills development, together with Six Sigma training where he is qualified at the Green Belt level.

Revision Acquires Protonex

(ck) Revision, a manufacturer of both soldier-worn and platform power solutions, has acquired Protonex Technology Corporation, formerly a subsidiary of Ballard

Photo: Revision



Power Systems. Protonex has been producing portable power solutions which align well with Revision's NERV CENTR soldier power solutions; in particular, Protonex's power managers complement Revision's soldier power portfolio. With immediate effect Protonex will operate under the Revision name as a stand-alone entity in Southborough, MA.

Digitising Germany's Military

(ck) Rheinmetall and Rohde & Schwarz have set up a joint venture called RRS-MITCOS to meet the German military's requirement for integrated operational and communications systems and digitise Germany's ground forces. Rheinmetall holds a 74.9% stake in the new company, with the remaining 25.1% belonging to Rohde & Schwarz. The joint venture is open to additional partners. The two partners intend to use RRS-MITCOS to bid for the German army's "Digitisation of Land-based Operations" (D-LBO) programme, which is the Bundeswehr's premier modernisation project, and which will result in the future digital command system of the German Army. Thousands of army vehicles are due to be retrofitted with new technology in the medium term.

RUAG and Elbit to Form Joint Venture

(ck) RUAG and Elbit Systems have signed a Memorandum of Understanding (MoU) to establish a joint venture in Switzerland with a joint team of professionals. The two companies intend to pool their expertise and act as a national competence centre for communication to respond to the requirements of the Swiss MoD. This centre will theoretically also support the joint efforts of the two companies with regard to an upcoming Swiss military communication programme.

Schiebel Doubles Production Capacity

(ck) Austrian Unmanned Air Systems (UAS) manufacturer Schiebel will expand its Vienna-based production facility to meet the growing demand for its UAS CAMCOPTER S-100. The facility opened in 2006 and it has since grown from 50 employees to approximately 120 employees. The current expansion will double the size of the location to house production and maintenance, logistics, training and office space for an expected 150 employees by 2020. Schiebel's growth has been driven largely by its prime product, the CAMCOPTER. The Vertical Takeoff and Landing (VTOL) UAS requires no prepared area to enable launch and recovery, and operates by day and night with a beyond line-of-sight ca-



Photo: Schiebel

ability out to 200 km. Its carbon fibre fuselage provides capacity for a wide range of payload/endurance combinations up to a service ceiling of 5,500 m. In a typical configuration, the CAMCOPTER carries a 34 kg payload for up to 10 hours.

Embraer and Boeing to Form Joint Venture

Embraer and Boeing to Form Joint Venture

(ck) Embraer and Boeing have established two joint ventures, the first of which concerns the marketing of the KC-390 multi-mission medium air transport system; Embraer will hold 51% of the shares in the joint venture, and Boeing 49%. There has been speculation that this joint venture is intended to pave the way for Boeing to play a role in other Embraer defence projects, such as the A-29 Super Tucano, which the US Air Force is buying for Afghanistan and for itself. However, the defence business with end-to-end product development capabilities remains with Embraer, including the Super Tucano, F-X2 and various C4ISR platforms as well as support and maintenance. Embraer intends to retain control of its defence products and the joint venture between Boeing and Embraer will preserve Brazilian defence capabilities. The second joint

venture concerns Embraer's civil aircraft and services businesses, in which Boeing will purchase 80% of the business for US\$4.2Bn and Embraer will keep the remaining 20%. Both transactions are subject to approval by the Brazilian government.

New CEO at Terma

(ck) Effective on June 1, 2019 Jes Munk Hansen will become President & CEO of Terma A/S. At present, Hansen is CEO for Osram USA. Before joining Osram, Jes Munk Hansen served several years as CEO of Grundfos North America where he led the establishment of a local R&D center and the acquisition of several companies. Hansen holds an MBA from London Business School (1997).

Photo: Terma



ESD Spotlight

MITTLER REPORT

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.

European Security & Defence SPOTLIGHT
 Issue 100/2018
The Geopolitics of Energy
 Joris Verbeurg, Editor Belgium/EU/NATO for ESD

The existing world energy system was largely shaped by Anglo-American interests, which favoured market-driven competition over access to energy resources on a demand and supply basis. Global geopolitical shifts in the early 21st century have caused a profound transformation of this market-oriented system to which we need to find an answer.

The geopolitics of energy comprises three dimensions: an economic dimension, an ecological dimension, and a security dimension. Energy security, with numerous implications for global security, has become a real internationalisation issue for NATO in the aftermath of the Russian annexation of Crimea in 2014. For many NATO in-house energy resources are economic constraints themselves. The rise of the oil industry is intertwined with the rise of capital and international business, and fuel has remained as the dominant energy source in the industrialized world. The existing world energy system was largely shaped by Anglo-American interests that favoured market-driven competition over access to energy resources on a demand and supply basis, which we need to find an answer.

Energy security, with numerous implications for global security, has become a real internationalisation issue for NATO in the aftermath of the Russian annexation of Crimea in 2014. For many NATO in-house energy resources are economic constraints themselves. The rise of the oil industry is intertwined with the rise of capital and international business, and fuel has remained as the dominant energy source in the industrialized world. The existing world energy system was largely shaped by Anglo-American interests that favoured market-driven competition over access to energy resources on a demand and supply basis, which we need to find an answer.

European Security & Defence SPOTLIGHT
 Issue 100/2018
Technology

Issue 100/2018
Technology

Issue 100/2018
Technology

European Security & Defence SPOTLIGHT
 Issue 100/2018
Industry & Trade

Issue 100/2018
Industry & Trade

Issue 100/2018
Industry & Trade

European Security & Defence SPOTLIGHT
 Issue 100/2018
Masthead

Issue 100/2018
Masthead

Issue 100/2018
Masthead

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

Pakistan to Increase Cyber Security

(ck) STM Savunma Teknolojileri Mühendislik (STM) is expanding its business in Pakistan. Following cooperation in naval programmes under the leadership of the

eral Manager; Air Vice Marshal Faaiz Amir, Vice Chancellor of Pakistan Air University; and officials. The agreement will increase the cyber security capabilities of Pakistan Air University, which sets up cyber security strategies of Pakistan and is responsible for the establishment of Pakistan's National Center of Cyber Security (NCCS). STM will provide integrated cyber security, big data and IT domains and organise special training and programmes in cyber security and IT for Pakistan Air University students.

MCM Consortium Presents its Partners

(ck) Belgium and The Netherlands will together procure 12 Mine Counter Measure (MCM) vessels which will be evenly distributed among the two navies. In late 2018 Naval Group and Eca Robotics formed a consortium, to be known as Belgium Naval & Robotics to bid for the Belgian-Dutch MCM programme; Naval Group and Eca Group have collaborated since the 1970s on mine clearing. In mid-December 2018, the consortium

presented the industrial cooperation plan that it wishes to execute as part of the MCM tender. The plan includes 39 partners throughout Belgium and is expected to generate hundreds of jobs over the next 20 years. Among the partners are



Photo: STM

Turkish Presidency of Defence Industries, STM is expanding into cyber security. At IDEAS 2018, STM signed a Memorandum of Understanding (MoU) with the Pakistan Air University for cyber security and IT. The signing ceremony was held with the participation of Mustafa Murat Şeker, SSB Vice President; Murat İkinci, STM Gen-



Photo: Belgium Naval & Robotics

FN Herstal, CMI Defence, TKM Industries and Esterline. Belgium Naval & Robotics proposes to set up an industrial centre of excellence in Belgium to ensure Belgium's strategic excellence in robotics, artificial intelligence, acoustic detection, cyber security, and other very high-added value activities.

Preview

• Focus Issue: International Armoured Vehicles

- Vehicle and Crew Protection
- European Armoured Military Truck Programmes
- Heavy Armament Options for Light and Medium Armoured Vehicles
- Discreet Armour for UN/NGO/Diplomatic Vehicles
- EW/ECM Protection of Armoured Vehicles
- Track Technology Developments
- Runflat Technology
- UK Armoured Vehicles Programmes Update
- Armoured Ambulances
- Remotely Controlled Weapon Stations
- US Army Armoured Systems Programmes
- Specialist Armour and Engineering Vehicles
- Sensors for Combat Vehicles

ESD 1/2019 · January 2019

The advertisement features three main logos: 'COMBAT LOGISTICS' with a green truck icon, the 'UAE ABU DHABI' logo with a colorful globe, and the 'International Armoured Vehicles' logo with a white silhouette of an armoured vehicle on a black background. The text 'IDEX 2019' is written in Arabic and English below the UAE logo.

MITTLER
REPORT

Mittler Report Verlag GmbH

Baunscheidtstr. 11 · 53113 Bonn, Germany
Phone: +49 228 35008 70 · info@mittler-report.de
www.mittler-report.de · www.euro-sd.com



LAZAR
MULTI-ROLE ARMORED VEHICLE



MILOSH
ARMORED MULTI-PURPOSE
COMBAT VEHICLE 4x4 - BOV M16



NORA B52
155 mm SELF – PROPELLED
GUN HOWITZER



MISSION CRITICAL – SEE, BEFORE YOU'RE SEEN

IMAGE INTENSIFIED, THERMAL AND FUSED SIGHTING SOLUTIONS



SAKER FUSED



KESTREL



DRAGON-C 640



DRAGON-S 12



PHOENIX-H



PHOENIX-S

Visit us at IDEX, Abu Dhabi, 17 - 21 February 2019

Email: sales@uk-qioptiq.com | For the latest information visit: www.qioptiq.com