

International Security and Defence Journal

# **Mortar Developments**

- Polish Technical Modernisation Plan
- Naval Warfare: The US View
- Sniper / Spotter Optics
- Urban Assault Technology
- Small Arms Ammunition
- Aircraft Protection
- India's Defence Investment
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## **Editorial**

## European Hubris – Ecologically Packaged



With Brexit the European Union has lost a voice of reason which in recent years was able to prevent the worst from happening by speaking up whenever state intervention was promoted over the market economy, and centralism over the diversity of European identities and concepts of order. Those in Europe who rejoice at the warning that the UK sends Brussels with its departure will soon be longing for the good old days. "If only they had stuck with it", they will say. Perhaps the chance of driving the essentially intransigent European Union to reform would have been far greater.

Now things are turning out the way they should not. Europeans had a first taste of what to expect as soon as the new European Commission – established amidst the usual birth pangs - took office. No one will rule out the possibility that a rapidly growing world population, with its current economic systems, will have an impact on the climate. Nobody will deny that it is the task of responsible politicians to address this issue without joining in the doomsday campaigns of radical anti-capitalists. However, the so-called "Green Deal", of which the new EU Commission, under its President Ursula von der Leven, has championed the cause, does not fulfil its remit. Spin doctors were at work here, with the intention of achieving a PR coup, but neitherclimate experts nor even bureaucrats, with all their expertise in keeping such a complex construct as the EU afloat. Above all, however, and this is something of which the President of the Commission is particularly guilty, an idée fixe of German domestic policy, which can only be understood in a few other Member States, has been elevated to a European paradigm. At the end of the Merkel era, the prevailing view in Berlin is that, soon, a socially acceptable and majority-capable government alliance will only be possible between the once-conservative Christian Democrats and the once left-wing Greens. A common basis for this is being investigated right now in Berlin. But in most EU countries there are neither effective Christian Democrat nor relevant Green parties: those nations still focus on the classic issues of how to combat youth unemployment, maintain standards of living and avoid poverty in old age. There are many countries that are concerned about internal security, and some, particularly in the East of the continent, even external security. Almost everywhere people would like to have an answer to the guestion of manageable, humanitarian migration.

Were the "Green Deal" merely an otherwise inconsequential German imposition on an ultimately uninterested public, or perhaps even an honest attempt to redirect the economy ecologically, without collateral damage to third parties, it could be ignored, or even accepted. However, the fanatical determination with which the new EU Commission seems to want to make over-arching European history through the Green Deal does not allow easy acceptance. In EU countries, the economic and innovative strength of which has been flagging for decades, and which remain mired in a financial crisis that has yet to be overcome, it could spark further massive upheavals. Even though every state and every alliance of states has the indubitable right to weaken itself economically if other goals are valued more highly, and if others are not affected, from the outset the Green Deal is revolutionary. Once again, Europeans know better, have finally discovered a new global political mission, and those who will not listen will be made to suffer. At the World Economic Forum in Davos, von der Leyen put forward the idea that CO<sub>2</sub> duties might be levied on imports from companies - beyond the reach of EU regulations – that undermine European climate policy. Perhaps it would be better in Brussels to consider where and how existing trade barriers that still hamper prosperity might be removed instead of threatening new, ideologically motivated obstacles. If the EU does not put a stop to the euphoric, navel-gazing hubris of its Commission, it will not only increase its disintegration, but it will continue to lose its global relevance.

#### Peter Bossdorf

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## Periscope

#### New UAVs for the Spanish Armed Forces

(ck) Alpha Security and Defense (AS&D) has delivered two ALPHA 800 rotary UAV systems to the Spanish MoD's Materiel Directorate (DGAM). The DGAM will have the two UAVs tested by the UME responder



unit (Unidad Militar de Emergencia). Classified as small drones (<25Kg) the UME has already undergone training and is flying the Alpha 800s in preparation for emergency and disaster relief missions.

A complete ALPHA 800 System includes:

- Two gasoline-powered rotary UAVs with dual sensor optical payload;
- One GCASE DUO ground control station;
- One GTRACK antenna for transmissions and data control.

The delivery of the two ALPHA 800 UAVs consolidates the participation of Alpha Security and Defense in Spain's RAPAZ programme, the objective of which is to evaluate best-of-breed UAVs in each size classification with MTOW <150kg and with proven and tested ISTAR technology.

#### Damen and Blohm + Voss Selected for German MKS180 Surface Combatants

(ck) On 13 January 2020, the German BAAINBw procurement authorities announced the selection of Damen as the preferred bidder for at least four Class MKS 180 multi-role combat ships for the German Navy. Damen is teamed with Blohm + Voss and Thales.The selection of the bid now requires parliamentary approval by the German Government. The ships will be built at the Blohm + Voss shipyard in Hamburg and at other shipyard locations belonging to the German Lürssen Group. Damen intends to spend



around 80% of the total net investment as added value in Germany. The same applies to the electronic systems that are to be supplied by Thales Nederland. Around 70% of the services will be provided by the German subsidiary of Thales and by other German subcontractors. The MKS 180 project contributes to securing the export power of both Dutch and German naval construction in the longer term. The project also opens perspectives for the requested European (defence equipment) cooperation. The Kiel-based German Naval Yards shipyard will take legal action against this procurement decision.

#### Mexican POLA Class Sea Trials Completed

(ck) The Mexican Navy, the Damen Shipyards Group and its subcontractors have completed the successful sea trials of the Mexican Navy's POLA Class frigate ARM REFORMADOR. The trial programme was comprehensive, including testing of platform and combat systems in addition to the training of Mexican Navy crews.



ARM REFORMADOR is the latest example of how Damen forms partnerships with navies around the world to build naval vessels in local yards. Damen has developed a strong relationship with the Mexican Navy over the last decade. This has resulted in the construction and delivery of more than ten naval vessels of various designs. Damen has also worked closely with yards like the ASTIMAR 20 naval shipyard in Salina Cruz, Mexico, the building vard of the frigate. These collaborative efforts are ensuring a significant transfer of technology and knowledge to the Mexican shipbuilding industry. The 107-metre long ARM REFORMADOR is the Mexican equivalent of Damen's SIGMA Frigate 10514 and represents the tenth time that Damen's has built a SIGMA frigate. The unit for the Mexican Navy is a proven design that takes advantageofthe expertise of the Dutch naval shipbuilding industry which comprises renowned research institutes and a dedicated naval cluster of international specialist suppliers such as Thales.

#### Elbit Systems Awarded US\$144M Contract for Small Calibre Ammunition

(ck) Elbit Systems has been awarded a contract by the Production and Procurement Directorate of the Israeli Ministry of



Defense (IMOD) valued at approximately US\$144M (approximately €130M) for the supply of small calibre ammunition to the Israeli Defense Forces. This five-year contract, work on which will commence in 2021, will be a continuation of the existing multi-year contract with the IMOD.

#### First Flight of Eurofighter TYPHOON in Kuwait Air Force Configuration

(ck) On the 23 December 2019, at the Flight Test Centre of Leonardo Aircraft Division in Turin-Caselle, the first Instrumented Series Production TYPHOON (ISPA 6) designed according to the Kuwait Air Force configuration successfully completed its first flight. The aircraft is the first to fly the CAPTOR e-scan radar with Phase Enhancement P3Eb, and this is a key milestone for the entry into service of Eurofighter with the State of Kuwait. This standard is the most advanced variant of the fighter, with a package of capabilities that builds effectively on existing enhancement programmes. A contract for the supply of 28 Eurofighter TYPHOON



multi-role fighter aircraft was signed between the Ministry of Defence of the State of Kuwait and Leonardo on 5 April 2016. Under the terms of this programme, Leonardo acts as Eurofighter's prime contractor. The aircraft is scheduled to enter service with the State of Kuwait over the course of this year. While other aircraft in different Eurofighter partner companies

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are testing specific parts of this configuration, including the development of the escan radar in UK and Germany, this is the first flight of the entire package. The capability package for Kuwait includes the integration of STORM SHADOW and BRIM-STONE and other air-to-surface weapons. Moreover, it foresees the integration of a new advanced laser designator pod (the Lockheed Martin SNIPER Advanced Targeting Pod) that will expand Eurofighter's portfolio of cleared laser designator pods; the introduction of the DRS-Cubic ACMI P5 combat training pod and an enhanced navigation aid (VOR).

#### GA-ASI Concludes Successful MQ-9 Demonstrations in Greece

(ck) General Atomics Aeronautical Systems, Inc (GA-ASI) concluded a series of flight demonstrations using its MQ-9 GUARDIAN Remotely Piloted Aircraft System (RPAS) on 19 December 2019. The demonstrations showcased the maritime surveillance capabilities of the MQ-9, and the GA-ASI-developed Detect and Avoid



(DAA) system for traffic-deconfliction in civil airspace. The flights were sponsored by the Hellenic Air Force (HAF) and the Hellenic Coast Guard (HCG) and staged out of Larissa Air Base in Greece. The flights were performed for an audience of European military and civilian representatives. The MQ-9 configuration demonstrated is operational in the US. Currently GA-ASI aircraft systems support the Italian Air Force, the UK Royal Air Force, the French Air Force, and the Spanish Air Force. The Ministry of Defence of the Netherlands has selected MO-9 for the Royal Netherlands Air Force, and the Government of Belgium has approved Belgian Defence to negotiate the acquisition of GA-ASI's MQ-9B. In early December, the Australian Government announced the selection of MQ-9B for the

Australian Defence Force under Project AIR 7003. GA-ASI RPAS are operated by the US Air Force, US Army, US Marine Corps, US Department of Homeland Security and NASA.

#### IAI to Develop and Build Israel's National Communication Satellite

(ck) Israel Aerospace Industries (IAI) will develop and build Israel's national communication satellite, DROR 1. The satellite



system is intended to meet Israel's satellite communication needsfor the next 15 years. DROR 1 is primarily based on local Israeli technologies developed at IAI, in-



cluding an advanced digital communication payload and "smartphone in space" capabilities, to provide communication agility throughout the satellite's lifetime in space. The agreement signed between the Israeli Government and IAI represents the implementation of the Government's decision from September 2018 to promote a long-term strategy for Israeli satellite communications. This decision stems from the understanding that the capability for communication independence is of critical national importance, as well as enabling the preservation of the knowledge and expertise gained over the past years.

The new satellite will be developed by IAI's Systems, Missile, and Space Group, which is dedicated to developing and building air defence systems, such as the BARAK MX, the ARROW 2 and 3 weapon system, advanced observation satellites, nano-satellites, satellite launchers, as well as the BE-RESHEET lunar lander, which reached the moon in 2019. IAI is the national hub of expertise for radars, satellites, UAVs, civil aviation, and cyber.

#### Iveco Under Contract for FRECCIA

(ck) The contract for the procurement of 30 FRECCIA 8x8 medium armoured vehicles (five combat and 25 anti-tank versions), including ten years of integrated logistics support, was signed on 27 December 2019 at Palazzo Guidoni, the residence of Italy's General Secretariat of Defence and National Armaments Directorate. The FRECCIA VBM is a proven 8x8

Photo: lveco



Armoured Infantry Fighting Vehicle (AIFV) and available in several versions (combat, anti-tank, mortar carrier and command post). The vehicle was developed through cooperation between the General Secretariat of Defence - Directorate of Land Armaments, the Italian Army General Staff and Italian industry. Thanks to a hull designed to provide maximum protection, a powerful Iveco engine coupled with the traditional H-drive, three steering axles, a HITFIST turret with 25 mm cannon and advanced command, control and communications systems by Leonardo, the FRECCIA provide stactical and strategic mobility and force protection combined with firepower adequate for a wide range of operational scenarios. The contract, worth €1.5Bn, takes advantage of funds allocated in the scope of the tri-ministerial convention comprising the Ministries of Defence, Economic Development and Finance. The vehicles will be delivered to the Italian Army Second Medium Brigade.

#### Lockheed Martin Awarded Hypersonic OpFires Phase 3 Contract

(ck) The Defense Advanced Research Projects Agency (DARPA) has awarded Lockheed Martin a US\$31.9M contract for the Operational Fires (OpFires) Phase 3



Weapon System Integration programme. OpFires seeks to develop and demonstrate an innovative ground-launched system to enable a hypersonic boost glide missile system to penetrate modern enemy air defences and rapidly engage time-sensitive targets. The award for Phase 3 of the OpFires programme will take the design from the initial requirements development through the Critical Design Review (CDR) in late 2021. Integrated flight testing is scheduled to begin in 2022, with component and subsystem tests expected in 2021. Hypersonic weapons will provide a survivable and affordable capability that will overcome distance in contested environments using high speed, altitude and maneuverability. They amplify many of the enduring attributes of airpower - speed, range, flexibility and precision. Lockheed Martin has played a significant role in the research, development and demonstration of hypersonic technologies for more than 30 years. The corporation has made significant investments in key technology and capability development - including hypersonic strike capabilities and defence systems against emerging hypersonic threats - and is supporting all branches of the US military on these hypersonic programmes.

#### Link Microtek to Supply Mobile Communications for Type 26 Frigates

(ck) Link Microtek, a manufacturer of optical, RF and microwave products, has received an order worth approximately £750,000 from Rohde & Schwarz to supply its AZDEC secure optical MLC (mobile local communications) systems for installation on the first three of the Royal Navy's planned class of eight Type 26 frigates, which are due to enter service from the mid-2020s. Rohde & Schwarz is responsible for the supply and integration of all communication systems on board the new Type 26 vessels, having been selected for this task by prime contractor BAE Systems. The AZDEC optical MLC system provides naval personnel with secure, interference-free voice communications while allowing them to roam away from their base positions, unhindered by any trailing wires. There are no RF emissions and the optical signals cannot be intercepted by any conventional method, so it is impossible for anyone to jam the transmissions or eavesdrop on what is being said. The company will be supplying complete systems for installation on HMS GLASGOW, HMS BELFAST and HMS CAR-DIFF, together with smaller-scale versions for the land-based integration facility that is used to test and verify the functionality of



the entire Type 26 communication system. Deliveries will be completed by 2021. The picture shows a typical AZDEC optical communications system in use on the bridge of HMS IRON DUKE, one of the Royal Navy's Type 23 frigates.

#### Germany Procures ENFORCER Missiles from MBDA

(ck) MBDA has been awarded a contract for ENFORCER missile systems for the German Armed Forces by the German Federal Office of Bundeswehr Equipment, Information Technology and In-Service Support (BAAINBw). Signed on 20 December 2019, the contract will fulfil the German requirement for a lightweight, day/night, precision-guided, shoulder-launched weapon system with an effective range of more than



1,800m. ENFORCER provides low-collateral precision effects capabilities against the threat from lightly armoured static and moving targets, targets behind cover, and against targets at long range, also in urban environments. ENFORCER is the result of a multinational MBDA development effort, and will complement the WIRK-

MITTEL 90 shoulder-launched unguided munition capability in the German Armed Forces. MBDA is now set to complete qualification, and prepare for series production. The modular design of the ENFORCER system enables a range of future development options, including a prospective 'family' of ENFORCER munitions for land, air and sea applications.

#### Northrop Grumman **Completes Initial In-Water** Sonar Testing

(ck) Northrop Grumman Corporation's AQS-24 mine hunting sonar recently completed initial in-water testing of a nextgeneration Deploy and Retrieval (D&R) payload. Operated from the Mine Countermeasures Unmanned Surface Vessel (MCM USV), the AQS-24 D&R demonstrated that unmanned operations needed to perform a mine hunting mission off the MCM mission package aboard the littoral combat ship (LCS). The MCM USV tests are ahead of planned user-operated evaluation system testing of the AQS-24 on LCSs. The company has multiple versions of the AQS-24 to provide mine hunting capabilities for navies. The AQS-24B is a deployed system which uses side-scan sonar for real-time



detection, localisation and classification of bottom and moored mines in addition to a laser line scanner for precise optical identification. Integration of the AQS-24 sonar with USVs allows for the real-time transmission of all AQS-24 data to a remote sonar operator, who can then commence real-time mission analysis (RTMA) of all recorded mission data. RTMA significantly reduces MCM detect-to-engage timelines, as well as the real-time reacquisition and identification of bottom mines following traditional mine hunting sorties.

#### Northrop Grumman to Lead IAMD IBCS Software Transformation

(ck) Northrop Grumman Corporation has been awarded a US\$70M, 28-month contract to transform the software development process for the US Army's Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS) to an agile development framework. Under the contract, awarded by



the Aviation Missile Technology Consortium (AMTC), Northrop Grumman and the US Army will partner to prototype an agile development process in order to build, test and field capabilities faster to respond to current and emerging needs. As part of the Agile Technical Insertion initiative, IBCS was designated among a number of high priority programs to adopt an agile development methodology to enable maturation of the system. With its open systems architecture, IBCS allows incorporation of current and future sensors and effectors, and enables interoperability with joint C2 and the ballistic missile defence system. This modular open system architecture optimises the benefits of agile techniques and methodologies, including frequent, ongoing and rapid "agile sprints" to develop and test incremental software advancements. This transformational approach will enable greater responsiveness to current and emerging needs that support mission objectives and avoid costly rework later in the development cycle. Designed to connect the force for unified action against evolving threats, IBCS is a net-centric command and control system for the air and missile defence mission. IBCS enhances battlefield survivability by creating a resilient self-healing network of all available sensors that can reduce and eliminate vectors of attack while providing operators with a single integrated air picture of unprecedented accuracy and a broader defended area. IBCS is managed by the US Army Program Executive Office for Missiles and Space, Redstone Arsenal, Alabama.

#### Northrop Grumman IR **Countermeasure System Completes Flight Testing**

(ck) Northrop Grumman Corporation's Common Infrared Countermeasure (CIRCM) system for the US Army has successfully completed free flight missile testing at White Sands Missile Range. As part of this test,



the CIRCM system was presented with engagements in both single and multiple shot scenarios while mounted to an aircraft that hangs from an aerial cable. The successful completion of this testing is a significant milestone on the path to full rate production, indicating that CIRCM is ready to help protect US Army aircraft from infrared threats. CIRCM is a lightweight countermeasure system that uses laser energy to defend rotary wing, tilt rotor and small fixed wing aircraft against infrared threats. Its modular, open systems architecture allows it to be integrated with systems and sensors to address current and emerging threats.

#### 10,000+ R&S M3SR Software **Defined Radios Delivered**

(ck) Today's secure radio communication solutions must meet demanding radio frequency (RF) requirements as well as



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provide high operating reliability. Rohde & Schwarz's software defined radios (SDR) are optimised for stationary and shipborne secure voice and data communication. Rohde & Schwarz's manufacturing plant in Memmingen, Germany has achieved a milestone: more than 10,000 R&S M3SR SDRs have been delivered. A majority of the delivered SDRs encompass the R&S M3SR Series 4400 VHF/UHF radios for line-of-sight (LOS) communication. The plant in Memmingen is the centre of competence for mission-critical equipment. Capabilities include electronic module assembly, microelectronics, microwave engineering, final production, and manufacturing of test equipment for most of Rohde & Schwarz's own products. The plant has a calibration laboratory that is accredited by the German accreditation body (DAkkS) and an antenna test chamber that is unique throughout Europe. The SDRs offer customers a wide range of system interfaces and waveforms, including standard and proprietary frequency hopping waveforms, as well as radio communication in line with all relevant NATO standards. Military data transmission methods such as LINK 11 and LINK 22 are supported. To ensure that existing radio communications systems remain up-to-date, their functionality can be enhanced through subsequent software updates and, if necessary, by using new hardware modules. The SDRs are in use with international navies, and in mobile military and civil ATC tower applications around the world.

## Rheinmetall to Supply the Bundeswehr with 1,000 trucks

(ck) At the end of December 2019, the German Bundeswehr ordered a thousand logistic vehicles from Rheinmetall worth €382M. The order is the third call-off from a framework contract, signed in July 2017, encompassing over 2,200 military trucks which the Bundeswehr is purchasing as





part of its "Unprotected Transport Vehicles" project. Of the thousand vehicles ordered in December, 675 have a five-ton payload, while the remaining 325 have a load-carrying capacity of 15 tons. Starting in January 2020, the trucks will be built at the Rheinmetall MAN Military Vehicles GmbH (RMMV) plant in Vienna, with deliveries to be completed by the end of the year. Most of the principal components - the engines, axles, transmissions and build-ons - are made in Germany. Featuring a basic military configuration, these robust, off-road-capable vehicles will be available to support the Bundeswehr's Very High Readiness Joint Task Force (VJTF) 2023 mission. Awarded by the Federal Office for Bundeswehr Equipment, Information Technology and In-Service Support (BAAINBw) on 5 July 2017, the framework contract, which covers a period of seven

years, encompasses a total of 2,271 vehicles from RMMV's HX family. As a first step, 558 vehicles were ordered immediately. A further call-off of 252 vehicles followed in May 2019, and another 60 in November 2019.

#### CAMCOPTER® S-100 Deployed in River Pollution Crisis

(ck) Schiebel's CAMCOPTER<sup>®</sup> S-100 was deployed as a first emergency response providing critical situational information dur-



ing the Kim Kim river toxic pollution crisis in Malaysia. In March 2019 more than two tons of illegal chemical waste were dumped in the Kim Kim river, which is located near Johor, the largest industrial area in the South of Malaysia. As a result, toxic fumes were released throughout the adjoining area affecting more than 6,000 people with many being hospitalised and numerous schools being closed. In collaboration with the Malaysian Armed Forces the Malaysian Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) called for a first emergency disaster response to analyse and scan the polluted river and adjoining area. The CAMCOPTER<sup>®</sup> S-100 was the Unmanned Air System (UAS) of choice and was deployed from March to September 2019 to gain situational information. The UAS was operated by day and night for a total of approximately 30 flight hours. The CAMCOPTER® S-100 was equipped with FLIR Systems Star SAFIRE 380-HDc, which delivers stabilised multi-spectral imaging and intelligence functions.

## Drone Systems, a Rising Activity of Naval Group

(pb) Exploring new on-board operational capabilities : this is the challenge addressed by the Naval Group teams in close collaboration with the French Defence Procurement Agency and the French Navy. Different design, development and deployment activities are centred around the integration of drones on board vessels. The challenge is a stimulating one: the projects are advancing quickly and new opportunities are opening up on the international markets. The "adventure" started in 2016. As a result of successful experiments on board the offshore patrol vessel L'ADROITt, Naval Group installed a drone system on the amphibious helicopter carrier DIXMUIDE. This was first deployed in stand-alone mode, in other words without being linked to the combat system but controlled by a console developed by Naval Group and housed in a shelter on the flight deck. A second shelter, in the aviation hangar, was used for vehicle maintenance. "Our goal was to study the impact of its presence on board and evaluate the safety measures before expanding the range of its functions", explains Audrey Hirschfeld, Work Package Manager, who is working on the programme for new operational capacities on amphibious helicopter carriers. The trials took place in May 2017, off the coast of Montpellier. "Gathered on the visual defence bridge, at dusk, all eyes fixed on the drone, we all held our breath until it took off", recounts the engineer, recalling the emotion of the teams in front of the screens of the Operations Control Room, which showed the images from the drone's camera. "It was our best reward", she continues. With some great successes in the FREMM frigates and GOWIND® corvette programs under her arm, Audrey Hirschfeld was one



of the first to join the project, attracted by the collective challenge. This first trial campaign has proven convincing: Naval Group has been entrusted with the study and sustainable integration of the drone system into the helicopter carrier's combat system. Further campaigns confirmed the expectations. Embarked on the Corymbe mission in September 2017, in the Gulf of Guinea, followed by the Jeanne d'Arc campaign, the drone system gradually revealed its full potential for surveillance and reconnaissance missions. In the medium term, a complete drone system - with two airborne vehicles, new payloads - should equip each helicopter carrier. Integration on the TONNERE is foreseen for 2020 and the deployment on board the MISTRAL could follow soon after, while at the same time offers on the international market are underway.

# Modular Combat System (MCS) by ZASTAVA ARMS, Serbia

Following the trends in tactical requirements for the use of automatic rifles, Zastava Arms has developed a new MCS model. Compared to other manufacturers, Zastava Arms went a step further by offering a rifle that, in addition to easy barrel replacement and the ability to use barrels of different lengths, also allows for calibre change and the choice between a conventional 7.62x39mm and a new 6.5mm calibre. At the same time, cation is reflected in the design of the cross latch on the receiver, which allows easy and quick replacement of the barrel, without disassembling the rifle and without the use of tools. In addition to barrels in different calibres, within a single calibre, there are different barrel lengths (254mm and 415mm), allowing the rifle to quickly adapt to a variety of combat situations, so that basically the same weapon can be used as a subma-



The design of the Zastava Arms MCS rifle is based on the Kalashnikov system.

in support of this concept, Prvi partizan Uzice developed a 6.5mm calibre cartridge based on cartridge 6.5 Grendel for military purposes. The reason for the introduction of the new calibre is that the 6.5mm cartridge has a number of ballistic advantages over 7.62x39mm that allow for significantly greater range, as well as better efficiency and penetrating power at all distances, while maintaining all vital parts of the rifle, requiring just the replacement of the barrel and magazine to change to a different calibre. Easy change of calibre has a number of logistical advantages in terms of easy adaptation to various environments.

The design of the MCS rifle is based on the existing rifle platform by which the Zastava Arms is recognisable, a derivative of the Kalashnikov system. The modifichine gun, automatic rifle, light machine gun, or DMR (designated marksman rifle). Changing the calibre of the rifle also requires the change of magazine, and the magazines are clearly marked and noticeably different. Magazine capacity for calibre 7.62x39mm is 30 rounds and for calibre 6.5mm, the magazine capacity can be 25 and 20 rounds.

The rectilinear upper side of the receiver has a full-length Picatinny rail. In the receiver cover there is a centrally mounted charging handle (like the HK 416 model), allowing for easy handling for both righthanded and left-handed shooters. The charging handle is of non-reciprocating type, that is, it does not move with the bolt carrier and the bolt. Fire selector is ambidextrous, positioned above the handgrip and easily accessible without re-



leasing the grip in combat. The positions of the selector are safe, semi-automatic and automatic. The rifle has no integrated iron sights, but a long Picatinny rail on the cover allows the sights to be mounted according to tactical needs. The stock is telescopic, with 5 predefined lengths, folding to the right. Cheek pad is adjustable, in two positions. The rifle is able to operate when the stock is folded. The receiver cover is made of aluminium, and the handguard andguard is made of glass fibre reinforced polymer with Picatinny rails at 12 and 6 o'clock, and lateral Kholes that allow the assembly of a wide variety of optoelectronic equipment. By removing the handguard, the supporting devices can also be mounted on the cylinder carrier, which also has K-holes, thus establishing a firm and stable connection with the rifle.

The rifle has a gas flow regulator. The flash hider on the muzzle is also a muzzle brake, and the standard thread on the muzzle also allows the assembly of other muzzle devices.

The rifle's ergonomics are remarkable because, in addition to ambidextrous commands (charging handle, magazine release, fire selector), the shape of the stock and weight distribution ensure a balanced system without major recoil. The weight of the rifle with an empty magazine is less than 4 kg.

The MCS rifle represents a significant step forward in the offer of Zastava Arms models, and the fact that it is in the phase of testing and adoption into the armament of the Armed Forces of the Republic of Serbia speaks about the importance of this model and the applied concept.

## SECURITY POLICY

# Russia's Strategic Game in Africa

#### **Stephen Blank**

Despite the flood of news stories about Russian activities in Africa, far too many Western observers still refuse to take Moscow's African policies seriously enough.

Any Western observers argue that Moscow lacks the resources to compete with either the US or China, that its interests are mainly economical, e.g. oligarchs' Russia's African policies, like those in the Middle East from which they partly emerge, are fundamentally strategic and long-standing. Though they are constantly evolving,



*Russia has pursued various avenues to strengthen its position in Africa, the Russia-Africa Economic Forum 2019 in Sochi being one of them.* 

enrichment, or circumventing sanctions, not strategic. Allegedly, Russia has no genuine African strategy; its activities are limited to a handful of fragile authoritarian corrupt regimes. Therefore, despite is vaulting ambitions, it is not a serious strategic challenge. Consequently, the West need not become unduly alarmed about Russia's activities across Africa. This essay argues otherwise.

#### Author

**Dr. Stephen Blank** is a Senior Fellow at the American Foreign Policy Council. He is the author of numerous foreign policy-related articles, white papers and monographs, specifically focused on the geopolitics and geostrategy of the former Soviet Union, Russia and Eurasia. He is a former MacArthur Fellow at the US Army War College. they are by no means as limited as some analysts would argue, and utilise all the instruments of power available to Moscow, often in innovative ways.

#### **Russia's Return to Africa**

First, Moscow's return to prominence in Africa did not begin yesterday. Neither is it only due to the impact of sanctions in 2014 though it admittedly accelerated after 2013-14. But, and second, that is not only due to sanctions. Russia's ongoing record of success in the Middle East has clearly encouraged it to expand all the dimensions of its influence across North Africa, the Sahel and Sub-Saharan Africa. And in this quest it also has obtained supporters or enablers from the Middle East, most notably the UAE. Russia welcomed the apparently Chinese initiative of 2010-11 to bring South Africa into the BRICS partly to thwart an apparent US-India initiative in Africa. And the BRICS organisation, whose avowed purpose is the reconstruction of a different international order itself is a largely Russian initiative. Inasmuch as Russia regularly invokes the BRICS as an alternative to and mechanism intended to counter US economic-political supremacy, the inclusion of South Africa, even if its inclusion was economically justified, has served as a base from which Moscow could enhance ties to Johannesburg and return to Africa. Moreover, Russia regularly uses BRICS summits as platforms for its African initiatives, like creating the BRICS Development Bank, which sponsors African among other initiatives, and its Russia-Africa summit of 2019.

Third, current bilateral relations do not serve as the only vehicle by which Moscow retains a positive image and basis for lasting influence in Africa. The Soviet Union's support for many African independence movements during the Cold War still evidently fosters positive African thinking about Russia, at least among veterans of such wars like Angolan President Joao Lourenco, if not others. Certainly Vladimir Putin and his subordinates frequently invoke that support when they are discussing Africa or talking to African leaders.

Moscow's African policies also span the entire continent. In Egypt, Russia provides weapons, conducts air defence exercises and supports the movement of General Haftar in Libya that Egypt supports; it provides or offers nuclear power to countries like Ethiopia, offers help against terrorists in the Central African Republic (CAR), send political technologists and private mercenaries to influence governments in Libya, Madagascar and Mozambique, offers economic and energy deals, if not weapons, all over the continent, and so forth.

#### **Political Technology**

Indeed, Moscow is actively seeking to influence governments across the entire continent. Russia has sent "political technologists" to at least 20 African countries. That is hardly a limited operation. The term "political technology" prevalent across the former Soviet space might perhaps be best described as "a euphemism for what is by now a highly developed industry of political manipulation." Thus, it is also targeting African voters with disinformation campaigns as in the US and Europe. Election rigging may be commonplace in Africa, but Russia has sought to influence elections in Nigeria, Libya, Madagascar South Africa, Mozambique, and across Africa. In Nigeria, Russian hackers allegedly conspired with the People's Democratic Party and its candidate, Alhaji Atiku Abubakar, to rig the presidential elections. Similarly, the Wagner private military fighters sent to Libya participate in election rigging along with other Russian elements in Madagascar. In Libya, their operatives have discussed rigging elections on behalf of General Khalifa Haftar, Moscow's chosen candidate against the current Libyan government. In Madagascar they sought to co-opt candidates who could then drop out and allow their favoured candidate to win. Meanwhile in South Africa, Russian operatives created a think tank to act as a vehicle to tarnish Mmusi Maimane, the DA leader, and Julius Malema, the populist leader of the far-left Economic Freedom Fighters. The team drew up documents, obtained by the investigators, that listed its proposed tactics, ranging from "generating and disseminating video content" and "coordinating with a loyal pool of journalists" to find ways "to discredit" the opposition.

This is hardly a record of activity of a country that thinks that it cannot or should not compete with China. Indeed, Russian elites fully grasp that their resources are limited in regard to China or the US. Nevertheless, they do not see this as a barrier to their ability to compete in areas where Russia has a comparative advantage, for example, in nuclear energy, or to utilise the instruments of power available to it in creative and innovative ways, e.g. the use of so called "political technologists", or private armies, whether they operate in Libya, the CAR, Mozambigue, Madagascar, or are selling hydrocarbons or nuclear reactors and power plants to Ethiopia and others. In other words, Russia's resources are creatively and imaginatively deployed across the entire span of Africa and, as the October 2019 Russia-Africa summit showed, Russia's sense is that it is only beginning to recover its rightful claim to a place in the African sun.

#### **Russian Goals**

Neither are Russia's goals primarily or purely economic, e.g. circumventing sanctions or enriching oligarchs. To be sure, those are prominent goals and we cannot deny that those objectives may drive oligarchs along with their desire to respond to the government's demand for classic (albeit modernised) forms of Muscovite state service or suggestions that contributing to the expan-



*In recent years, Moscow has been ramping up military and political ties with African nations.* 



South African President Cyril Ramaphosa receiving Russian President Vladimir Putin at the 2018 BRICS Summit in Johannesburg.

sion of Russia's global influence would stand them well with Putin. Obviously, the support of such people as Yevgeny Prigozhin or Konstantin Malofeev who have bankrolled private military forces in Africa, the Middle East, and the Balkans is laced with the expectation of rewards from the state in return for assuming substantial risks. Yet in the final analysis, they are state actors not individual entrepreneurs or even analogies to Western mercenaries or corporations like Blackwater. Since their wealth and position are wholly dependent on the state, like medieval servitors, they are obliged to support or even to anticipate its initiatives, e.g. expanding Russian influence globally, whether it be in Ukraine, Syria, the Balkans, or Africa. Indeed, these private mercenaries exemplify the innovative quality of Russian policy by using so called private forces to minimise the burden of both risk and expenditure in "gray area scenarios" across the globe in order to advance Russia's agenda.

Apart from minimising the burden of risk and expenditure to the government and the state budget, these private military companies also appear to be important elements in an evolving Russian military strategy for projecting power abroad to prevent or abort socalled colour revolutions, or exploit conflicts in the Third World where they can be turned to Russia's advantage. Africa, like Syria before it, is plagued with many such conflicts and can duly serve as a laboratory for the refinement of this concept of operations. Considerable evidence suggests that Russia is building a template for global expeditionary forces in these conflicts where it can, at minimal expense and risk to its own budget and military, intervene as it sees fit to exploit either insurgencies against pro-Western re-



Putin has revived relations with Egypt, which were already very good in Soviet times. Egypt is now one of the strongest Russian allies in Africa. Depicted is a meeting between Putin and Egyptian President Abdel Fattah el-Sisi on 11 December 2017.

gimes or support the regimes against alleged Western-inspired "colour revolutions". The only political criteria seem to be if there is a pro-Russian force of sufficient capability that can be utilised by Moscow for its objective, and second, as in Syria, if it can keep the level of intervention below the point where it would galvanise a serious Western response.

#### **Force Deployment**

Although these deployments of private military forces, advisors, and/or SSpecial Forcesremain small, in the hundreds, there is no authoritative account of just how many private military forces like Wagner, or official Russian military personnel have been deployed to Libya, Mozambique, Central African Republic, and Madagascar. Nevertheless, all these cases of military and political intervention, taken in tandem, reflect not only tactical opportunism, but also clear strategic thinking. Indeed, we see a template for global expeditionary operations along with a matching force structure coming into being.

Specifically, the template consists of a Russian force structure combining Russian regular forces, including Special Forces, as a command and control centre that integrates these regular Russian army, navy, air, and air defence forces as needed, private military companies (PMCs) like Wagner, intelligence assets from the GRU or FSB, or who are linked to these PMCs, irregulars or paramilitary forces, or regular forces in the host country. And this template can then be adjusted or tailored to the specific requirements of the theatre in question while, in the meantime, political operations like election-rigging, intervention and information warfare campaigns in these countries, active measures, and influence operations can

occur simultaneously. Thus, Moscow uses Africa to conduct the military equivalent of a laboratory test to verify this emerging new paradigm of foreign wars and crate its own conventional global expeditionary forces.

#### **Russia`s African Laboratory**

But these deployments, taken together, suggest the implementation of a new Russian approach to Third World conflicts in which Moscow is essentially creating global expeditionary forces based on small, but integrated land, air, and air naval forces, leveraging private military forces, either insurgents or regular forces in the country, and paramilitaries as in Syria to effectuate pro-Russian political change and resist supposedly Western organised colour revolutions. Essentially, Moscow is now developing in its "African laboratory" techniques first used in Syria to suppress what it perceives as "colour revolutions" against its interests throughout the Third World and/or Europe or to launch its own uprisings on behalf of pro-Russian forces and leaders. In this "laboratory" it is developing a new formula for a global Russian and pro-Russian expeditionary forces melding both Russian and indigenous, regular, private, and irregular forces integrated by Russian command and control centres.

In conformity to this evolving template we see not only intensified efforts to sell African states Russian weapons, but also efforts to lay the basis for expanded joint military operations with them and for projecting Russian military power to Africa. In November 2019, the South African, Russian, and Chinese navies conducted joint exercises off the coast of South Africa for "joint actions to ensure safety of shipping and maritime economic activity". Similarly, Egyptian paratroopers have participated in annual joint exercises with Russian and other foreign troops in Russia and Egypt since 2017. And as part of this evolving template or concept of operations Russia is also learning how to project power to Africa if necessary. For example, Tu-160 strategic nuclear-capable bombers and their support aircraft flew to South Africa in October 2019 as part of a "diplomatic deployment not unlike a similar earlier deployment in 2018 to Venezuela.

All these activities are intended to give flesh to Defense Minister Sergei Shoigu's earlier statement that the Russian armed forces are now capable of performing remote missions. In view of the sustained improvement of Russian military and weapons capabilities over the last decade this observation is not merely an apercu but very likely a policy statement. Certainly it conforms to Shoigu's 2014 statement about the Russian Navy's global aspirations. At the same time as Moscow was first occupying Crimea, Shoigu proclaimed on 26 February 2014, Russian Defence Minister Sergei Shoigu announced progress in talks with eight governments to establish a global network of airbases to extend the reach of Russia's long-range maritime and strategic aviation assets and thus increase Russia's global military presence. Shoigu stated, "We are working actively with the Seychelles, Singapore, Algeria, Cyprus, Nicaragua, Venezuela, and even in some other countries. We are in talks and close to a result." Shoigu cited Russia's need for refuelling bases near the equator and that "It is imperative that our navy has the opportunities for replenishment." And in May 2014, Deputy Defence Minister Anatoly Antonov announced that Russia is negotiating to establish support facilities in unspecified Middle Eastern countries, although we can guess that Syria, Cyprus, and Egypt are the most likely ones. These moves show why Russia's domination of the Black Sea is critical for power projection into the Mediterranean and Middle East. Thus, Russia's activities in and around the Black Sea and Eastern Mediterranean comprise parts of a larger, even global anti-American and anti-NATO ambition where naval forces and contingencies play a significant role.

#### The Russian Navy`s "Ocean Strategy"

In a recent speech the CINC of the Navy, Admiral Viktor Chirkov referred to the Navy's "ocean strategy" and the large-scale procurement campaign underway to realize this vision. According to Chirkov, the aim of this strategy is "to ensure the state's interests and the security of its maritime economic activity in the various regions of the seven seas." Clearly the aspiration is for a global oceangoing naval capability. While the first mission



might be homeland defence, naval tasks obviously will far transcend that requirement which is all the Russian navy could effectively do after 1991. Along with the invocation of this strategy, Chirkov outlined a programme to build the capabilities and infrastructure necessary to sustain it: a new carrier, nuclear powered destroyers, frigates and corvettes, and air capabilities.

Given the constraints on shipbuilding, which are formidable and of long standing, i.e entrenched in the system, this can clearly only be a long-term strategy. But if we look at Africa as well as the Middle East, we see real strides being made to realise this vision. In Sudan Omer Bachi offered Bur

Sudan, Omar Bashir offered Russia a base in return for support against his opponents. This fell through but Moscow is still trying. Somaliland and Eritrea have, however, offered Moscow bases that it now uses. Moreover, there is no doubt that it seeks bases in Alexandria, Egypt in general, Libya, Algeria and probably across Sub-Saharan Africa. Moreover, the quest for bases also encompasses army bases, not just air and naval bases as in the aforementioned cases. Certainly Moscow appears to be on the verge of obtaining a base in the CAR supposedly at the request of its government. Since "power projection activities are an input into the world order," Russia's activities clearly represent an effort to bring African governments into a pro-Russian position on major issues in world politics and crate lasting spheres or a sphere of influence there. Indeed, Russian commentators do not refrain from proclaiming Russia's objectives and perspectives. For example, the expert Andrew Korybko writes that, Russia's dispatch of specialists to the Congo Republic (Congo-Brazzaville) in order to maintain military equipment completes Moscow's plan of creating a corridor of influence across the continent from the Sudanese Red Sea coast to the Congolese Atlantic one via the Central African Republic, which therefore greatly increases the chances that it will ultimately succeed with its grand strategy of becoming the supreme Afro-Eurasian "balancing" force in the New Cold War.

Thus Russia's presence in Africa aims to reinforce the sources of

its domestic elites' wealth and power, influence African states to follow Russia's lead and example, and support its policies like the UN. Russia also seeks to corrupt African elites and states and where necessary degrade governance across the continent while also creating conditions for more violence and more foreign military intervention. Those policies also aim to gain leverage on African air, ground, and naval bases to challenge Europe and NATO in the Mediterranean and the West in key waterways like it and the Red Sea. Moscow also seeks to weaponise the Muslim migration issue by its activities and influence here. And it also clearly seeks leverage upon energy sales to Europe, Africa's natural market. Given the orchestration of all the admittedly limited instruments at its disposal and its now constant efforts to improve its capacities for operating in Africa, including the use of information warfare, influence operations, and so called active measures, it is the height of recklessness or of wilful blindness to grasp the rudiments of strategy to suggest that Russia not only cannot compete in Africa or pose a strategic challenge to the West. In fact, it already does so here as France and the US can attest. And it fully intends to do even more to destabilise the international order and retain a lasting influence in Africa.



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# Viewpoint from **Yerevan**





# Russian-Turkish Relations Through the Prism of Armenia's Security Concerns

#### **Gayane Novikova**

Decent developments in Eurasia and the Middle East require a Tre-evaluation of the security environment and the roles of each regional and sub-regional actor. Against the background of trends in global security politics, Russia and Turkey have become key actors in the Wider Black Sea and the South Caucasus regions, as well as in Syria. Their ambitions and competition for dominance in these areas possess a permanent character; their interaction can be described as a love-hate relationship, owing to their serious disagreements on the one hand and shared strategic interests and concerns on the other hand. Russian-Turkish bilateral relations are strongly defined by their relationships with global actors, such as the US, the EU, and NATO. Any problem with any of them forces Russia and Turkey to overcome, or to neglect, their disagreements with each other and to move gradually toward a strategic partnership, - meanwhile remaining competing regional powers with overlapping and/or conflicting interests. The current stage of their "love affair" is based on several factors:

Turkey and Russia share frustration regarding US policies in Eurasia

- and the Middle East;Both are under US and EU sanctions, and are viewed as outsiders
- Both are under Os and EO sanctions, and are viewed as outsiders in international politics;
- Their ambitious and, in the meantime, problematic supplier (Russia) – consumer (Turkey) partnership in the energy field;
- A growing and strengthening bilateral military cooperation (that very much annoys the US, as well as Turkey's NATO partners);
- The personal relationships of President Vladimir Putin with his Turkish counterpart, Recep Tayyip Erdoğan, build on their similar leadership style; it includes pronounced elements of authoritarianism and strong criticism of the West for latter's "weakness" and inability to act properly in critical situations.

The main issues that can – under certain circumstances and beyond fluctuations in the economic sphere – complicate the Russian-Turkish relationship are: a) the annexation of Crimea by Russia in 2014 (Turkey supports the territorial integrity of Ukraine and views Russia's action as illegitimate); b) the Syrian Civil War, in which both regional powers initially supported opposing forces and currently jointly control the northern part of Syria; and c) the unresolved Nagorno-Karabakh conflict. Russia and Turkey are reshaping and recalibrating their foreign policy priorities, and invading each other's the areas of strategic

interests. Meanwhile, their interaction directly influences the regional security environment.

Competing with Russia in the South Caucasus, Turkey has been exploiting all of the contradictions that exist between Russia and Azerbaijan, and Russia and Georgia. To a certain degree it has succeeded in increasing its influence in these two regional states, above all through several economic and communication projects. The case of Armenia lies in a different plane.

#### **Historical Memories**

Among the three South Caucasus states Armenia is the most sensitive and vulnerable to any shift in Russian-Turkish relations. This vulnerability is historically grounded. The beginning of the 20<sup>th</sup> century was marked by the Genocide of Armenians in the Ottoman Empire; it reached its peak in 1915. Since that time, Turks in general are viewed by Armenians (especially, in the Armenian Diaspora) as eternal enemies; conversely Russians are perceived as saviours and liberators. However, another factor - territorial losses as a result of Russia's politics – contributes to a cautious approach to Russia's geopolitical ambitions and to its "brotherhood" with Turkey. Two episodes embodied in the historic memory of all Armenians delineate their approach to the Russian-Turkish relationship. In March 1918, the Bolshevik government signed the separate Brest-Litovsk Treaty with three Empires - the German, Austro-Hungarian, and Ottoman, as well as with Bulgaria – to withdraw Russia from WWI. Among other territorial concessions, Russia agreed to transfer historical Armenian land, the Kars province, to Turkey.

#### **Territorial Losses**

Ataturk's revolution and the establishment of the Republic of Turkey coincided chronologically with the Bolsheviks' desire to export the Russian revolution. An alliance with Turkey was considered by Soviet Russia as strategically important. As a result, in March 1921, Vladimir Lenin and Mustafa Kemal Ataturk (leaders of the Russian Soviet Socialist Republic and the Grand National Assembly of Turkey, respectively) signed the Treaty of Moscow (or "Treaty of Brotherhood"), which defined the state borders between Turkey and three Transcaucasian Republics: Armenia, Georgia, and Azerbaijan. The historical Armenian province of Nakhichevan was placed under the jurisdiction of the Azerbaijani SSR, which was much more loyal to Bolshevik Russia than Armenia. Another territory – Nagorno-Karabakh – a few months later, in June 1921, was also transferred to Azerbaijan, this time in accordance with a decision made by the Caucasus Bureau of the Russian Communist Party. Both events were accompanied by ethnic clashes between Armenians and Azerbaijanis and both strongly contributed to Armenians' perception of Azerbaijanis as Turks.

At present, several issues in the Russian-Turkish relationship directly influence Armenia's strategic interests and security. The absence of bilateral Armenian-Turkish diplomatic relations and Russia's role as the main external security provider for Armenia aggravate and complicate the situation even more.

#### The Nagorno-Karabakh Conflict

Without going into the details, it should be mentioned that the collapse of the Soviet Union and the 1991-1994 war in Nagorniy Karabakh (between the self-proclaimed Nagorno-Karabakh Republic, the former Autonomous Nagorno-Karabakh region of Azerbaijan, and the newly-independent Republic of Azerbaijan) revived Armenians' painful historic memories. During the Karabakh war, Turkey provided military and economic assistance to Azerbaijan and, very significantly, in 1993 unilaterally closed its border with Armenia. The Armenian-Azerbaijani border is also closed. Although Turkey's attempt to participate directly in the war was prevented by Russia, it continues to intervene actively into the Armenian-Azerbaijani negotiation process under the aegis of the OSCE Minsk Group (Russia, the US, and France are its co-chairs), blaming it all for being ineffective in resolving the Nagorno-Karabakh conflict. Turkey supports Azerbaijan's efforts to change the format of the MG by including Turkey (and Germany) as its co-chair. Even more, Turkey demands, as a precondition for opening the border with Armenia a resolution of the Nagorno-Karabakh conflict exclusively on the basis of Azerbaijan's territorial integrity.

If Turkey unambiguously takes sides and continues fully to support Azerbaijan despite existing bilateral disagreements, Russia could not allow itself to make a choice. Therefore, it has supported both parties to the conflict during the war; it has become a mediator and, ironically, it supplies offensive and defensive weapons to both Armenia and Azerbaijan.

Against this background, the intensifying Russia-Turkey military cooperation poses some serious concerns in Armenia. The most recent developments are related to a deployment of the first part of the Rus-





Putin and Erdoğan giving a joint press conference following talks in the Black Sea resort of Sochi, 22 October 2019

sian S400 TRIUMF air defence system at Mürted Air Base in Ankara province. Rumours exist that the second batch of this missile defence system can be deployed close to the Armenian border. Upon request from the Turkish side its delivery has been postponed for a while. However, on 1 November 2019, Turkey acknowledged that it received an offer from Russia to buy its Sukhoy SU-35S fighter jets. (Armenia's arsenal includes the S300 missile defence system and Sukhoy SU-30SM jets.)

Gradually strengthening its positions in the South Caucasus, Turkey is also trying to balance the Russian military presence in this region (the 102nd Russian military base is stationed in Armenia) initiating preparations for building its own military base in Nakhichevan (Azerbaijan). In accordance with the Azerbaijani-Turkish Protocol, signed on 3 July 2016, the Azerbaijani government allocated "buildings and structures in Gizil Sherg military town, and one terminal building located in the airfield in Haji Zeynalabdin Tagiyev settlement" for the use of the Turkish Armed Forces. The existence of a Turkish military base in close proximity to the Armenian border will pose a security threat if an overt conflict between Armenia and Azerbaijan breaks out.

#### The Syrian Challenge

Syria has become a new serious challenge in the Russian-Turkish interaction. However, it contains also an "Armenian" segment. On 8 February 2019, Armenia deployed its humanitarian mission in Syria. Transportation and security of 83 Armenian specialists were carried with Russia's assistance. Turkey's offensive operation, which started on 23 October 2019, in northern Syria against the Kurdish-led militia alliance, revived certain memories among Armenians; some sources called it "genocide." This operation has brought to the surface concerns regarding the lives and safety of several hundred Armenian families living in this area. Presumably upon the request of the Armenian government, Russia persuaded Turkey to exclude from their jointly-controlled zone the town of Qamishli, where from 420 to 450 ethnic Armenian families still live, according to various sources.

In sum, the fight against terrorism (remains of ISIS, in particular) constitutes the only issue where Russian, Turkish, and Armenian interests coincide. In all other cases, especially regarding any possible developments in the Nagorno-Karabakh conflict, Armenia should be very cautious in evaluating any shift in Russia-Turkey bilateral relations. The Armenian government is working on a new National Security Strategy that hopefully will address current dangerous trends. A draft was discussed in November 2019.

# China's Submarine Fleet in the Arctic

#### **Debalina Ghoshal**

China's growing interest in the Arctic has become a worrying factor for the Pentagon. There is concern that as Chinese activities in the Arctic increase, so does China's military presence in the region. This article analyses the likelihood of such a scenario, as well as possible logistic support facilities for Chinese submarines.

n January 2018, China published its White Paper 'China's Artic Policy'. It clearly identifies the economic opportunities that the Arctic has to offer and the trade routes that will be made possible by the melting of ice in the region. In addition, it makes clear that countries outside of the Arctic region - those that do not have territorial sovereignty in the region - enjoy certain rights, including "scientific research, navigation, overflying, fishing, laying submarine cables and pipelines on the high seas and other relevant marine areas in the Arctic Ocean", and rights to explore and exploit resources in the area under treaties such as the United Nations Convention on the Law of the Sea (UNCLOS) and general international law. Ultimately, China hopes to develop a "Polar Silk Road" similar to the "Belt Road Initiative" (BRI). The White Paper also mentions security as a crucial role for China in the Arctic.

#### **China's Arctic Policy**

China has already developed an icebreaker called XUE LONG (which means SNOW DRAGON in Chinese). China is also focusing on nuclear-powered icebreakers, just like the Russians. According to James Stavridis, a former NATO Supreme Allied Commander, icebreakers are the key to two crucial elements which make the Arctic so strategically attractive. The first is the enormous wealth of hydrocarbons that are exposed when the ice melts. Some estimates suggest two trillion cubic feet of natural gas and almost 100 billion barrels of oil. Icebreakers open up the logistical routes for the construction

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Chinese scientists on board the icebreaker XUE LONG set up a drift ice camp to study the cracks in the Arctic ice.



Using the transport costs for LNG from the Yamal gas field to China, the researchers were able to show that the Western route via the Suez Canal is almost 25% more expensive than the Northern Sea route through the Arctic Ocean. The Western route takes 48 days and the North Sea route only 35 days.

of oil and gas platforms and, by opening new shipping routes, they are also part of the BRI.

All these activities would have to be accompanied by a military presence in order to safeguard China's interests in the region, also in view of its rival - the US. According to US intelligence Chief Dan Coats, China's military capabilities and reach will continue to grow as it invests heavily in the development and deployment of modern weapons, and Beijing will use its military clout to increase its political and economic influence.

China has already stepped up the militarization process in the South China Sea (SCS), a region it considers economically and strategically crucial. China has placed anti-ship missiles and surface-to-air missiles in the region. At present, China already operates six JIN class SSBNs that can carry 12 JL-2 submarine launched ballistic missiles (SLBMs) with a range 7200 km and that constitute China's 'first viable sea-based nuclear deterrent.' There is little doubt that these SSBNs would patrol the region to strengthen its deterrence visà-vis the US in the SCS.

#### A Polar Silk Road

In the long term, China could also make its SSBNs patrol the Arctic. According to reports, China has already taken steps to deploy sophisticated command and control systems and refine associated processes to ensure the integrity of a more dispersed nuclear force, including road-mobile intercontinental ballistic missiles and submarine deterrent patrols. China wants to have its submarines patrolling far away from China in the SCS and possibly in the Arctic. However, submarine operations in the Arctic require technological sophistication from China, as submarines there cannot rely on GPS and have poor communication capabilities. In the future, China wants to develop ports, airports and military bases in the Arctic. There is also a high probability that

China will cooperate with Russia to protect its port facilities against the common enemy - the US. China has already developed artificial islands in the SCS and is heavily militarising these islands. China is also making progress in deploying floating nuclear power plants in the region and can build similar capabilities in the Arctic to exert its influence there as well. This would not be surprising as Russia is already using floating nuclear reactors there. They provide electricity to Arctic port cities and industrial infrastructure and enable Russia to achieve its goals. However, floating reactors in combination with nuclear submarines would be beneficial, as the submarines could protect the nuclear power plants from hostile attacks in times of crisis.

#### Floating Nuclear Power Plants

If China plans to station floating nuclear power plants on an aircraft carrier in the Arctic, it may need nuclear submarines to protect them. Moreover, the Arctic nuclear power plant could become a recharg-





The attack submarine USS SEAWOLF surfaces through Arctic ice at the North Pole. Submarine operations in the Arctic are tricky as submarines there cannot rely on GPS and have poor communication capabilities.

ing point for the nuclear submarines patrolling the area. Nuclear submarines can also give China more opportunities to study the climatic conditions in the Arctic, as US Navy submarines currently do. Russia will operate unmanned nuclear submarines in the Arctic in the future and it is likely that China will follow suit. Russia and the US have already begun to strengthen their military presence in the resource-rich Arctic, and, therefore, China will not want to be left behind. Analysts have found that the discovery of nuclear submarines is difficult there for three reasons. First, differences in salinity resulting from multiple layers of temperature cause acoustic refraction. Second, Arctic waters are much 'louder' than other oceans, which is caused by the shifting and breaking of ice, creat-



The Russian floating nuclear power plant AKADEMIK LOMONOSOV

ing acoustic camouflage that confuses listening devices. Third, ice can become an obstacle to submarine defence. During the Cold War, the Soviet Union had already operated the Kola base to receive

its SSBN fleet, namely the TYPHOON and

DELTA IV-class nuclear submarines. In 2019, Lt. Gen. Robert Ashley, director of the US Defence Intelligence Agency, warned that Russia was conducting secret nuclear weapons test in remote Arctic regions. In 2019, Russia also launched its largest nuclear submarine - the BEL-GOROD in the Arctic port of Severodvinsk and has capability for deep sea operations, such as small nuclear reactors on ocean floor to power secret military installations in the Arctic. Another nuclear submarine – the LOSHARIK – has also operated in the Arctic collecting samples to prove that the Lomonosov Ridge and Mendeleyev Ridge were a part of the Russian continental shelf. In fact, Arctic remains the primary home for Russian nuclear ballistic missile submarines although the US SEAWOLF attack submarine (SSGN) already stayed submerged under Artic ice in 2015 while the OHIO class SSBNs have been converted to SS-GNs and arm land attack cruise missiles. Attack submarines, on the other hand, are being assigned the task of detecting and chasing SSBNs. The US also sent the USS HARTFORT SSN in 2018 in the Arctic to cruise along Arctic waters.

#### The Northern Sea Route

The Russians operate the SSBNs in the Arctic region because they want to control the Northern Sea Route (NSR). To this end, the Russian Army are preparing to monitor airspace and secure the NSR. Russia has also expressed interest in cooperating with China on the NSR, and according to Russian Deputy Prime Minister Maxim Akimov, Russia wants to cooperate with the Chinese BRI in developing the NSR. This is because the development would require considerable investment and because it would be economically advantageous for Russia to cooperate with China due to the current sanctions.

Amid these developments, not only will China want to deploy its SSBN fleet in the region, but owing to the SSBN threat from Russia, China could also work towards deploying a sophisticated SSGN attack submarine fleet in the region as a deterrent against adversaries' seabased deterrence. China will also realize the importance of possessing a SLBM/ SSBN fleet that is capable of under-ice operation. In fact, not only does Russia host the SSBN fleet in Arctic, it also has deployed an SSGN attack submarine thereby, strengthening its sea-based offence-defence posture in the region. Chinese trade routes in the NSR would need to be secured to allow for a safe passage of goods. For this, a sea-based deterrent would be needed to allow the Chinese Navy to patrol the region in order to ensure the safe passage of resources. In addition, placing a nuclear submarine with an intercontinental range SLBM force, especially with multiple independently targetable re-entry vehicles (MIRVs) capability, holds strategic significance vis-à-vis the US given that US mainland is within the reach of a Chinese counter-strike and second strike capability. China is also developing hypersonic glide vehicles (HGVs), which can be mounted atop their SLBMs too thereby, further strengthening their deterrence posture in the Arctic.

As submarines are easier to remain undetected in shallow waters, especially in ice-covered shallow waters than in deep seas and hence, the Arctic would provide a greater scope of survivability for Chinese submarines strengthening their nuclear deterrence vis-à-vis the US.

Operating submarines in those harsh conditions, however, will be a cumbersome task owing to the harsh conditions and also the icey- conditions that would become a variable factor. China would need to pay heed to such factors. Hence, thorough preparation will need to be made before setting nuclear submarines for patrol in the region. Breaking through ice for communication will remain a challenge while finding open water surrounded by ice hat does not freeze will require careful analysis on the ocean. The US Navy uses systems like side scan sonar, conductivity temperature and pressure detectors as a well as Submarine Radio Video System for detecting the best locations available to surface the submarine.

There is little doubt that China will not want to be left behind in exerting its influence in the Arctic. Military build-up had been suspected to be a key component in China's BRI and there is little doubt that it will be any different with China's 'Polar Silk Route' initiative.

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# Viewpoint from **Tbilisi**



# Russia's Strategic Response to the Euro-Atlantic Security Framework

**Beka Kiria** Director of the Gagra Institute

Before the Russian-Georgian war in 2008, Russia threatened the USA and NATO members with the suspension of the CFE Treaty at the end of the year, mainly in protest against the USA's missile defence plans in Eastern Europe. Later, at the Bucharest Summit, Putin personally warned NATO members not to grant the Membership Action Plans (MAP) to Georgia and Ukraine. As a non-NATO member, Russia vetoed the further expansion of the Euro-Atlantic security architecture, which was ultimately supported by Germany and France. However, the communiqué of the NATO summit in Bucharest included the promise that Georgia and Ukraine would one day become NATO members.

Instead of facing the challenges to world security and the international legal order after the Russian occupation of Georgia, Obama's government initiated a reset policy with Russia in 2009 and renewed cooperation to address the nuclear programs in Iran and North Korea. In addition, a new START treaty offered to reduce the number of strategic warheads deployed by 30% to 1,550 and to limit the number of ICBMs and SLBMs to 700.

#### **Obama's Reset Policy**

Obama's policy of reset was aimed at tackling the challenges of world security together with Russia. The main idea of Obama's policy was to avoid a new confrontation with Russia. In response, Russia cooperated with the US on sanctions against Iran and North Korea. Specifically, a new START policy was agreed on 9 June 2010, which assured Moscow that it would vote in favour of UN Security Council Resolution 1929, which provides for sanctions against Iran. Russia has also made a significant contribution to the implementation of US policy in Afghanistan. Moreover, the main result of the reset policy was to address the most urgent international security challenges. Despite Obama's accomplishments, US-Russian relations deteriorated and negative results soon overshadowed his achievements.

Obama's reset policy served to secure the European security framework and to reorient Russia towards international issues. But in the end, it significantly deteriorated the Euro-Atlantic security framework and prompted the US to apply the Pentagon's European Reassurance Initiative. The initiative included the transfer of an armoured brigade combat team to Europe with several thousand US soldiers and hundreds of military vehicles to the 60,000 American soldiers already stationed there, some of whom were brought forward on NATO's eastern flank. In 2010, Russia became exceedingly critical of the arrest of Russian spies in the US and abstained from the UNSC decision on the no-fly zone in Libya and was highly averse to the ousting of Gaddafi.

US foreign policy tried to shift Russia's focus from Euro-Atlantic security to international cooperation on nuclear issues. Obviously, however, this was not a coherent policy package and did not lead to short-term stability. In contrast, it led to a very aggressive stance by Russia, which resulted in increased hostility from the Kremlin and military campaigns first in Georgia, then in Ukraine and later in Syria.

It is legitimate to ask whether the reset policy served the interests of the United States and whether it succeeded in distancing Russia from the Euro-Atlantic sphere, at least temporarily, and in directing Russian focus to international cooperation in return for short-term stability in the Euro-Atlantic security framework. Was the policy of cooperation with Russia effective in preventing future Russian hostile operations in Ukraine and avoiding the current state of Syria?

#### **Deteriorating Relations**

Despite the positive momentum created by Obama's policy of resetting relations between the US and Russia, thousands of protesters in Moscow who opposed Putin's re-election became a turning point for the Kremlin. The Russians blamed US Secretary of State Hilary Clinton personally for her interference in Russian domestic politics and especially in the protests organized against Putin.

Almost parallel to the Moscow protests, Ukrainian President Viktor Yanukovich fled the country after mass protests broke out in Kiev because he refused to sign the association agreement with the EU. The Kremlin regarded the Kiev protests as a campaign orchestrated by the West. After the expulsion of Yanukovych, however, Russia quickly conquered the Crimea and later the Donbas region. Surprisingly, within a year of the events in Ukraine, Russia launched an air strike campaign in Syria and established several new military bases there. In light of the major failure of Western policy after years of cooperation with Russia, the restitution policy seemed to rest on a deliberate naivety towards Russia.

As a legacy of the Obama administration, which has realigned its strategy and commitment to Russia, Donald Trump was elected president with Russia's support. U.S. intelligence agencies reported that Russian hackers intervened in the U.S. election to influence it in favor of Donald Trump and undermine public confidence in the U.S. democratic process. The Obama administration underestimated Russia's role and how cyber-hacking could be used to interfere in the US electoral system.

Because of the series of failures in US policy towards Russia, current US-Russian relations are suffering under the heavy burden. Due to the failure of the Obama administration and the missed opportunities, the US strategic options are limited. The US can only react by imposing sanctions against Russia - for its actions in Ukraine and Georgia, for interfering in elections, for its attacks in Salisbury and Syria.

#### **Russia`s Political Take**

In essence, Russia's political approach focuses on Germany and France in order to weaken and undermine the Euro-Atlantic security framework. All Russian efforts have been aimed at ensuring that there should be no security framework or arrangement on the European continent without Russia's leading role.

Within the framework of transatlantic relations, there is therefore a wide gap between US and Franco-German positions. Germany regards the Nord Stream 2 pipeline as a commercial enterprise and turns a blind eye to the political consequences, arguing that Russian gas is 25 percent cheaper than American liquefied natural gas (LNG) shipped to Europe. However, the Americans see the project against the background of Russia's growing hostility in the European Union's eastern neighbourhood, and it should be in the European Union's interest to cool down the conflict between Russia and Ukraine. The EU should therefore support Ukraine's role as a transit country and intensify its efforts to end the conflict.

Although Russia has sent GRU agents to the French Alps to conduct secret operations, President Macron sees NATO as a "brain-dead" alliance. He also defends his "brain-dead" statements about NATO, arguing that China and Russia are not enemies of NATO. Following Macron's remarks about NATO, Russian leaders claim that European security institutions are outdated and the Euro-Atlantic security structure is unstable and unable to respond to new challenges. Therefore, Moscow does not consider NATO and the EU as equal partners. According to the Kremlin's vision, there should be no Euro-Atlantic security arrangement without the Russian leadership. Moreover, Russia should play a central role in the Euro-Atlantic security framework.

#### A Russo-centric Security Arrangement

Russia's strategic response is to undermine and dismantle existing security arrangements. Russia is engaged in hybrid warfare that destabilizes and undermines the current security structure in the hope of creating a new Russian-centric security arrangement based on the Franco-German axis. After the Russian-Georgian war in 2008, Russian leaders proposed a new European Security Treaty (EST) to Euro-Atlantic security member states by publishing a new treaty containing standard phrases such as respect for members, territorial integrity, conflict prevention, and so forth. The treaty explicitly underlined the fact that Moscow dominates the Russian sphere of influence, and a new security structure should focus on Russia. In short, Russia sees its role as a central orbit in a future security structure. Ac-



A mural on a bombed-out house in Gori, Georgia, shows a Russian aircraft dropping ordnance. The caption reads: "The Price of Independence".

cording to Medvedev: "Today, Russia is not part of any politicomilitary alliance... Yet we are interested in our voice being heard in Europe... We would like to have a platform on which we could discuss a variety of issues".

As long as the Euro-Atlantic security structure exists, Russia will try to undermine it and replace it with a framework geared towards Russia. Those Russian ambitions developed after the Cold War and aimed at reshaping the current Euro-Atlantic security framework. The Russian assertiveness projected by the post-Soviet conflicts is based on the Franco-German tripartite axis with Russia in the Euro-Atlantic security space - through the organisation of intelligence bases in the French Alps and support for the Nord Stream 2 project. All the three members of the axis emphasise Russia's strategic position - without Russia's leading role there should be no security arrangement.

# **EU Counter-Terrorism Strategy**

#### Andreea Stoian Karadeli

In 2003, the European Security Strategy was underlined with: "Europe has never been so prosperous, so secure nor so free." in 2016 a completely different picture is drawn: the European Union Global Strategy acknowledges that the "Union is under threat," and that "we live in times of existential crisis, within and beyond the European Union."

During the thirteen-year period, the security landscape of the EU has deteriorated, reflecting also the global trend. The conflicts in the Middle East and in other areas have affected the EU both directly and indirectly through foreign terrorist fighters, refugees, terrorist attacks, economic volatility and increases in mass migration. Among the most im-

complex and evolving threat represented by terrorism still needs a uniform, coherent, comprehensive and efficient strategy from the EU, with the full support of its Member States.

The roots of the European Union are motivated by economic and political objectives, while the counter-terrorism cooperation appeared on the agenda



In response to the London bombings of 7 July 2005, the UK drafted the first version of the "European Union Counter-Terrorism Strategy".

portant subjects of the global strategy, the EU counter-terrorism agenda, has been losing ground, being divided between the official "shared vision, common action" and the reality of "individual perspectives, bilateral acts". Today, the

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Andreea Stoian Karadeli is freelance researcher based in Turkey and a PhD 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. later on, as a reactive-measure to certain key events, without promoting a common understanding of the phenomenon among the member states in the first place.

#### Before and After 9/11

The European community acknowledged the threat of terrorism in 1970s and decided that an intergovernmental platform was necessary to ensure the exchange of information. The roots of the EU counter-terrorism policy are found in the creation of an informal body, independent of the European Community's institutional structure: TREVI (Terrorisme, Radicalisme, Extrémisme et Violence Internationale). The fight against terrorism has been seen as primarily a member state competence, although, in the past years, the Global Strategy has promoted more cooperation among the Member States and external partners in this regard. The 9/11 terrorist attacks represented a turning point for the EU's vision of counter-terrorism. Previous to 2001, cooperation in the field of counterterrorism was not carried out within the EU's institutional framework. Acknowledging the threat and its complexity has pushed the EU officials to develop a common platform that could ensure the cooperation for their citizens' safety. This act was, in fact, the EU's response to the tragic events in the United States.

In line with this action, the EU's counterterrorism agenda has proved to be mainly 'crisis-driven', while four major shock waves have marked its evolution: the 9/11 attacks; the Madrid and London bombings; the Syrian civil war and rise of ISIS, the foreign (terrorist) fighters phenomenon, and the attacks on Charlie Hebdo, the Bataclan and Brussel/Zaventem; and the Nice and Berlin attacks and a series of small-scale attacks featured by lone perpetrators that were radicalised at home, in the online environment. Therefore, in the aftermath of the 9/11 terrorist attacks, in June 2002, the EU adopted its first action plan, the Framework Decision on Combating Terrorism, providing a common definition of terrorist offences across Europe. Secondly, in response to the London bombings of 7 July 2005, the UK drafted the first version of the "European Union Counter-Terrorism Strategy" which was adopted in December 2005. The first strategy became the foundation for further developments and was based on four main pillars: prevention of "individuals from turning to terrorism", protection of "citizens and infrastructure by reducing the vulnerability to attacks", pursuit of terrorists as well as the disruption of their support networks and response such as managing and minimising the consequences of terrorist attacks.

#### The EU Counter-Terrorism Strategy

The "European Union Counter-Terrorism Strategy" adopted in 2005 also provided the foundation for future EU counter-terrorism cooperation with non-EU countries and international institutions. Today, the EU cooperates with international organisations and bodies including the United Nations (UN), the Global Counterterrorism Forum, the Global Coalition against ISIL/ Da'esh, and the Financial Action Task Force (FATF). The EU counter-terrorism strategy has developed both within and outside the EU borders.

On 28 April 2015, the European Commission adopted an improved European agenda on security which became the major policy instrument defining the EU response to security challenges. The main three priorities identified in the agenda are: terrorism and radicalisation, organised crime, and cybercrime. The action to be taken was further specified by a number of action plans adopted between 2015 and 2018: on firearms and explosives (2015); strengthening the fight against terrorist financing (2016); strengthening the European response to travel document fraud (2016); protection of public spaces (2017); preparedness against chemical, biological, radiological and nuclear security risks (2017); and on maritime security (2018).

The Global Strategy on the European Union's Foreign and Security Policy (EUGS) was released in June 2016, highlighting concerns about terrorism and other threats that have increased on European soil and beyond over the past decade. In the strategy's mission statement, terrorism is no longer seen as a main threat but rather the primary danger facing the EU. The EUGS also looks at opportunities that lie ahead to preface its vision for the EU to tap its potential and use the tools it has at its disposal to address five key priorities: the security of the Union; the state and societal resilience to the East and South; an integrated approach to conflicts; cooperative regional orders; and global governance for the 21st century.

## An Integral Part of the EU Global Strategy

The current EU counter-terrorism strategy has been given its current form as an integral part of the EU Global Strategy, which provided the context for its further development and action plan. Looking at the EU Global Strategy as a whole, the first message given points to the "existential crisis" that reaches the Union and beyond. The Strategy identifies the main threats that the European Union is facing in the current security landscape such as terrorism, migration, conflict, porous borders, cyber threats, climate change and environmental degradation. The terrorist threat is emphasised in the context of foreign and security policy, underlying the importance to prevent and counter violent extremism. Secondly, the European Union's Global Strategy provides clear guiding principles in the form of the values shared by the Member States: unity, engagement, responsibility and partnership. The guiding principles pave the way for the main priorities of the Global Strategy. All of these are succinctly articulated and provide enough direction to follow when it comes to promoting resilience, taking an integrated and joined-up approach, as well as working with a wide array of governmental and nongovernmental partners. However, coherence in the form of an action plan is less obvious or accessible. The final section of the Global Strategy – "From Vision to Action" - seemed to provide the material for the set of coherent actions that are designed to carry out the guiding policy. Although this last section begins with an emphasis on the credibility of the Union, followed by responsiveness and cooperation for the following steps, the Global Strategy lacks clear exemplification of strategies and instruments to be used to address the security challenges. Bearing in mind the evolution of terrorism in conjunction with radicalisation and the pressures of migration that all combine to feed extremist narratives and present a vexing challenge to practitioners and policymakers, the nicely-packed EU Global Strategy remains just a beautifully-shaped surface.

Taking the EU counter-terrorism agenda out of the Global Strategy and analysing its development so far, the main criticism has been identified in the lack of uniformity, coherence, comprehensibility and efficiency of its elements. The EU counter-terrorism agenda has been elaborated as a result of a crisis-driven process that hasn't provided the necessary time and context for an in-depth understanding of the general trend and its causes. The foundation for a uniform EU counter-terrorism strategy should be provided through a common understanding of the main concepts involved such as terrorism, radicalisation and extremism. Although the EU provides a definition of these concepts to be accepted by the Member States, the national perspectives that have been sculptured in time through various experiences and conflicts, provide different understandings of these already sensitive subjects. Moreover, the individual capacity of decision of the Member States in regard to their national counter-terrorism strategies have provided the space for the different strategic interest to be manifested, while sovereignty has only been given up only when it fit the national interest. As a consequence, EU member states prefer bilateral and informal cooperation and intelligence sharing. Yet member states' inability or unwillingness to act as a col-



Jihadists returning from Syria are a major terrorist risk. It is important to sever their networks in order to reduce the long-term threat.

lective when it comes to counterterrorism is not the only problem.

Although the first pillar identified in the counter-terrorism strategy is to prevent, the EU has put more effort in combating terrorism rather than preventing it. From the perspective of terrorism seen as a crime, the EU strategy has avoided the complex side of the phenomenon which involved personal, societal, psychological, economic, cultural, and ideological factors. In this way, the focus has been on the symptoms, rather than the causes of terrorism. For instance, the strategy should integrate the self-assessment element that would identify the factors that contributed to the radicalisation in the first place such as: the environment in the place of origin, the lack of efficient social policies for youth, the lack of access to education, the lack of jobs for the new generation or the lack of psychological support for the youth in their communities.

Moreover, caught in the crisis-and-reaction process, the EU counter-terrorism strategy was also affected of the pressure put by the expectations coming from the population after every terrorist attack. Although the pressure should motivate the responsible official bodies towards a more effective strategy, it pushed them in an abyss of unrealistic deadlines and short-term measures that, once again, were aimed to cure the symptoms and not the real causes of the problem. different ideological backgrounds, but showing common elements in terms of modus operandi.

Daesh lost its territory in Iraq and Syria, but it is still present on the online platforms accessed by the citizens, and in the hearts and minds of hundreds, maybe thousands of sympathisers unknown



In response to the terrorist attacks in Paris, the French have set up new anti-terrorist units. Shown here is an assault team of the Groupe d'Intervention de la Gendarmerie Nationale (GIGN).

While the EU's counter-terrorism efforts are commendable, they have, to a large extent, been crisis-driven – reactive rather than proactive – although this is gradually changing. Still, member states are the major players in counter-terrorism. That means that when it comes to designing, implementing, and following a policy or issuing legislature, member states have the final say. The same is also true for each country's intelligence agencies. The EU's actual role is merely in coordinating member states' individual counterterrorism strategies and ensure operation within a common framework.

Despite various criticism regarding its Global Strategy and counter-terrorism agenda, the EU is a key actor in international affairs that is now facing a complex system of threats and needs to adapt continuously and to respond immediately when it fails to prevent.

#### **Current Challenges**

Today the EU is facing the terrorist threat in its most complex form, coming from

by the authorities. The phenomenon of foreign terrorist fighters resulted in more than 5,000 citizens from the EU who travelled to Syria and Iraq. The first wave of EU foreign terrorist fighters - between 2011 and 2013 - caused an increase in the number of terrorist attacks after 2014. According to the database developed as part of my research on the Daesh phenomenon in the EU, the countries that provided the highest numbers of foreign terrorist fighters among the EU member states also suffered from the deadliest terrorist attacks committed by returnees in the period between 2014 and 2019. Throughout the European Union, after the declaration of the Caliphate and up to present, at least 10 attacks were proved to be planned and conducted by the returnees in France, Belgium, Finland and Germany.

The foreign terrorist fighters' phenomenon also has a long-term effect which is much dangerous in its various ramifications. There is no complete record of the people who travelled to the conflict zone since the beginning of the war in Syria. The EU member states, except Germany, have proven reluctant in repatriating their foreign terrorist fighters. While important measures have been adopted related to returning foreign fighters, including increased information exchange on identification and the detection of suspicious travel, significant challenges remain. For example, gathering legal evidence to support prosecutions and proving specific actions on the battlefield can be very difficult. This reason pushes the governments to let their citizens in the insecure prisons in Syria and Irag, places that become radicalisation heavens for the future terrorist groups.

## The Women and Children of Daesh

In the same way, the women and children of Daesh do not represent a priority for the EU member states or for the EU counter-terrorism strategy. The controversy between the fundamental human rights and security together with various political and legislative concerns have made EU member states reluctant to repatriate captured foreign nationals, even in the case of the ones who have not been directly involved in violence. Thousands of fighters, women and children are in the custody of the US-backed Syrian Defence Forces in Syria. That is the new generation of jihadi terrorists, just being formed as a consequence of our reluctance in assuming responsibility and taking action to repatriate our citizens. Organised repatriation should be planned at EU level immediately, at least for women and children, in order to reduce the long-term threat

Home-grown terrorism and online radicalisation is visible among various groups' propaganda, especially Daesh, al-Qaeda and right-wing groups. Most of the perpetrators of the attacks on European soil in recent years, although with a salafijihadist ideology, were European citizens, born in Europe and radicalised without even leaving Europe. The digital environment offers easy ways to radicalise: the use of social networks, the darknet and encrypted communication channels such as Telegram for spreading propaganda, training and for recruitment purposes.

The digital environment also increases the level of cyber risks, emphasising the necessity to protect critical infrastructure. Even though such complex cyberattacks have not yet been realised, the chances for skilled individuals to be recruited and to conduct such attacks is very high. Firearms and explosives are also an important threat for the security of the EU citizens, as news of old ammunition found in the hands of right-wing extremist groups are spreading. So far, in the case of the terrorist attacks witnessed in the EU between 2014 and 2019, explosives were used in 8 terrorist attacks, while firearms were used in 17 terrorist attacks (personal database).

The foreign fighters' phenomenon and the high terrorist threat have challenged the principle of free movement across EU internal borders and exposed flaws in external border control and also in the share of information between member states. Another threat that should be tackled by the EU counter-terrorism strategy is the process of radicalisation in prison, which was observed in some member states. Two terrorist attacks carried out in 2018 (Liège and Strasbourg) were executed by individuals radicalised in prison. Many prisons are not sufficiently equipped to hold jihadists and fully prevent them spreading extremist ideology and searching out vulnerable individuals to groom. Prison staff lack sufficient training as well.

#### **Suggestions**

Terrorism is a multidisciplinary concept and counter-terrorism should definitely be understood as an interdisciplinary task. To start with, a better and common understanding of the phenomenon is needed and, in this regard, research is also necessary to better understand why people become terrorists and how terrorists operate and communicate but, more importantly, how they think. Beyond terrorism as a crime, its complex dimensions, such as the social and psychological ones, should be analysed. The research should not focus on the symptoms of terrorism, but it should rather aim at identifying the causes of the phenomenon, starting with our own societies, communities, groups and families. An ongoing research programme established by the EU Commission called 'Horizon 2020' is tangentially relevant, but the topic of terrorism does not seem to be at the focal point of this project, and little to no priority appears to be given to researching the backgrounds and causes of terrorism. The Radicalisation Awareness Network is also a great step ahead, but the platform of experts should be continuously challenged through various projects and used to its maximum potential. Such projects should include frequent reports, analysis, expert meetings, and suggestions for policymakers. Investing in applied research in

terrorism would be helpful to the overall EU counterterrorism strategy in the long-term.

The EU has been identified with the concept of "soft power" and should use the experience it has in order to develop its role in counter-terrorism as a "soft power" actor that promotes international cooperation based on intercultural dialogue and common understanding of threats. In the vicious cycle of terror and counter-terror, repressive measures and strong-arm approaches are often implemented. Unfortunately, they only succeed in nourishing the extremist narrative, leading to even more terrorism. The more dividing the threat becomes, the more unity should be promoted, and the EU has the power, the experience and the legitimacy to act and develop its soft-power strategy based on what it does best. Measures should aim to empower youth in the affected communities within the EU Member States and to provide the social policies necessary to fight the elements that caused radicalisation in the first place. The role of the family and community should be acknowledged and treated accordingly, with measures that will provide the necessary infrastrucnise the importance of investing in building public resilience rather than responding (and appealing to) public fear. Ending this vicious cycle would eventually be in the EU's best interest.

And beyond any measure, the EU counter-terrorism strategy should be humancentric and prevention-driven instead of state-interest focused and crisis-driven. Instead of over-estimating the threat, acknowledging the human face of the threat should redirect the attention to the various dimensions of the phenomenon and, further on, to the causes of radicalisation within our own borders.

#### Conclusion

The EU's future depends on if and how it manages to achieve a nuanced counterterrorism strategy both within its territory and outside in its various partnerships and alliances. Furthermore, the extent to which the ongoing Brexit will affect the EU's efforts in this area remains to be seen. Some might argue that the bilateral agreements between member states will continue unaffected by the Brexit, but they can never ensure unity



Hundreds of mourning people during a vigil at the Place de la République in remembrance of the victims of the November 2015 Paris attacks.

ture for these families and communities to have access to information and to be able to reach and to be easily in the reach of authorities. Moreover, the new strategy should aim at building trust between affected communities and authorities, in order to provide the advantage before the terrorist groups. The EU needs to recogand cohesion to the EU counter-terrorism strategy. Instead of struggling to create a different, 'hard-power' oriented identity, The EU should focus on its 'soft-power' capabilities and opportunities in further developing a united, comprehensive and efficient counter-terrorism agenda to face the evolving threat.



# Viewpoint from Copenhagen

# Denmark's Current Security Threat Perception



The days when Eisenhower said; "In war nothing is more important to a commander than the facts concerning the strength, dispositions, and intentions of his opponent, and the proper interpretation of those facts", have long gone, if you read the Danish Defence Intelligence

Risk Assessment issued in December 2019. The focus is now shifting as it is no longer a given that consensus and convergence will prevail within the traditional alliances and cooperation patterns. Pursuit of national interest will increasingly complicate such cooperation. At the same time, the rule-based world order is being tested. The assessment was finalised on 20 November 2019 and as the world situation changes so rapidly that a report might be obsolete when it is released in print, there might already be changes to some parts of this assessment, for instance in relation to Libya, Syria, Iraq and Iran.

This annual Risk Assessment collates the key threats and several other issues abroad that have an impact on Denmark's security and strategic interests.

This year, the Risk Assessment starts out with a chapter on the Arctic as an area that the interests of the great powers have a direct impact on, an area which is of growing significance for Denmark. In addition, just as in recent years, the main points of emphasis are on Russia, the cyber threat and the threat of terrorism. Those are the subjects dealt with in this viewpoint. But it can be mentioned that China's growing global influence is also subject to this year's Risk Assessment.

Besides, separate chapters consider the Middle East, parts of Africa, and Afghanistan, all of which will continue to pose foreign and security policy challenges to the Kingdom of Denmark.

In relation to the Arctic, the Arctic states are still cooperating on regional issues. However, the military focus on the Arctic is growing; even the Arctic nations have a shared ambition to keep the region out of security policy disagreements. The United States has enhanced its military focus on the Arctic and aims for a stronger role for itself in the region in order to prevent Russia and China from increasing their regional influence. Security policy developments in the Arctic will also affect Denmark's freedom to manoeuvre in the Arctic. An interesting observation in this context is that even bilateral relationships have deteriorated since the Ukraine crisis; the relations on the Arctic are characterised by pragmatism and dialogue in the Arctic Council. Nevertheless, it should be mentioned that Russian combat aircraft deployed to Nagurskoye Airbase could guickly reach the north-eastern parts of Greenland, and by using long-range missiles or air-to-air refuelling they would have the ability to attack the United States' Thule Air Base.

It is still likely that Denmark may become the target of a Russian influence operation with little or no warning. Russia has conducted influence operations in 2019 on social media and Russia continues its long-term efforts to build up a capacity to influence political decision-making beyond its own political sphere, including in Denmark.

The relationship between Russia and Denmark is also affected by the tensions between Russia and NATO in the Baltic Sea Region. Russia regards Denmark's support to the EU sanctions after the annexation of Crimea and the force contribution to NATOs enhanced Forward Presence in Estonia as an expression of its confrontational course towards Russia. In this context, it is worth mentioning that Russia has deployed a tank regiment, an ISKANDER missile brigade and three new missile corvettes to the 11th Army Corps, Kaliningrad.

#### J. Bo Leimand

Another area of interest in the paper is the cyber threat. The cyber threat is still among the most serious threats against Denmark and Danish interests, especially the threat of cyber espionage and cybercrime.

The attempts of cyber espionage from foreign states are purposefully directed against the Danish Foreign Ministry and the Danish Ministry of Defence. The interests of foreign states focus on information related to NATO, EU and the Arctic. This threat directed at foreign policy and defence policy will continue in the long term and may affect Danish interests in the short-to-long term.

In the worst case, cybercrime may prevent private companies and public authorities from delivering critical services. Some foreign countries are actively seeking to steal intellectual property and other types of commercial data from Danish companies. The costs of those attacks run up in millions of Danish kroner. Finally, a few words on terrorism. The assessment describes that today the main threat to the West emanates from lone wolf terrorists and small cells capable of launching relatively simple terrorist attacks requiring little planning and limited resources. Propaganda and detailed instructions on how to build a bomb and to launch a terrorist attack are available online. This makes it easy for people that have never been in contact with a terrorist group to plan and execute attacks in their countries of residence. In addition, foreign fighter returnees have a significant impact on

the threat landscape in Western countries. As mentioned above, the assessment from the Danish Defence Intelligence Service was finalised on 20 November 19, 2019. As a result, the last two months have not been covered and therefore the current disturbing situation in Libya, Syria, Iraq and Iran could not be assessed. This situation could pose a threat to the West and therefore to Denmark, too. Against this background, the intelligence services are closely observing the developments and react when needed. This could last be observed on 11 December 2019 in regions covering most of Denmark.

# Monitoring Finland's Air Space

#### **Alan Warnes**

A 1,300 km border with Russia means Finland lives under a constant threat from its big neighbour. But unlike other European nations that share common airspace, Finland is not a NATO country. For now, the Finnish Government is treading the fine line between NATO membership and the Russian bear.

During the Cold War, Finland acted as a border state between the West and the Soviet Union. In exchange for staying neutral, Russia did not meddle with Finnish domestic affairs and for now Finland continues to walk that fine line. During the 1990s, when peace between Russia and NATO was breaking out, Finland stayed stubborn. The military has never been reduced and there is still conscription.

The Air Force has approximately 2,000 uniformed and non-uniformed service members, as well as around 1,300 conscripts each year. However, there is a reserve force of around 38,000 personnel if the need arises, and the commander is Major General Pasi Jokinen.

As with any credible air force, the Finnish Air Force monitors Finland's air space on a 24/7 basis. An air picture compiled of data from surveillance radars and other sensors covers Finland's territory and adjacent areas and is the key enabler of the Air Force's air policing mission. Thales long range and medium range surveillance radars, originally purchased in 1988, are now being upgraded to meet the increasing demands of monitoring today's threats. They play a significant part in the Air Force's overall capability.

Most air policing missions are executed by the Boeing F/A-18C/D HORNET multirole fighters standing on quick-reaction alert rotation. In a crisis, the Air Force shifts the focus on defensive counter air fighter

#### Author

Alan Warnes is a journalist specialising in military aviation and has travelled to over 60 countries researching articles and taking action photos for his work. For 12 years, he was the Editor of AirForces Monthly. He has also written several books, including two on the Pakistan Air Force (in 2008 and 2017), and most recently on 100 years of Aero Vodochody.



Finnish Air Force F/A-18C/D HORNETs provide the air defence required to monitor the Russian Air Force and other threats. They are expected to be retired by 2030, when one of the five candidates currently being evaluated by the air force will take over.

missions and air defence fire control for all three services. Under peacetime conditions, air force aircraft are normally located at the service's main operating bases - Lapland Air Command's Rovaniemi Air Base, Karelia Air Command's Rissala AB, Satakunta Air Command's Pirkkala AB and Air Force Academy's Tikkakoski AB. If a need arises to adjust readiness level, either in peacetime or in the event of a crisis, aircraft may be dispersed to road bases and other remote operating locations.

#### **Finnish HORNETs**

With the continuous threat from Russia, it is no surprise air defence plays a major part in the Air Force's philosophy, and with a fleet of 62 F/A-18C/D HOR-NETs the Russian military are continuously monitored. Finland believes in a strong military, and the Finnish Air Force is an extremely capable one. In 1992, Finland ordered 65 F-18C/D HORNETs (they were not initially designated F/A-18s as they did not have an attack mission) which were delivered between 1996 and 2000. The HORNETs continue to serve with two units: Lapland Wing's 11th Fighter Squadron at Rovaniemi Air Base and the Satakuntas Wing's 31st Fighter Squadron at Kuopio-Rissala Air Base. While a third unit, the Air Combat Centre also operates some HORNETs at Tampere-Pirkkala.

Since being introduced into service, the jets have been subjected to sys-



A batch of 18 former Swiss Air Force HAWKs, upgraded with new avionics by Patria, has been in service since 2011.

tematic upgrades between 2006–2010 and 2012-2016. The upgrades were carried out in conjunction with scheduled maintenance visits at the Patria's Halli facility. The focal point of the first upgrade (MLU 1) was to revamp the aircraft's air-to-air capability, which involved the integration of a helmet-



mounted sighting system with the AIM-9X SIDEWINDER infrared guided missile. MLU 2 enabled the integration of a wide range of air-to-air and air-toground capabilities. The air-to-ground weapon suite includes the Joint Direct Attack Munition (JDAM) precisionguided bomb, Joint Stand-Off Weapon (JSOW) medium-range glide bomb and Joint Air-to-Surface Stand-off Missile (JASSM) long-range standoff missile. The electro-optical LITENING targeting pod was also fitted. MLU 2 also saw the introduction of modern self-protection, communication, and information distribution systems.

#### H-X

But the HORNETs' end is now in sight and they are expected to be retired by 2030. Now the Finnish MoD has launched a HORNET replacement (HX) programme, with a budget of between €7Bn and €10Bn. The objective is to find a multirole fighter solution best suited for Finland's circumstances. Fighters play an essential part of the air defence system and defence force's capability in engaging land and sea-based targets. They also supplement the defence force's intelligence, surveillance and command environment. Former Finnish Air Force Commander, Major General, Lauri Puranen is the H-X programme director at the Finnish MoD and told the author in early 2019: "It's critical we get the best military capability for Finland." The types under consideration are the Boeing F/A-18E/F SUPER HORNET; Dassault RAFALE; Eurofighter TYPHOON (with BAE Systems taking the lead), Saab GRIPEN E and the Lockheed Martin F-35 LIGHTNING II Joint Strike Fighter. The new fighter is expected to be purchased next year with deliveries commencing in 2025. The Finnish Air Force has organised a HX Challenge test and evaluation phase at Tampere-Pirkkala Air Base, from 9 January to 26 February when all five aircraft to be checked out over seven days.

The Eurofighter TYPHOON was the first to begin the process, with two RAF jets deployed from the UK from 9-17 January. The Dassault RAFALE followed from 20-28 January, then Saab GRIPEN E (29 January – 6 February), Lockheed Martin F-35A (7-17 February) and Boeing's F/A-18E/F SUPER HORNET (February 18-26). In his blog, Puranen recently explained why: "The Finnish operating environment and operating methods may differ from other users' weather and lighting conditions." Adding, "Winter conditions may affect the operation of the multifunction fighter and especially the performance of electro-optical systems, but possibly other active and passive systems as well."

A further evaluation activity to be conducted later in 2020 "will look at the operational effectiveness of each candidate's HX system by simulating a longrunning war game [as] part of the Finnish defence system," Puranen continued.

The purpose of the HX Challenge is not to rank the candidates, but to make sure the performance values reported in the bidders' responses apply in the Finnish operating environment. The hub of the HX Challenge is taking place at Tampere-Pirkkala Air Base, the main operating base of the Satakunta Air Command, but evaluation flights will take place all across Finland. In the air, the candidates will face Finnish Air Force F/A-18s and HAWK jet trainers. The Air Combat Centre of the Satakunta Air Command will play an important role in the execution of the testing and evaluation event. Within the Finnish Air Force, the Air Combat Centre is tasked with flight-testing as well as the research and development of air warfare tactics and doctrines.

The HX negotiation process will progress step-by-step. The tenderer-specific revised Request for Quotation (RFQ), based on the initial tenders and the first phase of HX Programme negotiations with the candidates, was sent to the manufacturers in October 2019 with responses due by 31 January 2020. The revised RFQ launched the second phase of the HX Programme negotiations, in which the content of the HX solution will be finalised with each tenderer. The request for the Best and Final Offer (BAFO) will be sent to the tenderers in 2020 at the end of the second phase of the HX Programme negotiations. The Government of Finland will decide on the procurement in 2021.

#### **Industrial Participation (IP)**

The Finnish MoD will evaluate how cooperation between HX tenderers and domestic industry would be realised. It doesn't mean an assembly line will be set up because that could be too expensive according to Puranen.

An industrial participation obligation for the HX Programme is set at 30% minimum of the total contract value. Puranen said: "We aim to rely on existing infrastructure and build as little as possible."

That could be a major stumbling block for the F-35. Operational F-35 bases in Italy, Norway and the UK have been through considerable reconstruction. Security is being given as a major reason and with Finland sharing such a long border with Russia that will be paramount in the foreign company's bids.

Saab's Magnus Skogberg, Campaign Director H-X, believes, the GRIPEN has the advantage: "In Finland they use the road base concept as well as the harsh Nordic climates. GRIPEN has been built to cope with these conditions, and to be easily maintained by conscript mechanics [Finland is one of only a handful of European forces operating fighters that still use conscript mechanics] in a very short turnaround time. One technician and five mechanics can turnaround a GRIPEN in ten minutes, while an engine change will take less than an hour."

#### **Exercises**

In 2018, Finland and its neighbour Sweden entered into a formal bilateral defence agreement. The treaty has seen both of the country's air forces participate regularly in each other's main air operations exercises, focused on national defence. Politicians from both sides are keen to foster a closer military relationship, because of Russia's increasingly aggressive posture in recent years. There is also the need to foster stronger working relationship with outside forces. Last May, the two along with Norway hosted Exercise Arctic Challenge Exercise (ACE) which saw a lot of foreign aircraft involved, and included eight USMC F/A-18C HORNETs deploy to Rovaniemi.

In October, the Swedish and Finnish air forces worked together again in Finland's largest air exercise of 2019. The objective of the annual Ruska exercise is to enhance the readiness of the Finnish Air Force, and to train the Finnish defence forces' personnel, conscripts



The Training Air Wing at Tikkakoski has 28 Grob G115Es that formerly served the RAF. Like the HAWKs they were modernised before entry into service between 2016 and 2018.

and reservists for air defence tasks under emergency conditions. The manoeuvres involved 4,500 personnel, including approximately 2,000 reservists and over 50 aircraft including up to 28 F/A-18C/Ds, 14 HAWKs transport and liaison aircraft. The Swedish Air Force participated with eight JAS 39C/D GRIPENs and an S100 ARGUS airborne early warning and control (AEW&C) aircraft. Missions were flown primarily out of the Tampere, Kuopio, Rovaniemi and Jyväskylä air bases. In accordance with Finnish Air Force doctrine, aircraft were also dispersed to temporary bases, established at the airports of Halli, Joensuu, Kajaani, Oulu, Pori and Vaasa. The Swedish aircraft operated mainly from Kuopio Air Base in Finland and Luleå Air Base in Sweden.

#### LIFT and other Assets

While the Finnish Air Force is looking for HORNET replacement, a new lead in fighter trainer is not on the cards. The HAWKs are scheduled to remain in service until the 2030s or beyond. Puranen told the author in 2019: "We acquired [18] low-houred HAWK jet trainers from Switzerland in 2007 then upgraded them between 2011 and 2013 with two-way datalink systems." He continued: "We also transferred a lot of the training from HORNETs to HAWKs."

From 2019 onwards, FAF will fly a fleet of 31 HAWKs with upgraded digital cockpits. The jet trainers are operated by the Training Air Wing at Tikkakoski Air Base, alongside the relatively new Grob G115E TUTORs. Air Force pilots until recently trained on the fleet of 28 indigenous Valmet L-70 VINKA primary trainers delivered from 1980. However, they were replaced between 2016-2018 by 28 Grob G 115Es, acquired from Babcock Aerospace, that were surplus to RAF needs. Before entering service, they received an avionic and communication systems upgrade. State-of-the art digital displays will also be fitted to bring the cockpit layout compatible with the other aircraft operated by the Finnish Defence Forces. The Midnight HAWKs display team is also based at Tikkakoski. Patria Aviation was awarded a €4.7M contract in December 2018 for the procurement of preliminary and basic pilot training services and additionally, the contract covers maintenance of aircraft.

The medium airlift capability is fulfilled by three Airbus C295M tactical transports, although one of them is used as an ELINT (Electronic Intelligence)/COM-INT (Communication Intelligence) platform for eavesdropping. On 12 February 2018, the Finnish Air Force announced the Lockheed Martin's DRAGON SHIELD system was now operational on the aircraft. Lockheed Martin modified an Airbus CASA C-295 cargo aircraft to accommodate the containerised surveillance system that rolls on and off the aircraft. Lockheed Martin provided the Finnish defence forces with ground stations and communication terminals to support the airborne system. There are also three LEARJET 35s, with one dedicated to ELINT and the other two to target towing, aerial cartography, and light transport duties, while six Pilatus PC-12NGs fly light personnel and cargo missions. The C295Ms, PC-12NGs and LEARJET 35As are all operated by the Air Support Wing which is part of the Satakunta Wing at Tampere-Pirkkala Air Base.

# The Finnish Navy – 'Leaner and Meaner'

#### **Guy Toremans**

Finland, Europe's most northern state, defines its maritime policy according to the parameters dictated by its geography and climate. With a 675nm (1,250 km) long coastline, jagged by a maze of over 81,000 islands, rocks and shoals, the Finnish Navy combines highly mobile forces backed up with minelaying capabilities. Finland is under no illusions about the security challenges in the region.

he Finnish Navy is organised into the Navy Command, headquartered in Turku; the Coastal Fleet, comprising all the operational combat vessels and auxilliaries, operating from two naval base: (Pansio in the Archipelago Sea and Kirkkonummi in the Gulf of Finland); the Coastal Brigade, headquartered in Kirkkonummi; the Nyland Brigade, with headquarters in Raasepori and the Naval Academy, located in the Suomenlinna Sea Fortress, a small island off Helsinki. As of end-2019, the Navy employed 1212 personnel (471 officers, 218 warrant officers and 523 NCOs), as well as an additional 203 civilians and about 3200 conscripts. Most of the conscripts are assigned to the coastal de-

fence brigades and only some 20% serves onboard the ships.

In 2019, Finland's total defence budget amounted to  $\in$  3.138Bn of which the Finnish Navy received approximately  $\notin$  774.5M.

#### **Tasks and Missions**

The small but powerful Finnish Navy plays a central role in supporting the country's interests. The navy's core mission is homeland defence, enforcing control and support in territorial and EEZ waters, monitoring maritime traffic, search and rescue, and executing any missions required by the Government in close cooperation with the Army,



HANKO, third of the HAMINA class missile attack craft, entered service on 22 June 2005. The class is currently undergoing a major modification estimated at €190M – known as the "Squadron 2000 MLU".

#### <u>Author</u>

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Air Force and Border Guard. The resurgence of the Russian Navy has placed the northern waters, and the Baltic Sea in particular, back on the front line. When operating in the territorial waters, the ships' commanding officers have rules-of-engagement that give them the right to go through warning procedures and force a vessel to act as required, without having to seek permission from the Finnish MoD. Although homeland defence remains the Finnish Navy's primary task, the increase of missions in support of crisis management and asymmetric threats maritime challenges have been brought forward too.

#### **Force Levels**

The Finnish Navy operates a fleet of fast missile attack craft, minehunting and minelaying vessels, along with numerous auxiliaries and smaller craft. The heart of the service's strike capabilities are the four RAUMA class and the four HAMINA class fast missile attack craft.

Built in the early 1990s, the 240-tonne RAUMA class units received a €70M midlife upgrade (MLU) from 2010 to 2013, allowing the vessels to remain in service well into the 2020s. This modernisation entailed the installation of Saab's 9LV Mk 4 combat management system, a Simrad ST2400 variable depth sonar, an Ericsson SEA GI-RAFFE radar, a Bofors Electronic's 9LV 225 fire control radar; a Furono navigation radar and two Rheinmetall MASS decoy systems. The RAUMA class units have proven to be well suited for our needs, and we have not experienced any major difficulties or technical failures with them, even though their operational profile has been very active.

The 274-tonne HAMINA class fast missile attack craft, commissioned between August 1998 and June 2006, is currently undergoing a major modification estimated at €190M and known as the 'Squadron 2000 MLU'. Scheduled to be completed by2023, it will allow the navy to keep them in operation well into the 2030s. The upgrade focuses on the installation of a new Saab 9LV combat management system, a Tacti-Call communication system, and Israel Aero-

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space Industries (IAI) Elta electronic warfare suite, a TRACKFIRE remote weapon station, a Kongsberg ST2400 variable depth sonar, Saab Dynamic's New Lightweight Torpedos and the replacement of the RBS-15F missiles by the IAI Gabriel's SSM2020 missile system. In addition, the Airbus Defence and Space TRS-3D radar and CEROS 200 fire-control radar are upgraded, the Bofor 57mm Mk3 guns replaced with the lighter Bofors 40mm Mk4 guns, MASS chaff launchers and the integration of Link 16 and Link 22 and the installation of larger fuel tanks. All four units are planned to be operational again in 2024.

#### **Mine Warfare**

With mine warfare operations a central element, the Finnish Navy's inventory includes several minecountermeasure platforms. The latest addition are the three KATANPÄÄ class units. First-of-class KATANPÄÄ was formally delivered on 4 May 2012, the second – PURUNPÄÄ, and the third VAHTER-PÄÄ entered the fleet on 20 August 2013 and 2 November 2016, respectively.

The vessels minewarfare toolbox com-

prises the Saab Underwater Systems' reusable DOUBLEEAGLE Mk III, Atlas Elektronik SEAFOX Combat (SEAFOX C) and reusable Identification (SEAFOX I) ROVs, a L3 Klein 5500 towed sidescan sonar, the Kongsberg Hydroid REMUS 100 and HUGIN 1000 MR. These MCM systems have a high degree of commonality with the systems onboard the Swedish, Belgian, Dutch and German navies' MCMVs. All three units are set to be Fully Operational Capable (FOC) in 2020. The sea service's other minecountermeasure assets include four KIISKI class inshore minesweepers built in 1984, and three 1974-vintage KUHA class inshore minesweepers, the latter having been modernized between 1998 and 2002. There are plans to replace the influence and contact minesweeping capability around mid-2020. Whether or not this means a complete decommissioning of KUHA and KIISKI classes remains to be seen. The naval staff is looking into different possibilities to replace this capability with an integrated remotely controlled minesweeping system and closely monitors the results of any of the European Defence Agency's technology demonstrator projects, in which the Finnish Navy also participates.

Another crucial element in the Finnish Navy is its minelaying capability. The narrow, shallow straits and myriad islets are highly suitable for minelaying, hence most of the naval vessels featuring a minelaying capability. The mainstay of the fleet's minelaying assets are the two HÄMEENMAA class and three PAN-SIO class minelayers.

FNS HÄMEENMAA and FNS UUSIMA, inducted into the fleet in April and December 1992 respectively, received a major upgrade between 2006 and 2008 that included the installation of: a Denel UMKHONTO VLS missile system, an EADS ANCS 2000 combat management system, a TRS 3-D radar, a Simrad SS2030 hullmounted sonar and a Kongsberg ST2400 VDS, two quintuple RBU-1200 A/S launchers, a Thales integrated early-warning system, a SAAB CEROS weapon control system and a communications suite, a flight deck and new combat information centre and two new mast to accommodate the expanded sensor and communication systems. This upgrade made the minelayers suited for international missions beyond the Baltic. The other minelayers are the three ice-strengthened 460-tonne PANSIO class landing craft utility (LCU) minelayers, PANSIO, PORKKALA and PY-HÄRANTA. Having joined the fleet in the



With an overall length of 52.5m, beam of 9.8m and draught of 3.1m, the 708t KATANPÄÄ is built from a new type of glassfibre-reinforced plastic, conceived specifically to sail in up to 50cm of ice.

#### **CAMCOPTER trials of the Finnish Border Guard**

In September 2019, Schiebel's CAMCOPTER® S-100 successfully completed intense flight trials for the Border and Coast Guard Division of the Finnish Border Guard. The five-day maritime surveillance demonstration was carried out from the offshore patrol vessel TURVA. The trials included searching, locating and identifying objects as well as surveillance for maximum situational awareness. The test was part of the ongoing VALVONTA2 (Surveillance2) project that is led by the Finnish Border Guard and funded by the European Maritime and Fisheries Fund (EMFF).

To comply with its assigned tasks, the S-100 was equipped with the L3Harris Wescam MX-10 electro-optical/infra-red (EO/IR) camera, the Overwatch Imaging PT-8 OCEAN-WATCH wide-area maritime surveillance payload and an automatic identification system (AIS) receiver.

According to the company, maritime ISR and search operations can derive significant benefits from the use of UAS. As a robust VTOL platform, the CAMCOPTER® does not require any additional takeoff or recovery equipment, which makes it suitable for OPVs with small decks.



Schiebel's CAMCOPTER<sup>®</sup> S-100 operating from the Finnish Coast Guard vessel TURVA.

early 1990s, they underwent an overhaul in order to keep them in service well into the 2020s.

This modernisation programme consisted of the installation of a new combat management system and satellite communications system, a new electro-optical system, a new Doosan-MAN diesel engines. The service operates various auxiliaries, small landing craft and service launches. With one of its tasks being also the control of marine pollution, the navy operates three pollution control vessels: the 71.4-metre-long LOUHI, the largest oil spill recovery ship in the Baltic region, and the 64-metre-long HALLI and HYLJE. The fleet's other assets include 12 JEHU class, 36 JURMO class and some 30 MERIUISKO class assault craft, and the 35 G-class raiding craft, two ASKERI class and four SYÖK-SY class command launches, LOKKI class training vessel KAJAVA, the LCU transport craft KAMPELA 3, two VALAS class transport craft, the diver support platform ISKU, three FABIAN WREDE class training vessels for the Naval Academy and one harbor tug KALLANPÄÄ. The Finnish Navy stocks also a variety of mines: S/43 and S/58 anchored electromagnetic anti-surface warfare contact mines, PM/83 and PM/83-2 acoustically influenced anti-surface warfare and anti-submarine warfare acoustic/magnetic bottom mines and PM/85 acoustic/magnetic mines with pressure-influence settings.

#### The 'Squadron 2020' Project

The increasingly strategic value of the Baltic Sea as a potential theatre of military conflict has triggered steps by the Finnish

Government and the MoD to bolster the sea service's surface and anti-submarine capabilities. Central to this new vision is the 'Squadron 2020' ("Laivue 2020') Corvette Programme, launched by the MoD on 25 September 2015 and covering the procurement of four new corvettes to replace the four RAUMA class missile attack craft and two HÄMEENMAA class minelavers. On 28 April 2017, the Finnish Defense Forces signed a design contract with RAUMA for the hull design and, in October 2017, Deltamarin was awarded a contract for the basic design of the deck outfitting and machinery, with all work being conducted at RAUMA's facilities.

Known as the POHJANMAA class, the corvettes will have an estimated length of 115 metres, a displacement of around 3900 tonnes, and feature anti-surface, anti-air and anti-submarine warfare suites, as well as a minelaying capability (two rails for up to 100 PB 17 influence sea mines). They will also be able to operate a medium-sized helicopter and unmanned maritime systems, as well as facilitate a small staff. Of the 70-strong crew, half will be conscripts or reservists. The corvettes will allow the sea service to conduct surveillance missions all-year round in any kind of weather and in different ice conditions

Their Combined Diesel Electric and Gas Turbine (CODELAG) configuration will provide the units an operational range of some 3500 nautical miles, thus making them suited to deploy even 'out-of-area', including the Red Sea and the Gulf of Aden. Their procurement will leave a powerful footprint in meeting the Finnish Defence Forces' requirements as their systems will be interoperable with those of the Army and Air Force. Following the approval of the 'Squadron 2020' Project by the Government on 19 September, the Finnish Defence Forces' Logistics Command formally signed the





The 3,450t LOUHI is the largest spill recovery ship in the Baltic region.

#### Masthead

#### **European Security & Defence**

Issue 2/2020 · February 2020 ISSN 1617-7983 · www.euro-sd.com

#### Published by

MITTLER REPORT

Mittler Report Verlag GmbH A company of the Tamm Media Group

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Layout: CREATIVE.CONSULTING GmbH, Germany

#### Production:

Lehmann Offsetdruck GmbH 22848 Norderstedt, Germany

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Cover Photo: Cpl. Tojyea Matally, 1st Marine Corps District

Annual subscription rate: €64.90 incl. postage

contracts for a total value of some €1,325M in Turku on 26 September. A €647.6M contract is awarded to the Finnish RAUMA Marine Constructions Oy (RMC) Shipyard, for the design and construction of the units. The hulls will be built by RMC's subsidiary RMC Defence Oy. The Finnish company AKER ARCTIC Technology Oy signed a €27M contract for the design, development and integration of the special propellers and propeller shafts. Key issue with the propellers is the requirement of a small diameter due to limited draught, slow turning speed due to the sound signature, and high vessel speed. And a €412M contract goes to the Swedish company SAAB for the supply of its 9LV combat management system, the CEROS 200 radar/electro-optical director, a Saab Naval Laser-Warning System, the TACTICALL integrated communications system, the TORPED 47 New Lightweight Torpedo system and TRACKFIRE remote weapon station and the Saab Lightweight Integrated Mast. This mast incorporates a SEA GIRAFFE 4A Fixed Face active electronically scanned array radar, optimised for long-range air/surface surveillance and target indication, and the rotating SEA GIRAFFE 1X radar that provides a complementary surface search and air surveillance capability. SAAB will also be responsible for the integration of the combat management system, the radar suites and weapon systems and is mandated to establish service and maintenance capabilities and industrial cooperation arrangements in-country.

The corvettes will also be equipped with a Raytheon RIM-162 Evolved SEASPARROW missile point defence missile system (designated ITO20), the BAE Systems Bofors 57mm Mk 3medium calibre gun, Rheinmetall MASS decoy launchers and the IAI GA-BRIEL V anti-ship missiles designated as SSM 2020.

The corvettes' ASW suite will be made up by a bow mounted medium frequency active search and attack sonar as well as a mine avoidance sonar (with Thales and Simrad the leading candidates) and a Kongsberg ST2400 towed array. The contracts for these systems amount to some €238,4M.

The construction of the four corvettes will be staggered over the 2022–2025 period, with the 'first-of-class' scheduled to be delivered by 2026 and all four units anticipated to be fully operational by 2028. The decision to build these new vessels at RMC was based on the shipyard's longstanding tradition and experience of supplying combat vessels for the Finnish Navy and, most importantly, to ensure in-country supply and sustain domestic shipbuilding capability. Due to security reasons, the corvettes will be built in separate locations, away from the shipyard's commercial vessels. A new vehicle and passenger ferry for the Vaasa-Uumaja route is currently under construction.

With a life expectancy well into the 2050s, these multi-role combatants will form the backbone of Finland's maritime defence. Going to be one of the world's most modern and advanced platforms, they will set a new era in terms of operational readiness, weapon and sensor suites. Obviously, this will have an impact on the Navy's Concept of Operations (CONOPS). The sea service is already modifying and updating its CONOPS in order to ensure the optimal use of these new units.

#### **Cooperation and Partnerships**

The dense level of maritime traffic in the Baltic Sea and the Gulf of Finland requires an increased focus on maritime surveillance and safety. However, these security challenges cannot be mastered by any navy alone. As a consequence, the Finnish Navy is enhancing its co-operation with its international partners in order to bundle our competences in the different warfare areas. With the Scandinavian and Nordic countries continuing to
#### COUNTRY FOCUS: FINLAND



With a length of 44m, the PANSIO class minelayers – the photo shows the PORKKALA – have a draught of just 2m that enables them to operate in shallow waters. The three ice-strengthened landing craft utility (LCU)-type minelayers underwent an extensive overhaul aimed at keeping them in service well into the 2020s.



The RAUMA class fast attack craft are lighter and faster than the HAMINA class so they can go into smaller spaces. The class represented the navy's first effort to introduce stealth technology into ship design.

the 'Northern Coasts' series from 2007 onwards. This type of manoeuvre allows the navy to compare itself with other European and NATO navies.

Like several other European navies, the Finnish Navy also pools its assets. In 2014, having close cooperation with the Swedish Navy for many years, both navies announced their intention to take their cooperation even further, revealing the Swedish-Finnish Naval Task Group Concept.

After participation in Exercise 'Northern Coats 2017', the task group reached its Initial Operational Capability (IOC) and is to attain Full Operational Capability (FOC) by 2023.

As cyber-defence is a priority in all military domains, not least for the world's navies, the Finnsh Naval Staff is well aware of the evolving risks in the cyber domain. Finland signed a cyber-defense agreement with NATO to improve situational awareness, capabilities, detection of cyber incidents and resilience to disruptions in information networks. And, in May 2018, Finland, Sweden and the US signed a letter pledging to increase planning and organized joint exercises.

#### Conclusion

With the comprehensive modernisation programmes ahead, the Finnish Navy will be able to better respond to the new arising security situations. However, it is important to set a clear course to guarantee the relevance of the navy in the longer term. Numbers do matter and exploring new technologies - such as unmanned systems, robotics, sensors, artificial intelligence and communications systems - can help maintain that edge.

play important roles, particularly with regard to the High North, Finland is deepening its defence ties. International cooperation has become an integral part of the navy's way of operating.

Finland joined the NATO Partnership for Peace programme in 1994 and the EU and the CSDP Defence cooperation the following year. Other steps taken to enhance cooperationwith neighbouring countries and regional partners are projects such as the Surveillance Cooperation Finland-Sweden, the UK-led Joint Expeditionary Force Concept, the Maritime Surveillance, the maritime Surveillance Cooperation Baltic Sea Project and the Nordic Defense Co-operation.

The navy is getting even more engaged in joint international exercises in the region, in particular with the Nordic neighbours and NATO forces. The sea service also became more engaged in multi-national exercises organized in the region, such as the NATO's 'Baltops' exercise since 1993 and in



The "Squadron 2020" Offshore Patrol Vessel Programme consists of four corvettes known as the POHJANMAA class.

### "We are under no illusions about the current security challenges in the Baltic region."



**ESD:** RAdm Harju, what is your assessment of the current Finnish Navy?

RAdm Harju: We are a modern and an effective navy and our overall readiness is high. The platforms are at a high operational level, and my personnel, including our conscripts, are highly skilled and motivated, and our assigned tasks and missions are well defined. The coming years look promising, with several procurement and upgrade programmes underway: the 'Squadron 2020' Project approved by the Government in September last; the mid-life upgrade of our four HAMINA class units - known as the 'Squadron 2020 MLU', (Laivue 2020 MLU) will allow us to keep them operational well into the 2030s; and the modernization of our coastal units.

**ESD:** The 'Squadron 2020' Project with four new POHJANMAA class corvettes is a major programme. What will these ships offer in terms of meeting Finland's defence and security requirements?

**RAdm Harju:** 'SQ2020' is the second strategic programme of the Finnish defence administration. The procurement of POHJANMAA class corvettes has a powerful footprint in meeting the requirements of the Finnish Defence Forces as their systems will be interoperable with those of the Army and Air Force. They will feature com-

In view of increasing military activities in the Baltic Sea region, Finland feels compelled to develop its maritime defence capabilities. Finland wants to be prepared for a possible regional crisis and is taking various steps to modernise its navy. ESD talked with Rear Admiral Jori Harju, Commander of the Finnish Navy.

prehensive anti-surface, anti-submarine and anti-air warfare capabilities, a minelaying capacity as well as extensive C<sup>2</sup> and EW suites. With a life expectancy well into the 2050s, these multi-role combatants will form the backbone of our country's maritime defence.

**ESD:** What will be the major challenges to bring these units to full operational readiness?

RAdm Harju: The Finnish Navy, together with the Finnish Defence Forces Logistics Command, will implement a robust approach, comprising a lot of efforts and resources to establish an effective and efficient training programme in order to achieve Full Operational Capability (FOC) by the end of 2028. The crews will be trained both in-country and at the facilities of the companies. Simulators will also be used, but the exact level and scale is still to be defined, pending the outcome of how we progress with the planning for the training. It is worth mentioning that the crews currently serving on board the ships that are scheduled to be decommissioned [the 4 RAUMA and 2 HAMEENMAA class units] will be manning our new corvettes. Thus, we will be able to retrain the majority of the personnel.

**ESD:** I suppose that with the introduction of these 'state-of-the-art' units, you will have to re-think the navy's Concept of Operations (CONOPS) to make the most out of these new units?

**RAdm Harju:** As the POHJANMAA units are going to be one of the world's most modern and advanced platforms, they will set a new era in terms of operational readiness, weapon and sensor suites. The use

of the corvettes is definitely different from the way we operated our current platforms and this will have an impact on our Concept of Operations. Consequently, we are modifying and updating our concepts and procedures in order to ensure the optimal use of these new units. The doctrine of the Finnish Navy is not going to change, but it will naturally be reviewed and re-assessed.

**ESD:** What are your Navy's other procurement programmes underway or in the pipeline?

RAdm Harju: We are looking into the procurement of logistic support ships. The requirements for these new platforms are currently being looked into. We are also to replace our influence and contact minesweeping capabilities of the KUHA and KIISKI classes around mid-2020. A study is underway and we closely monitor the results of the European Defence Agency's technology demonstrator projects, in which the Finnish Navy also participates. Even though the naval units take most of the attention, we need to maintain our coastal units' capabilities at an adequate level. We are to substitute our RBS-15M SSM system with the GABRIEL SSM system, as well as the ageing short-range missile and fixed artillery systems.

**ESD:** In recent years, the operational tempo of the Finnish Navy has increased. How do you address the augmenting commitments?

**RAdm Harju:** As the security environment and the asymmetric threats in the Baltic Sea increased, so did our commitments accordingly. We have prioritized actions regarding our core tasks, re-scaling our activities in a dynamic manner. **ESD:** You closely operate with the Swedish Navy through the Finnish Swedish Naval Task Group.

**RAdm Harju:** The establishment of this group underlines the close relations between our two countries. The main objectives of the group are to have a smart way to utilise our operational capacities to meet today's and tomorrow's security challenges and use our resources cost-effectively, provide common education and training, and develop a capability to transfer operational control of units between both navies. The group is already certified to conduct sea control and maritime surveillance operations and is anticipated to reach FOC no later than 2023.

**ESD:** Security concerns are growing again on NATO's northern flank and in the Baltic, making your Navy a paramount asset. What impact does this have on your navy? RAdm Harju: We are under no illusions about the current security challenges in the Baltic region. The increasing level of military activity in the region is generating a renewed focus, but there is no indication of any military aggression. However, a regional crisis may result in using political pressure or military force. Therefore, we need to be prepared. Hence, the importance for cooperation and interoperability with our allies. We are taking several steps to align our navy with regional partners through different projects and participate actively in international exercises and crises management operations.

**ESD:** Cyber defence is becoming a priority in all military domains, not least for the

world's navies. What are the major dangers of cyber threats for your navy?

**RAdm Harju:** We are becoming increasingly dependent on interconnectivity and digitalization. The Navy is facing the same threats this brings along as do the rest of the world. We are cognisant that due to their rapidly evolving nature, cyber threats will become more sophisticated and occur more often. The major issue is the lack of consciousness and carelessness of the people about cyber defence and cyber security.

**ESD:** How do you protect your networks in general and those of warships in particular?

**RAdm Harju:** Cyber resilience is very much a policy issue. We have a programme to improve cyber resilience by enhancing public awareness, and we must keep pace with the constantly evolving technologies.

As the onboard ship environment will continue to increase, and warships being networked to the supporting systems and as well as to the external services, active cyber countermeasures must be in place and there must always be backup systems or other means of communication between warships and shore-sites. Protecting the networks against cyber threats is a continuous challenge and our overarching concern. We constantly monitor the data flows for any attacks, assess and analyse any risks, and respond at the earliest opportunity.

**ESD:** What is needed to improve security in the cyber domain?

**RAdm Harju:** The main challenge will be to keep abreast of the fast-moving pace

of technology. Especially as warships and their systems typically have a long life-cycle span, adding information or cyber security at late stages of capability development programmes is slow, costly and seldom offer a satisfactory result. Therefore, cyber resilience and information security must remain an integral part of our development programme from the earliest stage. This unit-level resilience then needs to be networked with a broader awareness of cyber threats e.g. at a Navy or Defence Forces level.

**ESD:** What do you regard as the biggest challenge and what is likely to have a major impact on the Finnish Navy?

**RAdm Harju:** The comprehensive modernization programmes ahead and the newest technologies will put some pressure on our personnel. It is paramount to have committed and skilled personnel to use the variety of complex systems. Consequently, my major concern lies in recruiting capable and motivated staff.

**ESD:** Did you set yourself specific objectives to realize during your tenure as Commander of the Finnish Navy?

**RAdm Harju:** Yes. My main aim is to develop the Finnish Navy into a 'state-of-theart' force, in order to be able to conduct all necessary naval operations and to be ready to meet the demands of the ever-changing security environment. This means forces and capabilities that have high readiness, strong endurance, and high interoperability.

The interview was conducted by Guy Toremans.



UUSIMAA, the second of the 1,437t HÄMEENMAA minelayer class, received a major upgrade between 2006 and 2008. They are the navy's largest warships today.

### The Finnish Defence Industry A Different Approach to Supporting Defence Capabilities

#### Tuija Karanko

We Finns are famously modest, but Finland is, according to many international rankings, one of the world's top countries. We are consistently ranked in the global top 3 in terms of education, innovation, professionalism, security and trustworthiness. For the past two years, Finland has even been named the happiest country in the world!

Finland is a country at the forefront of highlevel technologies and digital solutions. This is also the case with Finnish defence industries. Finnish defence and aerospace companies are market leaders in our chosen systems and technologies. These include armoured wheeled vehicles, turreted mortar systems, certain C4ISR/C5, systems, and logistical solutions.

Most Finnish defence companies are privately owned SMEs. They invest significantly in R&D, ca. 15% of their annual turnover. Apart from being acknowledged internationally for producing high-quality, premium products with long life-cycle performance, the companies excel in their methods of utilizing technology and combining so-called civilian technologies into military systems.

The Finnish climate sets demanding requirements for defence technologies. Everything must function reliably in an arctic environment as well as in summer's heat and autumn rainfalls – and be NATO interoperable. We do excel in snow-how, but most of our products are used in the most demanding environments and crisis management operations around the world. The volume of exports varies annually from 40 to 60 % of companies' turnover.

#### **Military Security**

In Finland, a viable and competitive domestic defence industry is a fundamental element of credible national defence. Finnish technology expertise plays a vital role in the entirety of the defence system providing in-country capabilities (military security of supply).

#### <u>Author</u>

**Tuija Karanko,** Secretary General, AFDA – Association of Finnish Defence and Aerospace Industries





Finland is also an open market for defence goods. Despite high-level technological expertise and skills, Finland's own defence industrial capacity is focused on certain specific areas and, therefore, we have chosen to procure many major systems and platforms from abroad.

Military security of supply means that Finland must sustain the necessary industrial and technological competence and autonomy. That includes maintaining and tailoring critical systems so that their independent use can be guaranteed in all conditions.

**ASD Eur** 

The Finnish defence industry is integrated into the Finnish defence system in many ways. A major part of army, navy and air force maintenance has been outsourced to domestic companies, which act as close partners to the Defence Forces. The Finnish Defence Partnership model relies on companies carrying out their responsibilities, at all times, to secure military capabilities. We believe that the proper level of military security of supply can only be maintained through competitive defence companies with processes, systems, products, services and partnerships to match.

#### AFDA

The Association of Defence and Aerospace Industries, AFDA, represents Finnish companies within defence, aerospace and security. AFDA has ca. 130 member companies. It is a member of ASD – AeroSpace and the Defence Industries Association of Europe. AFDA also represents the Finnish companies at EDA, NATO and Nordic fora.

AFDA works in close cooperation with the Finnish Defence Establishment and other security authorities in Finland. AFDA is your point of contact for defence business in Finland. We can support you in networking with Finnish companies and in understanding the business environment in Finland. You can reach us at AFDA@techind.fi. www.defenceindustries.fi



The Finnish defence industry is at the forefront of advanced technologies and digital solutions.

## Polish Armed Forces to set new Modernisation Goals

#### Michał Jarocki

The Polish MoD envisions expenditure on the level of €123Bn in the period of 2021-2035 for further development of the Polish Armed Forces and enhancement of the country's security. The new Technical Modernisation Plan (TMP), which was presented in October 2019, outlined a number of major procurement programmes, which will affect every branch of the Armed Forces and significantly change its posture and operational capabilities.

The new TMP will cover the period of 15 years, which is 5 years longer in comparison to the previous one, that was announced early 2019. According to Mariusz Blaszczak, Polish Minister of Defence, the decision to extend the document's timeline was taken in order to make the process of modernisation of the Armed Forces more effective and to simplify procurement procedures. "Acquisition contracts are complicated and costly. They require much work. Extension of the planning period allows us to sign multi-annual agreements", said Blaszczak.

#### New Aerial Combat Capabilities

Referring to the most important modernisation programmes, Blaszczak indicated HARPIA, under which Poland will procure 32 F-35A LIGHTNING II 5th generation multirole fighter aircraft, as the one, which will have the biggest impact on the country's security. "We've already commenced the negotiation process with the US government, right after the Congress approved the acquisition. The finalisation of the biggest procurement contract in Poland's history, is a matter of time", said Blaszczak.

The HARPIA programme was announced late 2018 and described as a necessary investment in modernisation of Poland's combat aircraft fleet. Although initially the MoD intended to select the preferred platform through an open, international

#### Author

**Michał Jarocki** is is an independent, Warsaw-based defence expert who has reported on security issues and developments from a qualified "insider" position for many years.



The new Technical Modernisation Plan was presented by Mariusz Blaszczak, the Polish Minister of Defence in October 2019. The document envisions investment of €123Bn over the period of 2021-2035.

competition, the department eventually decided to quit this process as in Spring 2019 declared that it will procure US-manufactured jets and sent an official Letter of Request to the US Department of Defence in preparation to the anticipated procurement.

The future fleet of F-35s will replace legacy Soviet-era aircraft, such as Su-22 bombers/ fighters and MiG-29 fighters, which no longer meet the requirements of the modern battlefield and due to their worsening technical condition, prove to be incapable of providing required operational capabilities. Furthermore, their future use could become hazardous for pilots, who risk being harmed in case of any accidents which could take place during future operational or training flights.

Although at this point Poland declares its ambition to procure only 32 F-35 fighter jets, some MoD officials have already indicated that the fleet of Polish 5th generation aircraft could increase in the future. Wojciech Skurkiewicz, the Secretary of State at the department, suggested that Poland might decide to acquire an additional batch of 16 F-35s at the later date.

However, it is not sure if the MoD will eventually decide to increase the number of F-35 fighter jets in the future, as the new TMP outlines also the requirement for an additional batch of F-16 multirole aircraft, which are quite older and less capable, but at the same time more affordable. Although it was not explained immediately, which variant of the aircraft will be eventually procured, it became obvious that these fighters would supplement the fleet of 48 F-16C/D Block 52+ jets, that are currently operated by the Polish Air Force.

The head of the Polish MoD also announced that in addition to the HARPIA programme, Poland will also launch another procurement project, called "HARPI SZPON", which, according to the department, will enhance the combat capabilities of the F-35 fighter jets. "Poland will apply to join the Loyal Wingman programme, which will lead to the design and development of a new stealth, unmanned aircraft", said Blaszczak.

He added that "such drone will learn from the pilot's reactions as early as during the training process. Its core reason is to jointly engage in reconnaissance or combat operations. While remaining under the control of the pilot, the drone will be able to attack enemy's well protected targets (...) not putting the operator at risk. The use of such systems, which are a combination of manned and unmanned platforms, will increase striking capabilities by carrying a wide range of precision munitions or bombs".

#### Improving Reconnaissance Capabilities

Under the new TMP Poland will significantly enhance its capabilities related to satellite and imagery reconnaissance, improving situational awareness on all levels of the chain of command, as well as providing commanders with all kinds of data necessary to effectively operate their forces on the battlefield.

"The modern battlefield relies primarily on data. That is why we drew up a programme for complex development of our capabilities of multi-level, integrated, satellite- and imagery-based reconnaissance. Under the OBSERWATOR programme the Polish



One of the major modernisation programmes outlined in the new TMP calls for the procurement of 32 F-35 5<sup>th</sup> generation multirole fighter aircraft, which will allow for gradual phase out of legacy Su-22 bombers/fighters and MiG-29 fighters. Along with new multirole jets Poland wishes to invest in auxiliary UAV platforms, which will enhance the system's operational and combat capabilities.

Armed Forces will acquire satellites, micro satellites, reconnaissance aircraft and a wide range of UAVs, information gathered by which will be collected and analysed in an imagery reconnaissance centre and used by soldiers during their operations", said Mariusz Blaszczak.

The requirement of the Polish Armed Forces for the integrated, complex reconnaissance



MBDA-UK is one of the front-runners in the NAREW programme, which will lead to the procurement of new, short-range air-and-missile defence systems, making it one of the pillars of Poland's combined AMD system.

system was also identified by Lieutenant General Rajmund Andrzejczak, Chief of the General Staff of the Polish Armed Forces, who said that "satellites are an example of moving towards a new, aside from cyber, warfare domain, that is, Space. We have aspirations to make sure that reconnaissance systems installed in observation satellites, as well as micro satellites, enhance situational awareness and become an integral part of the Armed Forces and their ISR systems, as soon as possible."

Andrzejczak also made a point about the planned digitalisation of the Polish Armed Forces, the process which will see cyber and space domains will work hand in hand. "We anticipate a complete digitalisation of our combat platforms, in a move to walk away from analogue systems. We want to balance these systems, which will be included in the digital and cyber transformation, with those, which are already available. Results of past exercises, even those concluded in big distances and with high intensity, gave us the reason for the enhancement of satellite communication systems, which are included as part of particular [modernisation] programmes. Without such communication and these capabilities, we're not able to provide an effective command system."

#### New Air and Missile Defence Assets

The Polish MoD confirmed its intention to continue the modernisation of country's medium and short range air-and-missile de-

fence assets by procurement of new systems under the WISLA and NAREW programme. In the first phase of the WISLA programme Poland plans to procure two PATRIOT-based batteries in the initial, 3+ configuration, along with the Northrop Grumman-developed IAMD Battle Command System (IBCS) and 208 PAC-3 MSE missiles from Lockheed Martin. The Letter of Acceptance (LoA) regarding this acquisition was signed on 28 March 2018. Deliveries are expected by 2022 and Initial Operation Capability (IOC) between 2023-2024. The second phase of the programme, which calls for the procurement of additional 6 PATRIOT batteries, is under negotiations.

The WISLA programme will also see the purchase of a new 360° AESA-GaN radar, in the same configuration as the future US Army's radar system, although the MoD is aware of the fact that the eventual acquisition of the current 90° sector scan radar from Raytheon, would be a more affordable option. Poland is also yet to decide on the future low-cost interceptor, which will supplement the PAC-3 MSE missile. In this regard Raytheon's SKYCEPTOR was considered as the most likely solution, however, MBDA's Common Anti-Air Modular Missile-Extended Range (CAMM-ER) interceptor is said to also be taken into consideration.

NAREW is intended to be the middle part of the future Polish AMD system, complementing WISLA and PILICA (VSHORAD) systems. The MoD identifies a requirement for 19 batteries of the short-range AMD system, which will be used to protect particular, highly important assets, such as critical infrastructure, C2 centres or manoeuvring Army's units.

The NAREW system is expected to utilise the IBCS command system, therefore making it interoperable with WISLA/PATRIOT batteries, and allowing to create an integrated medium/short-range AMD system functioning under one command structure. NAREW will replace currently operated, legacy 2K12 KUB and 9K33 OSA AMD systems.

As of today, a number of manufacturers have shown their interest in the Polish NAREW programme, declaring readiness to present their products and submitting complete offers, which aside from the AMD systems would also include transfer of technology – as Poland wishes to set up a local production of the new system – as well as industrial cooperation. However, less than a handful of companies are actually being considered as the frontrunners for the future contract, including Raytheon/Kongsberg and MBDA-UK.



The Polish MoD upholds its intention to modernise the submarine fleet of the Navy by the procurement of a series of modern, cruise missile capable vessels. However, the MoD wishes to introduce an interim solution by procurement – or leasing – of two 2<sup>nd</sup> hand submarines from an allied country.



MBDA has partnered with PGZ in the development of the new Polish tank destroyer, offering its experience in designing innovative, capable and combat proven effectors. For the programme the company offers its BRIMSTONE precision strike missile.



Photo: Polish MoD

The Polish Army has a requirement for several hundred of modern, highly capable main battle tanks, which will replace legacy T-72 and PT-91 platforms. New vehicles will most likely be a product of pan-European cooperation on national and industrial scale, a project in which Poland would like to play a hand in.



An additional batch of F-16 multirole fighter aircraft should be procured under the new TMP. At this moment it remains unsure, whether these will be brand new platforms or rather much more affordable 2<sup>nd</sup> hand jets, which, however, would require significant upgrade.

The former consortium is willing to offer Poland its proven and globally popular National Advanced Surface-to-Air Missile System (NASAMS), which has already been procured by eleven countries, such as the U.S., Norway, Finland, Spain, The Netherlands, Oman, Lithuania, Indonesia, Australia, Qatar and one undisclosed country. The NASAMS utilises a number of technology solutions, which are proven and affordable, such as the AIM-120 AMRAAM missiles, which are already operated by the Polish Air Force. The manufacturer also states its willingness to set up a partnership with a number of local companies in order to transfer as much of the production, maintenance and overhaul processes directly to Poland, as possible.

Both manufacturers forming the consortium have already a rich experience in cooperation with the Polish MoD and its Armed Forces. Raytheon will play an im-

Photo: Michał Jarocki



The ongoing modernisation of a series of Polish LEOPARD 2A4 MBTs will see 142 vehicles upgraded to the 2PL standard. The project is run by a consortium of PGZ and ZM Bumar Łabędy, partnered with Rheinmetall. The programme is delayed and at this moment it remains unsure, whether industry will be able to meet the current delivery deadline, which is set at 2021.

portant role in the implementation of the WISLA programme, providing a number of technology solutions, which will enhance the country's capabilities to defeat a number of aerial threats at medium distances. Kongsberg has been active on the local market for many years now. The manufacturer offers a range of its products, such as the Naval Strike Missile, which forms the core of the Polish Navy's Naval Rocket Unit subordinate to the 3rd Ship Flotilla.

Another potential favourite in the NAR-EW competition is MBDA-UK, which is offering its proven CAMM family of surface-to-air missiles integrated into the IBCS-based command systems and interoperable with Polish-manufactured observation, tracking and acquisition systems. The manufacturer has already confirmed its willingness to comply with Poland's requirements regarding a broad transfer of technology, allowing for setting up of local production not only of particular auxiliary subsystems and components of the CAMM-based NAREW AMD system, but the effector itself.

The manufacturer declares that it's ready to set up cooperation with a number of local companies, most of which would come from the Polish Armaments Group (PGZ, Polska Grupa Zbrojeniowa), such as Pit-Radwar, Mesko, Jelcz, HSW, CTM and WZE in Zielonka. However, MBDA is also open to cooperation with all of the local companies, which could have an essential input on its position and manufacturing capabilities on the Polish market, regarding not only the NAREW programme, but all other modernisation or procurement requirements of the Polish Armed Forces, which MBDA could play a hand in.

Industrial cooperation seems to be a very strong argument in MBDA's offer for the Polish NAREW programme, maybe even equivalent to the AMD system itself, as the manufacturer admits, that in consequence of choosing of the CAMM-based offer, Poland would become a member of the MBDA group and act as a typical NatCo (National Company) along with France, Italy, Germany, Spain and UK, making a significant contribution to the development of missile systems technology in Europe.

The perspective of becoming a NatCo should be especially interesting for Poland, as in result the country would have a saying in the development of missile technology among the MBDA group, introducing its locally designed and developed solutions, suggesting implementation of changes in the way, in which the group evolves and allowing its own manufacturers to enter MBDA's global sales market,



Under the KRUK programme Poland will procure a series of combat helicopters, which will replace the currently operated, legacy Mi-24D/W platforms. A number of companies have so far shown interest in the project, including Bell, Boeing and Leonardo.

either as subcontractors or developers of specific weapon systems.

#### Long Awaited Naval Modernisation

The newest TMP includes a number of investments in the naval domain. According to the MoD, in the next decades the Polish Navy will receive a series of surface and subsurface vessels, that will take place of the legacy platforms which are gradually decommissioned, and enhance combat capabilities of the fleet.

The modernisation programme, which draws most attention, is the planned procurement of a series of modern submarines, which will replace the aging fleet of ex-Norwegian KOBBEN class submarines, only two of which, ORP Sep and ORP BIELIK, remain in service. New submarines, if and when finally acquired, will also supplement and eventually replace the sole Polish KILO class vessel, ORP ORZEL, which for the past several years have suffered from continuous technical issues.

For the past several years the Polish MoD has struggled to finalise the procurement of a series of modern submarines under the ORKA programme, which called for the acquisition of vessels equipped with the AIP system and capable of launching cruise missiles, making it a strategic deterrent in case if any conflict would have emerged from the East.

A number of European manufacturers shown their interest in the ORKA programme, presenting their offers formed around particular naval platforms. These included ThyssenKrupp Marine Systems with the Type 212CD (Common Design), Naval Group offering the SCORPÈNE submarine and Saab with its innovative A26 platform.

However, despite year's long discussions between the MoD and industry, the department failed to continue with the ORKA programme and finalise the procurement, putting the Navy in a particularly difficult position, as further reduction of the submarine fleet, without any replacement platforms, will lead to degradation of its combat potential. Furthermore, without having a required number of operational vessels, the Navy will find it impossible to maintain a sufficient number of trained and experienced crew members.

Despite many difficulties, the Polish MoD upholds its wish to modernise the submarine fleet. However, as procurement of new vessels won't be possible in the near future, mostly due to other, more urgent acquisition projects, as well as the need to reconfigure technical requirements set for manufacturers, the department introduced an interim solution, which will lead to procurement – or leasing – of two 2<sup>nd</sup> hand submarines from one of Poland's partner nations.

Among other modernisation efforts in the naval domain outlined in the new TMP is the programme MIECZNIK, which calls for the procurement of two coastal defence vessels, as well as acquisition of six locally built light rocket vessels under the MURENA project.

According to the MoD, successful implementation of both programmes will in no small part be dependent on fruitful cooperation with the local naval and defence industry. It is expected that the country will very much like to contract Polish shipyards and other manufacturers for building, outfitting and testing of these vessels. However, it's clear that due to a number of reasons, like lack of



The WISLA programme calls for the procurement of eight batteries of the PATRIOT-based medium range air-and-missile defence system.



The Polish MoD has a requirement for several hundred additional ROSOMAK AMV 8x8 armoured vehicles in a number of variants, including some fitted with unmanned turrets. The country has a rich experience in operating these platforms, having sent them on a number of foreign military operations, including the NATO-led mission in Afghanistan.



The Polish Army awaits procurement of additional batches of KRAB 155mm tracked, self-propelled howitzers, based on the K-9 chassis.

proper experience in designing and building of such complicated vessels, the MoD will most likely have to enter into partnership agreements with foreign designers and manufacturers, which would act as subcontractors.

#### Land Domain Modernisation

In regards to the ongoing modernisation of the Land Forces, the MoD sets out a number of priority projects, out of which four seem to be of the biggest importance and might have a significant impact on the country's security. These are: further modernisation of the LEOP-ARD 2A4 Main Battle Tanks (MBT) to the 2PL standard, procurement of additional Rosomak/PATRIA AMV 8x8 armoured vehicles (in the baseline and special variants, as well as armed with unmanned turrets), acquisition of new generation MBTs under the 'Wilk' programme and new tracked infantry fighting vehicles (IFV) as a result of the 'BORSUK' project. The first of the programmes is run by a consortium of PGZ and ZM Bumar Labedy, a member of the former holding, which partnered with Rheinmetall. Under contracts signed in 2015 and 2018 a full fleet of Polish Army's 142 LEOPARD 2A4 MBTs is expected to be modernised to the new standard. According to the agreed timeline, the programme, which is delayed by at least several months now, should commence in 2021.

Among modifications, which are expected to be implemented during the modernisation process, are: new/upgraded observation and aiming sites for the commander and gunner, improved ballistic protection of the turret, new electronic system for turret traverse and cannon elevation, installation of more effective fire/explosion prevention system, new command and control system, additional APU generator, additional cargo carrying equipment and upgraded evacuation/ towing system adjusted to the higher weight of the platform, new fire control system, new ammunition (DM63 antitank and DM11 multipurpose) and day/ night reverse camera for the driver.

At the end of 2018, a number of prototype LEOPARD 2PL vehicles were delivered to Poland for testing. During the subsequent trial period a list of technical issues were identified, which needed to be fixed by the contractors. Most of the problems were related to the breakdown of particular subsystems and other types of on-board equipment. Some of them were not even included in the upgrade programme, therefore, they did not go through a proper overhaul and maintenance. It seems that the Polish MoD is also to be blamed for the delay, as it is said to have introduced a number of additional modernisation goals, only after the original contract was signed, which forced the industry to reconfigure the project.

Procurement of new generation MBTs is considered as one of the priorities for the Polish Army, as the service currently operates several hundred legacy Soviet-era T-72 and PT-91 vehicles. Although the Polish authorities declare they wish to engage the local industry in the procurement process to as big an extent as possible, it seems unlikely, that the new platform will be designed and developed in the country. More likely Poland will join one of the international, European-level programmes, which should lead to the development of the next generation MBT platform.

The BORSUK programme will significantly change the posture of Polish Army's armoured vehicle fleet, enhancing its operational capabilities and adapting it to the requirements of the modern battlefield. New IFVs will replace the fleet of legacy BWP-1 vehicles.

The future Polish IFVs will most probably be manufactured in the country. The local industry, including Huta Stalowa Wola (HSW), another member of the PGZ holding, has been developing such a platform for years. The vehicle awaits to enter a long and complicated process of field trials, which will test its operational and combat capabilities and prove that it meets Army's technical requirements. 'The era of post-Soviet BMP-1 IFVs is coming to an end. BORSUK will lead to their replacement by a modern platform developed and manufactured in Poland', said Blaszczak.





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### Viewpoint from Vienna

## Austria's Military: Renew or Abolish

#### **Georg Mader**

A the moment, it does not look as if the new conservative-green cabinet of Chancellor Sebastian Kurz will improve the precarious financial and material situation of the Austrian Armed Forces. Therefore, the prospects for Klaudia Tanner as Austria's first female Defence Minister are bleak. In the tabloid press, however, she gives a first impression as if she knows what kind of mission Kurz has chosen her for. After being sworn in on 7 January 2020 at the Federal Presidency, the Austrian Armed Forces welcomed their new political leader in the Rossau barracks. The new Defence Minister of Kurz's neo-conservative People's Party (OEVP) succeeds Mario Kunasek of the Freedom Party



(FPOE), who resigned in May 2019 when the previous centre-right government collapsed in the aftermath of the 'Ibiza' scandal.

#### A Huge Investment Backlog

Since then, Interim minister, Lt-Gen. Thomas Starlinger used his non-partisan role to confront the Austrian public with the dire situation of the Austrian Armed Forces, which is facing an investment backlog of about €16Bn. On 7 January, he reminded for the last time of the serious situation in many units and the obsolescence of many weapon systems by stating that Austria's military is unable to protect the population or critical infrastructure .

Upon her arrival in the Ministry, Tanner promised the officers and soldiers "to develop the army and national defence in tune with our time and our tasks", adding that "there is a difficult and steep road ahead of us. She emphasised that the Austrian Armed Forces need sustainable resources and structures as well as new equipment. With several procurements, major decisions have to be made. "We will master these challenges together." She announced the consistent implementation of a policy in the interests of the Austrian Armed Forces. "I know the uniforms and I know the hierarchies" from the time when she was the first woman to head the Lower Austrian Farmers' Association. She wanted to be "minister of the armed forces and not of words", she added, underlining that she saw the Army as "Austria's security guarantee". She also promised "adequate personnel and material equipment for the militia". The militia recently lost many vehicles and was also severely restricted by a fatal decision in 2006, which abolished previously obligatory military exercises.

#### In Tune with our Time

Yet, what does "in tune with our time and our tasks" actually mean? It is obvious that Defence Minister Tanner is in a difficult position. For many years, the Ministry of Defence was more an ejector seat than a career springboard, and she faces prejudices because she is a woman and a representative of the Farmers' Union. Yet, a female defence minister is nothing special today, as she is one of a number of successful female European politicians, even though the Austrian media quickly compared her with the new EU Commis-

sion President Ursula von der Leyen, who had also been German Minister of Defence. However, even more than its German counterpart, the Austrian military faces so many challenges that could quickly overwhelm Tanner's political fate. She will only be able - the presentation of the budget is on 18 March to grant some relief to the many problems she has inherited, depending on the funds that will be granted to her. Therefore, it might be tempting for the politicians around the young 'boy wonder' Kurz to re-model the tasks of the armed forces instead of providing it with sufficient funds. Allegedly, the politicians surrounding the Vice Chancellor lack any interest or affection for the nation's military or any military. Whatever her fate, the military will remain an unpopular stepchild. For decades the military served as a 'piggy bank', slaughtered to finance other 'sweet treats'. With the result that the piglet, which was beaten for so long by socialist-led coalition governments, now looks more like a skeleton from a horror film.

#### No Battle at Vienna's Gates

The recently presented government programme states that Austria no longer has any enemies in its neighbourhood and, therefore, the classic military means are no longer needed and the previous reduction of heavy systems such as LEOPARD 2A4 MBTs and M-109A5OE artillery should continue. Many insiders, therefore, predict that there is a hidden political agenda at play owing to the Green Party, which, it is said, aims to transform Austria's army into a kind of lightly armed disaster relief agency. Perhaps, it is true that there will be no heavy tank battle at the gates of Vienna. While other missions, such as disaster relief or cyber defence, are of civil and/or military importance, this is not the constitutionally prescribed mission of the military. However, if hostilities were to break out again, which nobody wants to happen, we all have seen the heavy tracked systems that are prominently featured on our evening television news, not somewhere far away, but near Europe, from Libya to Syria and Ukraine. Maintaining only 20 such platforms is not a competence factor, as key personnel will disappear and the few remaining systems will soon be obsolete, especially if, as in Austria, nothing investment has been lacking for the past two decades.

#### **Critics From Out of the Blue**

What is known so far about the strategy of the new centreleft administration has already caused some alarm - naturally from the bipartisan Officers' Society, but also from the Freedom Party. Their defence policy spokesman, Dr Reinhard Boesch MP, called the OEVP and the Greens "the gravediggers of the Austrian Armed Forces" and stated, "A constitutionally oriented and capable army for national defence was never the honest concern of Sebastian Kurz and his 'young Turks'. The huge problem of financing the Federal Army is apparently to be compensated for by a reorientation of the army with a decimation of its scope, tasks and capabilities, all at the expense of Austria's security! The military national and territorial defence is no longer mentioned in the government programme. Kurz thus is making a U-turn compared to our previous FPOE coalition government." In addition, he quoted figures issued by parliament last year, which called for a steep increase in the Austrian defence budget – €2.9Bn in 2020, €3.3Bn in 2021 and €3.6Bn in 2022. At that time, the Social Democrats supported this, but they were not in government either, and this motion has never been heard of since.

#### **Sad Examples**

Looking at the catastrophic record of their predecessors, one might think that things can only get better. However, the problems are numerous, whether on a small or large scale. For example, the army in Upper Austria owns 1,000 hectares of forest which are infected with bark beetle. Requested by the authorities to remove infected wood, the regional commander has only one military forester at his disposal – and this person is on a long-term recreational leave. So he gathered recruits who are from the countryside and are familiar with forestry, but they have no forestry equipment. Another sad example describes how in all of Upper Austria, there is only one lawnmower for all the barracks.

Another sad example from the upper end: 12 of formerly 40 Saab 105 aircraft are now 50 years old, and here we must recall that this is the Austrian Air Force and not the army of a failed African state. To make matters worse, these jet trainers are currently grounded due to cracks in the joints of the aircraft.Although the type was due to be phased out by the end of 2020,

new hinge bolts are being custom-made to get them back in the air by March, because air policing alone for the whole of 2020 with the remaining 15 single-seat Tranche-1 EUROFIGHTERS would be much more expensive –  $\in$ 3,000 compared to  $\in$ 30,000 per flight hour. The replacement of these six-decade-old interceptors has been postponed for at least 10 years. Modern aircraft from Italy, UK or Czech Republic available, and maintaining a second replacement type would cost more or less the same as doubling the Eurofighter's expensive flight hours and QRA. However, the administration wants to maintain its zero budget deficit policy.



On 7 January 2020, the new Austrian Defence Minister Klaudia Tanner assumed office.

According to recent surveys, Austrians now prefer to strengthen their own armed forces as a kind of insurance policy rather than being defended by the 'zero deficit' and empty phrases of neutrality. Modern threats do not care about Austrian neutrality, especially if it is only big-mouthed and not really supported by serious firepower as in Finland or Switzerland. Switzerland, half the size of Austria and even further to the east, have agreed to their current fighter aircraft procurement because there is supposedly a period of heightened tension for which four fighters are to be permanently on Combat Air Patrol for a whole month. Anyone who made similar demands in Austria would be deported to the lunatic asylum!

As long as the armed forces is still anchored in the Austrian constitution, politicians should respect their role by equipping soldiers in such a way that they are able to fulfil the national defence tasks assigned to them by law. However, if politicians, media and wider society do not live up to this responsibility, the troops will be led to the proverbial slaughterhouse in case of a future conflict. Or the politicians should openly tell us and our European neighbours that Austria does not want to afford the military. If we keep our fingers crossed and hope for neutrality, this could mean risking everything we are proud of. There is no one with a crystal ball, not even Tanner, who is being sold to us as an uncomplicated, tough 'power woman'. It is and remains the Russians who are the undisputed masters of deception.

## India's Defence Modernisation Programmes

#### Suman Sharma

In recent years, India has invested enormous resources in its military. At the same time, under Prime Minister Narendra Modi's 'Make-in-India' initiative, the Indian economy has succeeded in developing many indigenous cutting-edge technologies in the defence sector.

With the annual Indian state budget to be discussed in Parliament in early 2020, 'strategic watchers' are hedging their bets on a large part of the budget being allocated in the revenue category as in in 2019. The ever increasing pension bill seems to be taking the'lion's share' and the picture is slightly grim with the decreasing GDP growth rate of India, which declined from 7.67% to 5% in the last quarter of 2019. While the 2018 defence budget grew by 7.8%, there was a decline in 2019 to 6.8%. The budget allocation for defence in 2017 was INR2.74Tr and, in 2018 it was INR2.95Tr while in 2019 was INR3.18Tr.

#### **The Indian Navy**

The most awaited conventional submarine contract for the Indian Navy, INR450Bn for six submarines, is yet to have its global tender floated. A Request for Information was sent out last year to DCNS Naval Group of France, Navantia of Spain, TKMS of Germany, Daewoo of South Korea, Saab of Sweden and Rosoboron of Russia. Saab has apparently pulled out of the competition owing to a lack of accountability from the Indian side, as this would be a joint venture between the chosen foreign Original Equipment Manufacturer (OEM) and an Indian partner. The Indian partners would be chosen from Larsen & Toubro, Mazagaon Dock Limited (MDL - a government-owned Mumbai based defence public sector unit), Adani-HSL (the state-owned Hindustan Shipyard Limited public sector unit) combine.

This contract goes by the name 'Project 75(i)', and is for an additional six dieselelectric submarines with Air Independent

#### <u>Author</u>

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India's military has made major investments over the years and has acquired many new capabilities.

Propulsion system (AIP) to be integrated on all these submarines. This contract will be under a strategic partnership model, which entails an Indian partner, whether private or public sector, to choose its foreign OEM, based on the technical compliance. These submarines will comply with ISR missions, besides special force and mining operations, anti-submarine warfare and supporting operations ashore.

The ongoing Project 75 for the SCOR-PENE class submarines, worth INR500Bn, is progressing as planned in the Mumbai-based MDL as a joint venture with the French DCNS group, under 'Makein-India' transfer of technology. Under Project 75, the first two submarines, INS KALVERI and INS KHANDERI, have been commissioned into the Indian Navy. These SCORPENE class conventional diesel-electric submarines are 67.5 metres long, 12.3 metres in height and are equipped with missiles, torpedoes and sensors. The first submarine was commissioned in 2017. The Indian Navy has been projecting the need for having AIP on the SCORPENE class, but India's indigenous Defence Research and Development Organization (DRDO) has been developing

its own AIP, along with the Indian Navy's Naval Design Bureau, but does not seem to be in a position to have it integrated in the SCORPENE class. An Indian naval officer has stated that, "Since the indigenous AIP is still being tested, it will be integrated only in the next line of submarines, which is Project 75(i)."

#### The 'Make-in-India' Initiative

The Indian Navy has long projected its need to replace its ageing submarine fleet comprising of 10 Russian KILO class and four German HDW Typ-209 submarines. Owing to legal cases involving alleged kickback corruption, the acquisition has been long delayed.

The Indian Navy's Naval Design Bureau has been a full participant as far as submarine and warship design is concerned, thereby showing its commitment to the Government's 'Make-in-India' vision. Since December 2018, close to 88% of contracts and Acceptance of Necessity (AoN), by value, have been concluded with Indian vendors. Out of the 50 ships and submarines currently under construction, 48 are being built in Indian shipyards.

#### Ambitious Naval Programmes

The Indian Navy has embarked on an ambitious modernization programme, which comprises the indigenous aircraft carrier VIKRANT, which is likely to be launched in 2022, currently under construction in the Cochin Shipyard Limited. Other programmes scheduled for delivery in the first half of 2020 are the P-15B class destroyers, P17A class stealth frigates, Offshore Patrol Vessels and a P28 ASW corvette. The delivery of four additional P8I Maritime Reconnaissance Aircraft is scheduled by 2021, under the contract with Boeing for eight units.

The Indian Navy has also contracted for 16 ASW Shallow Water Craft and 36 aircraft, which includes the Hindustan Aeronautics Limited (HAL) built 12 Dorniers, 16 Advanced Light Helicopter (ALH) and eight CHETAK helicopters. AoN has also been accorded for 41 ships, for 31 helicopters, for the long pending 24 multi-role helicopters and six additional P 8I aircraft.

The Indian Navy requirement for Naval Utility Helicopters (NUH) is for 111 helicopters, worth roughly US\$10Bn. The deal will be under the Strategic Partnership model in a similar way to the Project 75(i) submarine deal. The Indian companies are Bharat Forge, Tata Advanced Systems Limited (TASL), Adani Group and Mahindra while the front-runner foreign OEMs are Sikorsky, Russian Helicopters and Airbus. Retired Naval Aviator Rear Admiral S.M. Vadgaonkar commented, "These Naval Utility Helicopters will replace the ageing CHETAK helicopters, which are of the 1960s vintage and modernization is about having the latest capability to meet the modern day challenges, like anti-piracy and high altitude, etc."

The former Chair of Hindustan Aeronautics Limited (HAL) P.V. Deshmukh has stated, "The Government owes HAL approximately INR150Bn, the payment of which has been delayed as the Government is holding back funds for deals like the S-400 air defence system and the RAFALE fighters, for which an immediate payment will have to be released. As the economy is not doing so well, and the defence allocation in the Union budget not looking very good, the Government needs to find state funds for its welfare schemes, and so defence modernization might suffer temporarily."

Naval Chief Admiral Karambir Singh highlighted last month in his annual press conference, "The Indian Navy envisages the induction of three Aircraft Carriers, which it has projected in its long-term capability plan so that two CBGs will be available



The Indian Air Force Light Combat Aircraft TEJAS received Final Operational Clearance during Aero India 2019.

to be dispersed deployments in the Indian Ocean Region at all times. The broad contours of IAC 2, to be constructed in India as a 65,000 tonnes CATOBAR carrier with electric propulsion, have been formulated and the case will be processed for accord of an AoN."

While Indian MoD sources have confirmed that the production of a second. Indigenous Aircraft Carrier (IAC-2) has been shelved due to its exorbitant price tag, as consultancy being offered by US and Sweden were taking up most of the funding of the contract. The Indian Navy has now placed its efforts in enhancing its in-house expertise in the repair and upkeep of modern weapon and sensors. Two major Armament Repair Facilities are being set up and are likely to be commissioned by mid-2020. To support its fleets to operate effortlessly over the entire IOR, several marine and technical repair infrastructure projects are also in the pipeline. A new Dry-Dock was commissioned by Defence Minister Rajnath Singh in September 2019, mainly to service aircraft carriers. Phase II-A of Project Seabird at Karwar at the Western seaboard will have a full-fledged naval dockyard and associated infrastructure in order to accommodate more ships and submarines.

The Indian Navy has also begun the process of indigenising complex and high end technology equipment, which is presently being imported, such as marine diesel engines, power generators and shafting and propellers, with active participation of the public and private sector, with an aim of reducing the dependency on imports while progressively increasing indigenous content in the shipbuilding projects.

The requirements of armament and weapon systems for Naval programmes under



The AKASH is a domestically developed medium-range mobile surface-to-air missile defence system.

'Make-in-India' will boost Indian SMEs and industries (public as well as private) and foreign OEMs. This also presents excellent opportunities for the creation of several



consortia that could work together for the realization of complete systems, rather than being merely confined to subsystems. These arrangements must necessarily look to take advantage of India's SME eco-system, which have excelled in the development of many naval technologies.

#### **Nuclear Submarines**

While India's first indigenous nuclear submarine, as part of its six SSBNs, was commissioned in 2016, the second in line has been launched but not yet commissioned. The tactical submarine – INS CHAKRA, which is under a 10-year lease from Russia – completes its lease in 2022. CHAKRA-III, which is undergoing refurbishment in Russia, as per Indian requirements, will join the Indian Navy in 2025 under a US\$3Bn deal. CHAKRA-III will be powered by a 190 MW nuclear reactor. It will weigh approximately 8,140 tonnes, have a speed of 30 knots, an operating depth of 530 metres and will be able to carry a 73-member crew.

The Indian Navy also has plans to build an additional six tactical attack nuclear powered submarines-SSNs under the 'Makein-India' programme. While Russian consultancy will be roped in like the ongoing SSBN ARIHANT class programme, design will be carried out in-house by the Naval Design Bureau and manufacturing by Indian companies such as Larsen & Toubro and Hindustan Shipyard Limited.

The ongoing ARIHANT class programme is named S-5, with INS ARIHANT being S-1-prototype. The last submarine S-5 is being aimed to be completely indigenous; it will have the capability to dive up to a depth of 1000 metres. The pre-technical design for S-5 will begin this and the technical design and workshop design will be in place over the next three years, followed by keel laying.

#### Launches

Meanwhile, the various shipyards have their order books full, with a lot of launches witnessed last year such as the INS IMPHAL, the third ship of Project 15B (VISAKHAPATNAM class) stealth guided missile Destroyer deal. The first domestically manufactured stealth frigate, out of a contract for seven under Project-17A INS NILGIRI, was launched at MDL, Mumbai on 28 September 2019.

The fourth submarine of Project 75 was launched last May. The submarine is named INS VELA.

The Keel laying ceremony of the fourth ship of Project 15B (VISAKHAPATNAM class) was held in November 2019, of the second ship of Project 17A in May 2019 in Mumbai, of the first of the Survey Vessel Large in November 2019 in Kolkata, and the steel cutting of the second ship of P-17A commenced in Kolkata.

11 surface platforms (two Off-Shore Patrol Vessels, three Fast Patrol Vessels, six INTERCEPTOR Boats (IBs) have been inducted into the Indian Navy's 2019 calendar.

#### **Indian Air Force**

2019 has been a great year for the Indian Air Force (IAF), with large procurements like the CHINOOK and the APACHE. In July, the IAF took the first deliveries of 15 Boeing CHINOOK heavy-lift helicopters CH-47F (I). The US\$1Bn deal is progressing well. The delivery of the CHINOOK helicopters will be completed by March 2020. Ten helicopters have been received so far. The CHINOOKs will be based at the Chandigarh Air Force Base under the Western Air Command for high altitude operations, for example, taking care of the supply line to the Siachen glacier and the Line of Actual Control bordering China in Ladakh.

Under a multi-billion-dollar deal with Boeing for 22 AH-64E APACHE, the world's most advanced multi-role combat helicopter, the IAF received its first four helicopters in 2018. APACHE is a tandem seating, day/night, all weather capable platform. It is highly agile, survivable against battle damage and is easily maintainable even in field conditions. As a multi-role network centric platform capable for deployment in Air Combat, AD, CI Ops, UAV neutralization, CSAR, and urban warfare, the aircraft meets all the requirements of the IAF as well as the Strike Corps requirements of the Army. Fitted with a 'state-of-the-art' Fire Control Radar, the AH-64 has the capability to detect, locate, designate, track and engage targets in daylight, night, and in reduced visibility conditions. India is also purchasing six AH-64 APACHEs for the Indian Army.

The Spanish Airbus C-295 transport plane due to replace the ageing IAF AVROs has been pending for a long time, out of the 56 AVROs to be replaced, 16 will be bought 'off-the-shelf' and the remaining will be built in India under 'Make-in-India' transfer of technology.

The HAL, which is manufacturing the Light Combat Helicopter to replace the CHEE-TAH and CHETAK helicopters of the IAF, is still to be finalized. Meanwhile the HAL will partner with Russia's Kamov to manufacture close to 200 Ka-226 helicopters, the deal for which has been signed, for use by the IAF.

HAL is also awaiting the orders from the IAF for the 83 LCAs in the Mark-1A category, which is an advanced fighter.

In the order book of the HAL is the HTT-40 fighter trainer for the IAF, after HPT-32 will soon be decommissioned and PILATUS has run into a controversy alleged kickbacks taken by the previous Congress Government. The first phase training will be on the



India's first aircraft carrier INS VIKRAMADITYA, which India obtained from Russia. Originally, the carrier's name was ADMIRAL GORSHKOV.

HTT-40, followed by the second phase of the KIRAN trainers, which will be replaced by the HAL manufactured IJT (Intermediate Jet Trainer). The IJT had issues with its spin test has been modified but is still pending initial trials. The third phase training is on HAWKs followed by the training of the particular fighter.

#### **114 Fighter Jet Deal**

The IAF has a squadron strength of 32.5, while its projected requirement is 45 fighter squadrons. India received the first of 36 RAFALE fighters on 8 October 2019 in Bordeaux, France, where Indian Defence Minister Rajnath Singh attended the handing over ceremony. The IAF is due to receive this jet in May 2000. The first omnirole RA-FALE squadron - the 17 Squadron 'Golden Arrows' - will be based in Ambala, India. The INR590Bn deal for the 36 RAFALEs was announced in 2015 and was inked in 2016, with the jets due to be delivered in batches until mid-2022. The training of IAF personnel is currently in progress in France. The Request for Information for the 1.5 lakh crore 114 fighter jet deal for the IAF has been awarded to the following vendors: Boeing for the F-18, Lockheed Martin for the F-21, which was unveiled in February 2019, Sweden for the Saab GRIPEN, Dassault Aviation for the RAFALE, EADS for the Eurofighter TYPHOON, and Russia for the MiG-35.

All of the above fighters have already been participants of the decade-long MMRCA competition, which explains why the IAF plans to hold swift trials in order to save time, as the competitors have undergone trials already.

#### S-400 Air Defence System

The deal with Russia for the S-400 TRI-UMPH air defence missile system for IN-R400Bn was finalized in June 2018 and signed in 2019. India has signed up for five units for defensive purposes. This longrange 'surface-to-air' missile system can target aircraft, incoming ballistic and cruise missiles and also ground targets. India wants to position them on its 4,000-kmlong eastern border with China. It is suitable for mountainous regions owing to its capability of detecting cruise missiles within 40 kilometres, as they can operate in lowaltitude flight paths.

The S-400 TRIUMF mobile multi-channel missile system comes with a YAMZ-8424.10 Diesel V12 400 HP/294kW engine and is equipped with a warhead that is directed to ensure complete destruction of targets. A gas system fires the missiles from a launch



BrahMos missile launchers on parade during Indian Army Day in 2013. The BrahMos missile is said to be one of the world's fastest missiles.

tube up to an altitude of 30 metres. The S-400 is a complete system with an aim to effectively combat future air threats.

New Delhi has discussed the issue of getting immunity from the newly formulated US 'Countering America's Adversaries Through Sanctions Act' (CAATSA), as Moscow was placed under sanctions. Under CAATSA, the US can punish those countries that engage in defence business transactions with Russia. India has been a long-time partner of Russia and is the largest buyer of defence hardware. For example, US sanctions on Rosoboronexport can affect deals worth billions of dollars.

#### **Payment Issues for the S-400**

The Russian arms company Rosoboronexport has been placed under sanctions by the US Office of Foreign Assets Control and is thus one of more than 40 Russian armsproducing OEMs affected by sanctions. It is a matter of making payments and finding a legal and secure way to avoid US sanctions, as the State Bank of India (SBI) cannot be used for this purpose. In all defence transactions, India uses the SBI for payment purposes, but when dealing with Russia, SBI cannot be involved.

Talks are ongoing with other banks, like the Vijaya Bank and UCO Bank, according to sources. According to a Government official, "Either payment will be made in kind, a sort of a barter, or through these banks, where Russia will open an account and trade in the Indian Rupee, so that SBI is not affected by sanctions. Vijaya and UCO banks are not affected by sanctions, therefore they could be used. India buys oil from Russia and exports pharma products, chemicals and food products, so these products could be traded as barter."

#### **Missiles**

The IAF is procuring 18 squadrons of Medium Range 'surface-to-air' Missile System jointly developed by DRDO and Israel Aerospace Industries. Its induction will be from early this year. The contract for seven additional indigenous AKASH missile squadrons and associated specialist infrastructure was signed last September, the induction for which will commence from 2021.

The IAF has contracted for 272 Su-30 MKI aircraft under various contracts. Presently, deliveries are continuing under a block IV contract and are likely to conclude by March 2020. The Su-30 MKI currently is the largest and amongst the most potent fighter fleet in operation within the IAF. The discussions for an upgrade of these frontline fighters to be done by HAL are ongoing.

The ASTRA BVR missile being designed and developed by DRDO has been evaluated for its performance and a missile test with a foreign client was successful. The IAF plans to procure these missiles for its fighter aircraft. Three missiles were launched in combat configuration with warheads and neutralized manoeuvring targets to establish the end-game capability of the missile. The trial campaign also included a direct hit of the target by the telemetered missile at maximum range.

The successful integration of the Indo-Russian BrahMos surface-to-air' missile on Su-30MKI aircraft to enhance the strategic significance and combat potential of the aircraft has been concluded. DRDO and IAF jointly successfully conducted two BrahMos supersonic cruise missile tests –



Under 'Mission Shakti', DRDO successfully launched a Ballistic Missile Defence (BMD) Interceptor missile in an Anti-Satellite missile test, engaging an orbiting Indian target satellite on 27 March 2019.

one each from land and air platforms. The first missile launch was from a land based mobile launcher, where most of the components were indigenous, including the missile airframe, fuel management system and DRDO- designed seeker.

The IAF has inducted the Do-228 Dornier aircraft with on-board Flight Inspection System (FIS) to undertake the Cat-II calibration of navigational aids available at Modernized Airfield Infrastructure (MAFI) at IAF bases. The induction of FIS aircraft would facilitate the in-house calibrations of MAFI assets and Navaids.

#### **Upgrades**

The Final Operational Clearance (FOC) of the MIRAGE-2000 fighters had been completed in March 2018 and series production is underway. The upgraded MiG-29 fighter aircraft have been allotted to a frontline squadron and are currently being used in operation. They are equipped with 'state-ofthe-art' avionics, an array of smart 'air-to-air' and 'air-to-ground' weapons and are capable of in-flight refuelling, which significantly increases their combat potential.

The upgrading of Jaguar DARIN-I JAGUAR aircraft to the DARIN-III standard by HAL included integration of new mission computers, cockpit displays (SMDs, Engine and Flight Instrumentation System), Fire Control Radar, Hybrid navigation system and Autopilot with advanced modes. With the integration of these systems through new mission software, the cockpit has been transformed into a fully functional glass cockpit. With the integration of the radar as primary sensor, the operational capability of the JAGUAR aircraft in detecting air, surface and sea targets has been greatly enhanced. With the avionics of DARIN-III aircraft, capability has improved significantly. Flight trials for the FOC was completed in November 2019. The DARIN-III platform has matured into a potent strike platform with 'state-of-the-art' integration of on-board sensors. The delivery of upgraded aircraft will commence in December 2019.

#### **Successful Tests**

DRDO has successfully completed a number of tests. The first ever arrested landing of a Navy Light Combat Aircraft at the Shore-Based Test Facility INS Hansa in Goa was successful. The test will pave the way for the indigenous platform to undertake landings on board the Indian aircraft carrier VIKRAMADITYA. Text book arrested landing heralded the arrival of a truly indigenous capability.

Airborne Early Warning and Control (AEW&C) is an indigenous system successfully developed by DRDO. The second AEW&C aircraft was handed over to IAF in September 2019. The system was delivered to Bhatinda Air Force Station in the Punjab, Punjab. The system comprises an Active Electronically Scanned Array radar, secondary surveillance radar, electronic and communication countermeasures, beyond 'lineof-sight' data links, satellite communication systems, advanced identification friend-orfoe system, provides 240° coverage, and a surveillance range of more than 250 km. The DRDO flight-tested indigenously developed low weight, fire-and-forget Man Portable Antitank Guided Missile (MPAT-GM). The missile was launched from a man portable tripod launcher on the target mimicking a functional tank. This was the third series of successful testing of the MPATGM. The missile has a 'state-of-theart' Infrared Imaging Seeker along with advanced avionics.

The DRDO has also successfully tested the 'state-of-the-art' Quick Reaction Surfaceto-Air Missile (QRSAM) against live aerial targets. Two missiles were tested against two live targets, meeting complete mission objectives of engaging the targets. QRSAM, with many advanced technologies, engaged the targets at different ranges and altitudes. The system has been tested in final configuration with radar mounted on a vehicle and missile on the launcher. It comprises an indigenous Phased Array Radar, Inertial navigation System, Data Link and RF Seeker, and is being developed for the Indian Army with 'search-and-track' and 'on-the-move' capability with very short reaction time.

India also joined a select group of countries with an Anti-Satellite (ASAT) missile capability after undertaking a successful test 'Mission Shakti'. A DRDO developed Ballistic Missile Defence (BMD) Interceptor Missile engaged a Live Indian satellite orbiting in Low Earth Orbit in a 'hit-tokill' mode. The interceptor missile was a three-stage missile with two solid rocket boosters. Tracking data from range sensors confirmed that the mission met all its objectives. The test demonstrated India's capability to defend its assets in outer space and vindicated the strength and robust nature of DRDO's programmes.

#### **Indian Army**

In December 2019, the Indian Army began introducing the newly purchased Sig Sauer assault rifles. The first batch comprises 10,000 SiG 716 assault rifles for the sensitive northern borders. The Army has signed a contract for more than 70,000 new assault rifles to replace the obsolete Indian 5.56x45mm Insas rifles.

At the same time, India and Russia have signed a contract for 650,000 Kalashnikov AK-103/203 assault rifles to be built in India for the army's combat units, replacing the INSAS and AK-47 rifles. The joint venture is between the Russian Kalashnikov and the Indian Ordnance Factory Board for the production of the AK-103 in India. It applies first primarily to the Indian Army, then to other Indian customers such as the Central Police, followed then by export orders.

### "Naval warfare is undergoing a rapid transition"



On 22 August 2019, Admiral Michael 'Mike' Gilday stepped into the Chief of Naval Operations (CNO) of the US Navy at a challenging time. Amid growing threats around the globe – confront the forces of Beijing and Moscow and the ongoing counter-terrorism operations in the Middle East, Africa and Afghanistan – he must lead a Navy that is in the midst of a force structure assessment, resolve the persistent maintenance and readiness bills, deal with some of the fallout from the issues related to the development of the aircraft carrier USS GERALD R. FORD and cope with the questions about the training of the officers and sailors in the aftermath of the USS MCCAIN and USS FITZGERALD collisions. Faced with this laundry list of challenges the Admiral has no plans to follow a 'business-as-usual' approach. ESD had the opportunity to talk to him.

**ESD:** Admiral, what is your assessment of the US Navy since you took command in August this year?

Adm Gilday: Naval warfare is undergoing a rapid transition, which demands integration between each of our fleets. We are adopting this transition with urgency. Our Navy will deliver a combat credible maritime force ready to conduct prompt and sustained combat operations at sea. Together with the US Marine Corps, our Navy is the bedrock of Integrated American Naval power. We will re-examine our force structures with the US Marine Corps, aligning our concepts, capabilities, programming, planning, budgeting, and operations, in order to define and develop future platform. Our strategic direction is strong, and I am convinced of the necessity of working closely alongside our allies and partners across the globe, as we have done for many years.

**ESD:** How has your nation's maritime security environment changed in the recent years, and how have those changes impacted the operations, manning, and future plans of your Navy?

Adm Gilday: I believe that naval warfare is undergoing a rapid transition, demanding the integrated, multi-domain capabilities of our fleets. We must and will respond to this transition with urgency. The very nature of our operating environment requires shared common values and a collective approach to maritime security. And that makes steady, enduring Navy-to-Navy relationships more important than ever.

Combined with a robust constellation of allies and partners who desire to build and strengthen the international economic order, we are all operating towards the same end. I am keenly focused on continuing our efforts to ensure security and stability that results in a free and open maritime commons.

Given the changing security environment and the increasingly multi-domain nature of threats, accelerating our sea service digital transformation is critical to preparing our assets and personnel to fight effectively across all domains

**ESD:** How would you define the nature of the maritime challenges facing your navy? **Adm Gilday:** The scope and scale of human activity today has made our economies more dependent on the seas than ever before. From energy generation to mining, from the transport of raw and refined products around the world to fishing and expanding digital infrastructures – all of us depend on the world's oceans. Waterways enable economic prosperity of nations, allowing the free flow of more than 90% of all trade and 99% of digital information. Indeed, our global economy floats on seawater.

The rise of global information systems, and the role of data in decision-making have also helped foster the environment and competition in which we find ourselves. Today, we are in a competition for sea control, sea lines of communication, access to world markets, and diplomatic partnerships. These are challenges, but also opportunities for us to harness these forces and compete effectively in today's maritime security environment.

**ESD:** Which are the difficulties facing your navy and how will you try to overcome these?

Adm Gilday: As we will still be using about 75% of our current fleet in 2030 we must continue to modernise our weapons, sensors, and platforms as we have learned over the past decade that it is cheaper to maintain readiness than to buy it back. Our near-term challenge is reversing the trend of delivering only 40% of our ships from maintenance on time by reducing, and eliminating, lost days through depot availability.

**ESD:** What is likely to have the biggest impact on your Navy over the next years?

Adm Gilday: I am focused on the frontiers of technology, which has always shaped the naval environment. We are rapidly innovating and digitising our operations through tactical cloud computing, artificial intelligence, and machine learning. We will combine that innovation with our talented sailors to generate unprecedented naval power – naval power that will preserve security.

The USN will further integrate space, cyber, electronic warfare, and special operations into fleet Maritime Operations Centres and the fleet staffs must strengthen and synchronise space, full-spectrum cyber, electronic warfare (EW), and information operations (IO) to fight effectively across all domains.

Thoughtful, focused decisions to rapidly mature, acquire, and field cutting-edge technologies – and integrating them into joint operating concepts – will be key to ensuring our navy always fights from a position of advantage among a network of allies and partners, unmatched by any rival.

**ESD:** As the former Commander U.S. Fleet Cyber Command/U.S. 10th Fleet, you are the right person to understand what the dangers of cyber threats are for your navy. What will be the greatest challenges the US Navy will have to face? What is needed to improve security in the cyber domain?

Adm Gilday: My experience as Commander of the US 10th Fleet helped me to understand the connections between the digital world and the maritime, and the challenges related to the interconnectedness of both. I believe we must strive to think differently and to educate our sailors about this digital realm as we rely on it more and more for security and stability. The US Navy will bridge the cyber divide to overcome new operational challenges in our own fleets.



In 2018, 75% of US Navy sailors who were eligible to reenlist for a second tour did so.

We must leverage the power of networks, tactical cloud computing, machine learning, and artificial intelligence (AI), including tactical clouds on our platforms and shore infrastructure.

**ESD:** Obviously, people are the key element in naval forces. Does your navy face any problems in recruiting and retaining the right people? Rumour goes that the crews are overstressed due to the increasing commitments and long deployments. What should be done to address these issues?

Adm Gilday: Our navy cannot succeed without its sailors – they are our asymmetric advantage. By every metric, our sailors are the best we've ever seen. Last year, 75% of

our sailors who were eligible to reenlist for a second tour did so, and we've met our recruiting goals for the past 21 years. Going forward, we must have the right mix of people with the right proficiency, experience, and training to properly man the fleet. I want my sailors to be focused on being at the highest possible operational readiness level. Therefore, we must care for them and their families and providing sailors stable and predictable deployment cycles, because at the end of the day, it's not high technology that will win a fight – it's going to be the individual sailors.

**ESD:** What do you think is needed for an effective approach to Maritime Security and Maritime Situational Awareness?

Adm Gilday: Today, the very nature of our operating environment requires shared common values and a collective approach to maritime security. And that makes steady, enduring Navy-to-Navy relationships more important than ever. Our common naval experience strengthens our ties and maintains the security and stability that continue to deliver prosperity to all. While any navy can surge forces, none of us can surge trust.

**ESD:** One of the first major maritime international events you attended as the new CNO was the XIIth Regional Seapower Symposium (XIIth RSS) in Venice. What is the value of this symposium?

Adm Gilday: The "XIIth Regional Seapower Symposium" underscored the inherent interconnectedness of the globe: of our economies, thoughts and ideas and our security. The symposium brought together a robust constellation of allies and partners



The USS GERALD R. FORD underway on its own power for the first time. The first-of-class ship – the first new US aircraft carrier design in 40 years – spent several days testing the ship's key systems and technologies.

who desire to build and strengthen the international economic order, all operating towards the same end - continued security and stability. Our strategic direction is strong, and I am convinced of the necessity of working closely alongside our allies and partners across the globe, as we have done for many years. I am focused on continuing our efforts to ensure a free and open maritime commons. Symposia like the Regional Seapower Symposiumseries help us build relationships so that we can talk to each other in good times as well as in difficult ones. And that makes steady, enduring Navy-to-Navy relationships more important than ever. Consequently, we are committed to maintaining a steady course of naval cooperation, strengthening the connections among our services.

**ESD:** What is the course ahead for the US Navy? How do you see the evolution of the US Navy both on the short and long term?

Adm Gilday: Mission one for each of our sailors – active, reserve and civilian – is the operational readiness of the fleet. Improving depot-level maintenance, integrating space and cyber capabilities, modernising training and education, and striving toward a culture of excellence will ensure we have a ready navy for tomorrow. We must be a ready navy – ready to fight today – but also be committed to training, maintenance, and modernisation, which will ensure that we have a ready Navy for tomorrow. We will experiment and exercise at the

high end of naval operations. Hence my

Biography

A 1985 US Naval Academy graduate, Admiral Michael 'Mike' Gilday is a surface warfare officer. He holds Master's Degrees from the Harvard Kennedy School and the National War College. As a junior officer, he served onboard the destroyer USS Chandler, and the cruisers USS Princeton and USS Gettysburg. His seagoing commands were the destroyers USS Higgins and USS Benfold and, subsequently, commanding Destroyer Squadron 7, serving as sea combat commander for the Ronald Reagan Carrier Strike Group. As a flag officer, he served as commander Carrier Strike Group 8 (CSG 8), embarked aboard USS Dwight D. Eisenhower. His staff assignments include the Bureau of Naval Personnel; staff of the Chief of Naval Operations, and staff of the Vice Chief of Naval Operations, executive assistant to the Chairman of the Joint Chiefs of Staff and Naval Aide to the President. As a flag officer, he served in joint positions as Director of Operations for NATO's Joint Force Command in Lisbon; as Chief of Staff for Naval Striking and Support Forces NATO; Director of Operations, J3 for U.S. Cyber Command; and as Director of Operations, J3, for the Joint Staff and as Director, Joint Staff; and just prior his appointment as the 32<sup>th</sup> CNO he headed the U.S. Fleet Cyber Command/U.S. 10<sup>th</sup> Fleet.

intention to organise again more largescale exercises that will include a great deal of experimentation, starting already in the Summer of 2020. These exercises will allow us to develop and test alternative concepts in order to provide us the means to adapt or modify our doctrines and tactics where needed. And by doing so, we will improve our readiness and responsiveness, pioneer new concepts, strengthen deterrence, and positively shape the security environment.

I intend to ensure the sea service remains focused on its role, as part of the Joint Force, in protecting the American homeland and defending America's interests. It is our duty to ensure that we can compete, fight and win across the spectrum from peaceful presence to violent conflict – in all domains. **ESD:** Admiral Gilday, being at the helm as CNO since 22 August 2019, what do you hope to achieve by the end of your tenure?

Adm Gilday: It's the honour of my career to be the Chief of Naval Operations, and it is my job to make sure that we have a ready navy, capable to conduct and sustain combat operations at sea if called upon and, at the same time, keep eyes on the horizon in order to build a navy that is needed for the future. I intend to ensure that we will be the navy the United States expects and deserves, always guided by our core values of honour, courage, and commitment.

The interview was conducted by Guy Toremans.



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# **Czech Air Force Modernisation**

#### **Alan Warnes**

Over the next decade the Czech Air Force is set to transform itself into a sleeker, more modern force. Since joining NATO 20 years ago, the relatively small air arm has been trying to catch up with some of the more established air forces' capabilities.

Regardless, it has become an established and enthusiastic member of NATO by participating in many exercises like Hot Blade and Ample Strike, held at Namest nad Oslavou this year, and operations in Iceland and Baltics whenever possible. Undoubtedly, the air force makes a little go a long way – with a small fleet of 14 GRIPENs manning two QRAs in Amari, Estonia and Caslav, Czech Republic.

#### **Fighters**

Czech Air Force Commander Major General Petr Hromek told the author in September 2019; "Now it's not just NATO that could ask for support but the EU, too and so I have to ensure that, as the force provider and force user, I am prepared for any eventuality and that means we have to modernise."

Since joining NATO in 1999, the Czech Air Force has been transformed and now is a reliable NATO partner standing alongside the more established militaries. In 2005, the CzAF signed a lease deal with Saab for 12 single-seat JAS 39Cs and 2 dual-seat JAS 39Ds, which in 2015 was extended to 2027, with an option for another two years. Last year they were updated with the Mission System (MS) 20 which has brought new capabilities. "It has brought a lot," the Commander told me. "We now operate with LITENING pods, have Have-Quick ra-

#### Author

Alan Warnes is a journalist specialising in military aviation and has travelled to over 60 countries researching articles and taking action photos for his work. For 12 years, he was the Editor of AirForces Monthly magazine in the UK, before opting to go freelance. He has also written several books, including two on the current Pakistan Air Force in 2008 and 2017, and the most recently on 100 years of Aero Vodochody.



The CzAF JAS 39C GRIPENs are currently working two Quick Reaction Alerts, at Amari in Estonia for BAP and their base at Caslav to cover Czech air space. Five aircraft are seen on the ramp at Caslav, armed with AIM-120C5 AMRAAMs and AIM-9M SIDEWINDERs on 30 August before they departed for the CzAF's third BAP tour.

dios and are all set for the introduction of Link 16 and Night Vision Goggles early next year."

The 211 Sqn GRIPENs' main role is defending Czech air space, for which they are on around-the-clock Quick Reaction Alert (QRA), equipped with AIM-9M SIDE-WINDERs as well as the 27mm Mauser gun. They can also carry up to four AIM-120C5 AMRAAMs but they have only been used for the Iceland Air Patrol (which the Czechs have manned three times) and the Baltic Air Policing (three times). Five GRIPENs deployed to Ämari in Estonia during late August, for a four months BAP stint that will end on December 30. While the LITEN-ING pods have allowed GRIPENs to train with JTACs (Joint Terminal Air Controllers) during their BAP commitment they will be used for a new role, for long range air-toair identification, so they don't have to get so close to intercepted aircraft while a full motion video is included as well.

As a result of the BAP detachment, the GRIPEN pilots have been trying to get current in the air-to-air refuelling role, which has proved difficult. Plans to train with a USAF KC-135R for a week in April as well as a Swedish Air Force C-130H HERCULES tanker in mid-May never came off because the aircraft couldn't make it. "It has been frustrating," the Commander told me, "but we are hoping in the longer term to fix this. Signing up to the MMF [Multinational Multirole Tanker Transport Fleet] in late October should help."

As part of the agreement, the Czech Air Force will be able to use 100 flying hours of NATO's eight strong A330 MRTT fleet. "We plan to use the aircraft for transport as well as air-to-air refuelling, which will benefit the GRIPEN fleet's capabilities." However, the AAR needs are not set to finish there, as the Chief added, "I have also been discussing with the German Air Force Commander, to work with his AAR equipped A400Ms. Of course there is some way to go yet, because the GRIPEN has to be certified as an A400M receiver which Saab will do. But I am positive it will happen."

On a future GRIPEN replacement, the Commander is now setting up an office to start looking at a JAS 39C/D successor, which could come as early as 2027 or 2029 at the latest. "It is important we start looking at all eventualities, and we hope to have a team in place next year, to start evaluating all the options by late 2020 or early 2021. There has a long lead-in time when buying new platforms so we have to ensure we order them several years ahead."

In the past the Czech Air Force was gain to have two GRIPENs squadrons, but has stuck to one due to budget constraints that are augmented by a squadron of L-159s. The 16 strong single-seat L-159 fleet is now going through a CZK1.6Bn maintenance contract, announced at the International Defence and Security Technologies (IDET) Fair in Brno on 29 May 2019. The Commander continues, "This will be the L-159's second eight-year overhaul and allows them to continue into service for the foreseeable future."

That ensures they remain flying until 2028/29 when a new fighter should be introduced into service, and could well open up the possibility of a two squadron purchase, of whatever the new platform will be. That would be quite a prize for a manufacturer.

As well as maintenance, there will also be several upgrades to the L-159s. One of them is the modernisation of the NVG (night vision goggles) system and adapting the cockpit for internal and external lighting. It will make sure the whole L-159 fleet is NVG compatible. Another upgrade is the installation of an Electronic Standby Instrument System (ESIS), to substitute several standby instruments and provide the pilot with attitude, airspeed, altitude, vertical speed and heading data in the event of a panel failure. Aero has already installed the ESIS to the five L-159T1s. These are being used to streamline the current lead in fighter training set-up, and have been joined by three new L-159T2s. The Commander added. "They were all delivered earlier this year and are now being used to train the pilots."

#### L-39NG?

On the basic jet training system, run by LOM Praha's CLV, the current seven L-39Cs are now in the twilight of their career and a replacement has to be ordered soon. The Czech Air Force Chief told the author, "These aircraft have enough hours on them to continue until 2022/23," and



With the Czech Air Force set to acquire four AH-1Y VENOMs (seen here) and eight UH-1Y VIPERs, an example of both type was airfreighted to Ostrava for the NATO AirDays Show on September 20-21.

he added, "We hope that CLV will acquire four L-39NGs for our use – we know they are trying to find the appropriate funding to do this. We need them."

Aero Vodochody does not yet have any orders for the trainer version of the L-39NG, although the there are four light attack versions for a Senegal Air Force requirement. Needless to say, the Czech aerospace company is keen the domestic market purchases the new jet trainer, for ensure future export success.

#### Helicopters

On the helicopter front, the Czech MoD announced in mid-August that the Bell UH-1Y VIPER and AH-1Z VENOM had been selected to replace its fleet of Mi-24V/Mi-35 Hinds. The deal reputedly worth \$622M is according to the Commander, "expected to be finalised by the end of November, or failing that by the end of year with deliveries expected by the end of 2023."

This marks the first sale of the pair to an export customer, and was selected ahead of an offer of 12 armed Lockheed Martin/ Sikorsky UH-60M BLACK HAWKs. While its believed the BLACK HAWK deal was cheaper, the Czech MoD wanted a specialised attack helicopter. Both the AH-1Z and UH-1Y share around 85% commonality, greatly reducing the logistics and maintenance costs. Operationally, they will also work together with the AH-1Zs providing air support for UH-1Ys and the troops inside and will be



A squadron of L-159s continues to work in the close air support role. The first two of 16 have recently been delivered to Aero Vododchody for overhaul, that will see them operate for another eight years.

based where the Mi-24/35s are currently housed, at Namest nad Oslavou.

The Commander added, "Spares for the Mi-24/35s are increasingly difficult to acquire and we had to look at new options. We hope to keep the Mi-24/35s flying until around 2025, when the new helicopters will be fully operational."

There are currently 15 of these Russian attack helicopters flying with the Czech Air Force, the six Mi-24Vs delivered in 2003 were joined by ten Mi-35s between April 2005 and January 2006 although one has since been lost. "We recently received two Mi-24/35s from LOM Praha where they are overhauled and there are currently four there now," said the Commander. Recently the Mi-24/35s were on exercise in the Pyrenees with the Mi-17ShMs for mountain training. While the operational use of the Mi-24/35s now have an end-date, the Mi17/171S are expected to soldier on until



Czech Air Force Commander Major General Petr Hromek

at least 2030 the Commander told ESD. Already aerospace companies have their options in mind, and with that in mind Leonardo Helicopters attended the NATO AirDays show at Ostrava on September 20-21, to promote the AW101.

Ten smaller PZL SOKOL W3A also serve the CzAF, with six of them configured for the SAR mission based at Pilzen-Line. The remainder are based at Kbely CLV Pardubice fly four Enstrom 480B-Gs for helicopter flying training which replaced the Mi-2s because spares and support from Russian Helicopters were so expensive. One continues to soldier on for airshows and special



This stunning looking LET L-410 is used for transporting VIPs. It is one of six on strength with the CzAF.

occasions until Pardubice show next May; then it will be retired.

#### Transports

The bulk of the transport requirements are fulfilled by four Airbus C295Ms delivered in 2010, but the fleet is hard pushed to meet its operational tasking. "We have ordered two more which should be delivered in early 2021, to assist with our paratrooping tasks. The fleet is stretched, because we also have an aircraft in the Sinai serving MFO [Multinational Force and Observers] mission since 2013."

MFO soldiers have been observing the peace between Egypt and Israel since 1982, and the C295 is normally used to shuttle personnel between the two MFO bases, Sharm el Sheikh and the northern base in El Gorah.

There has also been one on overhaul in recent years. All the Czech C295Ms are overhauled in Poland at PZL Warszawa-Okecie, which is a subsidiary of Airbus. According to the Commander, "the fourth aircraft to be overhauled there will return in November to get the fleet back to strength."

There are also remains the matter of the Embraer KC390, which the Czech Government committed to in September 2010, and is expected to acquire two.

However, nearly a decade on Aero Vodochody has worked on building five rear fuselages for the Brazilian Aerospace giant but there has still been no order forthcoming. "The KC390 is still on the table, and we may acquire it around 2025."

The Commander also discussed more about other existing platforms within the transport fleet. "The two Yakovlev Yak-40s will be retired by the end of next year, and replaced by a second business jet aircraft which should arrive by the end of this year. It will work alongside the Bombardier Challenger 601 and two Airbus A319CJs."

Major General Hromek also confirmed that the CzAF is still operating six LET L-410s for VIP and general transport purposes.

#### AATs

The Airbus A319CJs regularly shuttled personnel to the two Air Advisory Teams based in Kabul (Afghanistan) and Balad (Iraq) but Major General Hromek confirmed that both activities had ended. In Kabul the unit's primary task was to train and advise pilots and ground personnel of the Afghan National Army air force on the Mi-17. After more than ten years, the team completed its operations which led to the 311th International Air Advisory squadron to officially cease operations on January 29, this year. At Balad the AAT provided advisory and mentoring activities during operational training of Iraqi Air Force's air and ground personnel flying and maintaining the L-159 ALCA.

#### NATO Collaborative Programmes

While the Chief confirmed the Czech Air Force would join MMF he also said the Czech Republic was a partner in the Allied Ground Surveillance (AGS) system being set up in Sigonella, Sicily. "We are allowing the GLOBAL HAWK to fly through our airspace, so we are a partner but we are not sending any personnel to the facility to work." However, he did confirm that there were personnel working on NATO's AEW&C Force at Geilenkirchen.

## Mortars – Accuracy through Munitions, Fire Control and Aiming

#### **Tim Guest**

Traditionally an infantry asset, mortar capabilities are evolving both technologically and tactically, delivering new possibilities for mounted and dismounted units and with ammunition and fire control solutions bolstering their operational performance.

ortars are on the up. New technologies, systems, mobility and tactical thinking mean that the good old mortar, perhaps a little on the back burner earlier this millennium, has found a new place of importance in the inventories of militaries around the world. Traditionally, a key fire-support asset carried and used by infantry typically under the control of battalion commanders, fire support companies have used 120mm or 81mm calibre systems, sometimes installed aboard AFVs or unarmoured vehicles, often detachable for re-deployment on the ground for use by dismounted troops, to deliver critical fire support to friendly forces on the front line. And at platoon and section level, 60mm mortars or less have typically been deployed.

From conventional, manual sighting and laying, to today's digital systems interconnected via secure data links with laser rangefinders, day/night sighting and navigation information. This transition has made target acquisition much faster and given the mortar crews the necessary ability, in the face of changing operational threats, to perform fire missions in extra quick time, including with multiple rounds simultaneous impact (MRSI) capabilities. Being able to shoot and scoot before the enemy has the chance to locate the mortar position and then respond with counter fire is now critical to survival on the battlefields of today and tomorrow.

With more target acquisition systems and technologies now available and being used by many nations' artillery units, mortars – previously not the most accu-

#### <u>Author</u>

**Tim Guest** is a freelance journalist, UK Correspondent for ESD and former officer in the UK Royal Artillery. rate tool in the toolbox -- are also, with some militaries, coming under the control of the artillery, in turn benefitting from the artillery's highly precise target acquisition data, to become more accurate in the process. But while advances in mortar fire control and associated systems are part of this mortar evolu-

#### **Mortar Ammunition**

A wide range of mortar rounds have been standard fair for years, from traditional high explosive (HE), the most common used to deliver suppressing fire, to smoke, white phosphorous, and illumination rounds.



Mortars are in revival mode with greater mobility and survivability afforded by armoured platforms like the MJÖLNER from BAE Systems Hägglunds delivered to Sweden's Armed Forces.

tion, ensuring what lands at the other end delivers the desired effect is critical. Hence, mortar ammunition needing to pack the optimum punch as accurately as possible.

This article looks at some of the ammunition systems being manufactured and available to mortar units across NATO and beyond, as well as developments in fire control and aiming systems that can make mortar systems more effective and accurate than ever before. As the new-found popularity of mortar systems continues, their typically high trajectory is also an ideal factor to exploit with the development of precision-guided mortar bombs that, much like their artillery counterparts, are intended for use against high-value targets with a view to penetrating weaker top armour due to their high, near-vertical angle of attack. One such system is the General Dynamics Ordnance and Tactical Systems' 81mm Roll Controlled Guided Mortar (RCGM),

which the company calls an 'affordable, flexible precision-guided (PG)' mortar round suited to new-age conflicts where there is a greater need for increased precision on target with reduced collateral damage - effectively a portable precision munition for the infantry. The round can be fired from UK L16 and US M252 weapon systems and achieved a circular error probable (CEP) of less than five metres at ranges from 980 to 4000 metres when it was first in development some years ago. Using a portable GPS setter, target coordinates are programmed into the RCGM, and the multi-mode fuse set manually to the choice of proximity (PRX), point detonation (PD), or point detonation delay (PDD) modes. Once launched, the bomb's on-board GPS acquires satellites and determines its position and vertical reference. Continuous GPS updates enable the system's auto-pilot to calculate corrections and send commands to the bomb's canards, which continuously ma-



Hirtenberger's fire control system includes a forward observer computer for detailing observer locations, fire mission planning functions, introducing variable correction options into a mission, and conducting up to four simultaneous missions. noeuv the t pac ac in t t s A viv cou

noeuvre it toward the target until impact. The round's accuracy results in a 30% reduction in ammunition resupply logistics as fewer rounds are needed to complete missions. As it is still in service with an unconfirmed num-

Junghans is working on a new proximity fuse called FLAME, not yet in service. This new multi-option PRX fuse will have four modes of operation.

ber of nations, including some in NATO, GD also continues to offer the towed. rifled 120mm Expeditionary Fire Support System (EFSS), which was developed in response to the now defunct USMC programme in response to the need for a fire support system lighter, more mobile and internally transportable for missions requiring tactical versatility, speed and close-in fire support. The mortar has an ammunition suite comprising four typeclassified munitions: HE, smoke, illumination and practice rounds, which the company says provide greater lethality, accuracy, and range over currently fielded ammunition. The rounds are insensitive munitions (IM) compliant and have an effective range of up to 8.2km. The rounds use standard artillery fuses for point detonation or airburst capabilities. Rifled or smooth-bore ammo can be fired from the EFSS, though rifled typically provides greater stability, accuracy and range over current smoothbore munitions

The company also offers 60mm and 81mm Mortar Anti-Personnel Anti-Material munitions, which is says deliver up to 100% greater lethality than conventional mortar bombs. The round's pre-fragmented payload can be tailored to meet specific user requirements to ensure an optimum lethal area against various target sets; GD says this provides the advantage of precision control over the danger zone, giving friendly troops much more responsive fire support in close combat.

The propellants GD's Ordnance and Tactical Systems division makes for 60mm, 81mm and 120mm mortar systems increments are flash-suppressed and clean burning, which results in minimum residue, flash, and blast overpressure, important for the safety of the mortar team. The company also says that the superior flow characteristics of these Ball Powder propellants enhance efficiency and accuracy of loading operations.

#### Contract Highlights GMM Prowess

A US\$30M, two-year contract awarded in the first half of last year by an undisclosed country in the Asia-Pacific, highlighted Elbit Systems' mortar ammunition prowess, specifically of its precision-guided STYLET round, the subject of the deal. The bomb is a multi-mode GPS/INS-guided 120mm Guided Mortar Munition (GMM) with a range of 1000-8500m, suited for use by tactical combat units and special forces. It has an accuracy of less than 10m CEP and the company says that it offers an affordable precise solution that is easy and guick to operate, that not only increases operational effectiveness, but also significantly reduces collateral damage.

STYLET is suited for use against high-value targets and features autonomous fire control and multi-target assault capabilities and is effective against infantry and light armoured vehicles at ranges that depend on the 120mm mortar system using the ammo. The mortar bomb features a multi-mode fuse with PD, PDD and PRX operating modes, as well as a five-increment charge/propellant system. STYLET's blast and fragmentation warhead delivers high lethality and precision with minimal collateral damage. Elbit sees a growing demand for highprecision guided munitions that are also economically efficient.

STYLET is not the only GMM in Elbit's portfolio and the company has earned a global reputation for innovating precision GMM systems that will meet the operational needs of the modern battlespace, where a precision-strike, first-round capability is needed to support manoeuvring tactical combat units, at the same time as being cost-effective.

As with STYLET, so too are all of its GMMs equipped with a multi-mode fuse and blast and fragmentation warheads. Some also include penetration warheads. These systems significantly enhance fire-power at battalion and brigade level, and enable accurate firing to extended ranges with near vertical trajectory at line-of-sight (LOS) and non-line-of-sight (NLOS) targets, in urban or open terrain, and in all weather conditions.

Photo: Patria

Offering an even greater range capability, the company's RAPIER Long-range GMM can reach distances of 16 km, (depending on the mortar used), with high accuracy, even in severe weather conditions. The GPS/INS round requires no spotting of targets, no meta data, and uses the same multi-mode fuse as STYLET. The round takes 15 seconds to load and has a sixincrement charge system.

IRON STING is Elbit's 120mm Laser and GPS GMM, which can be fired to ranges from 1 km to 12 km, depending on the mortar tube, and has three modes of operation: GPS/IMU, SAL+GPS/IMU and SAL+IMU. This versatility provides robust capabilities in all battlefield scenarios. Iron Sting features a seeker laser sensor capable of operating with standard pulse (NATO STANAG 3722) and an encoded CW laser diode (lightweight and lowcost, suitable for small drones and UAS). The warhead is capable of penetrating double reinforced concrete with a blast and fragmentation effect. The mortar bomb features the same multi-mode fuse as mentioned above. With no meta data required, loading time of the 10.8kg round is 15 seconds.

As with the precision-guided kits that now exist to convert artillery rounds into precision-guided munitions, Elbit has its own Laser and GPS-guided Mortar Kit (LGMK), which converts existing 120mm standard mortar bombs into guided ammo. The LGMK enhances the 'dumb' round giving it a wide field of view and a moving target capability for precision use against soft or lightly armoured targets, as well as targets in urban environments where providing first-round capabilities and minimum collateral damage is crucial. The solution is compatible with



The twin-barelled AMOS 120mm mortar

STANAG 3733 NATO laser designation. Elbit's family of mortar ammunition extends across all calibres and includes a wide range of standard HE, illumination, smoke and training rounds, as well as longer range HE rounds and other specialised munitions.

#### **Pedigree in All Areas**

One of the leading suppliers of mortar ammunition to military forces internationally is Hirtenberger Defence Systems (HDS), which makes mortar bombs – it has been making smooth-bore mortar bombs for over 50 years – amongst a wide range of mortars and other mortar-related systems, for 60mm, 81mm and 120mm mortars. A key feature of the company's munitions is being able to withstand the harshest, hostile environments without compromising safety and without lessening the combat effectiveness of the ammunition. As a result, its IM mortar rounds are well received worldwide. Indeed, in the first half of 2019, HDS was awarded a contract by the Dutch MoD for the supply of insensitive 60mm mortar ammunition for delivery to its armed forces up until 2024, with a further two-year option under the terms of a frame agreement. The company is also in the process of refurbishing 70,000 rounds of old 120mm mortar ammunition for Germany's Bundeswehr. The munitions, which had been in danger of

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Hirtenberger's HE rounds for 60mm systems include the 60mm HE-TNT Mk2 PD and PRX bombs, both of which produce up to 5,000 fragments.

becoming obsolete, will have their charge systems replaced and be ready for use by 2026.

Taking its 60mm mortar ammunition family as an example, the company's current range of projectiles include a 60mm practice round Mk2 with inert filler though delivering terminal and impact effects and signature for training purposes. Its 60mm white phosphorous SMK-WP Mk2 round comprises a NATOqualified WP filler that produces a rapid smoke screen, though rivalled in speed of creating its smoke screen by the company's 60mm SMK-TTC Mk2 round with its Titanium tetrachloride filler also delivering very rapid smoke, though in this case, of 'cold' smoke. HE rounds for 60mm sys-

Photo: Hirtenberger



Seen here in use with an 81mm mortar and mortar round, Hirtenberger's, MFCS solution includes, on the weapon position, a GPS-enabled military handheld computer.

tems include the 60mm HE-TNT Mk2 PD and PRX bombs, both of which produce up to 5,000 fragments (see below). All the above weigh in at 1.79 kg. Also for 60mm systems are HSD's pyrotechnic ammunition with canister form ballistics. These include the red phosphorous SMK-RP Mk2 used to generate smoke screens that last up to 90 seconds and two illumination rounds: the ILL-VIS Mk2 with visible luminosity of 350,000cd that lasts 40 seconds during a 5 m/s descent, and the ILL-IR Mk2, which provides high infra-red emissions and low visible light emission. A similar range of ammunition is available for both 81mm and 120mm mortars. On the subject of fragmentation, what HSD calls its 'revolutionary, new' CON-

HSD calls its 'revolutionary, new' CON-FRAG technology is said to ensure that its bombs are more precise in their delivery of lethal fragmentation effects than other HE. CONFRAG controls the mass, velocity and distribution of fragments and apparently surpasses the current global standard of natural fragmentation, which produces fragments differing in size, mass and shape, therefore, with lower lethality. CONFRAG-delivered fragments are said, by HSD, to have much more energy, penetration power, and a greater coverage area resulting in increased lethality.

#### **New Materials in Production**

With its mortar systems in use in 35 countries around the world another player with a pedigree in all areas and offering munitions for 60mm, 81mm and 120mm mortars is Expal; the company provides ammunition in HE, IM, HC, WP, RP, ILL, IR and TP configurations qualified and compatible with all NATO smoothbore systems. It develops, manufactures, and integrates its own fuses, primers, propellants and other key components in house; it is Expal's core competence and experience in explosives and energetic materials technologies that sets it apart from many. The company's recent work adapting new materials and processes to improve conventional ammunition, including mortar bombs, is a milestone. Expal has researched the use of new polymer-based materials to replace metallic materials, where the former exceeds and improves the functionality and characteristics of original systems. In addition, with the increasing industrial use of 3-D printers in which such polymers can be used, a revolution in the generation of 3-D prototype munitions is possible. The company has also carried out a study on the adaptation of plastic materials in candles for illumination mortar bombs; traditional production involves a series of manual processes that require exhaustive controls to guarantee correct functioning; an inhibitor adhered to the internal walls of the round's canister, helps avoid corrosion and works as an insulator when in operation. Using plastics, however, the new adaptation consists of designing a body that integrates the insulation, enhancing candle performance with a new material that's chemically compatible and capable of withstanding the extreme forces and handling experienced during loading and firing. Different materials were selected for this R&D that could be manufactured both by injection and 3-D printing and offer characteristics such as high mechanical resistance, very long life, lightweight, lower cost, as well as being conductive and anti-static. The company intends to apply these new materials and processes to other munitions and products, including its wider range of mortar bombs, to help reduce weight of payloads or internal parts, and to enhance external ballistics. These developments are also set to improve manufacturing and production processes overall.

#### Single-Calibre Focus

With its focus on 81mm, BAE Systems has an effective range 81mm mortar bomb variants used by the British Army and other armed forces around the world with a variety of weapon systems. Currently, the company says that its engineering team is developing several improvements to these bombs to increase effectiveness and operational safety for users, which include IM compliance, so that mortar crews will be at a much lower risk of enemy fire triggering an explosive chain reaction in mortar bomb stockpiles on their position. In addition, precision guidance is being researched and the company says that it now has a fully developed mortar guidance system, which uses GPS and fins/canards built into the fuse to provide two-dimensional course correction.

A further line of research is into preformed fragmentation. Even though the company's HE L41A4 round with Mk4 charge system is said to provide optimised fragmentation from its spheroidal cast-iron bomb body, BAE Systems is testing preformed fragmentation that has the potential to increase the area effect and offensive capability of the 81mm HE bomb.

The current L41A4 HE round uses PD and PRX fuses and has a range up to 5,375m. Other 81mm rounds include red and white phosphorous smoke bombs, and two illuminating rounds, one which is IR Illuminating. Interestingly, the company says its RO 04-04A1 red phosphorus smoke variant gives longer lasting and more effective smoke production with lower toxicity than white phosphorus, and uses 36 pellets that disperse and sit above ground producing an effective smokescreen over a wide area in 120 seconds out to ranges up to 5,375 metres.

#### **Mortar Fuses**

Complementing any effective mortar round is an effective fuse and expertise in fuse technologies doesn't come much deeper than that from Junghans Defence; from g-hardened fuses and ignition systems, to mechanical fuses and fuse components including micromechanical subassemblies and mechanical safety and arming devices, and much more. Junghans' R&D in fuse technology, including for its mortar rounds, is con-



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IRON STING is Elbit's 120mm Laser and GPS GMM, which can be fired to ranges from 1km to 12 km.



Elbit's RAPIER long-range GMM can reach distances of 16 km.



The LGMK converts existing 120mm standard mortar bombs into guided ammunition.

stantly innovating to develop solutions, which may be required in the future to satisfy emerging operational needs. Indeed, the company is currently working on a new proximity fuse called FLAME, although not yet in service. This new multioption PRX fuse will have four modes of operation, these are: PRX high altitude / PRX low altitude, PD, and PDD. PDSQ (super quick) is also in development as a capability. The new fuse will have an IM firing train and will be both EU REACH regulation and STANAG 4187 compliant. As for Junghans' many other mortar round fuses, the family includes both DM93 (and a latest version the DM183) and L171A2 mechanical mortar fuses, which are in service in the UK. The former, the DM93 / M776 Mechanical Time Super Quick (MTSQ) Mortar Fuse is a mechanical time fuse with an additional impact mode, proven worldwide for use with illuminating and smoke rounds and suited for smooth-bore calibres between 51mm to 120mm. The safety devices of the DM93 (M776) fuse comprise a safety pin and a launch-pulse safety system, which ensures the fuse will react on impact but not before. It complies with MIL-STD 331C, STANAG 4157, AOP20, MILD-STD and STANAG 4187.

Junghans' DM 111A4/L127A4 PD Mortar Fuse is for use with HE, TP and smoke and has a highly sensitive impact device and can be set to two different modes: super quick and delay achieving a proven reliability better than 99.5%; it can be used with fin-stabilized 51mm to 120mm mortar bombs. (A latest version, the DM111S, is also available).

#### Mortar Fire Control and Aiming Remarks

The accuracy of mortars is certainly improving as a result of latest precision ammunition developments, round design and propellant charge innovations. But without accurate and speedy fire-mission data and coordinates, communicated efficiently together with the ability to lay the mortar quickly, all the above will be of little comfort to the forward troops calling for accurate, suppressing fire in the face of an advancing foe.

Directly networked with computerised fire control and navigation systems, latest vehicle-mounted mortars can be laid on target quickly and, using powered traverse and elevation, can deliver rounds on target rapidly. This enables mortar crews to bug out to another firing position before enemy locating troops can identify their position -- advanced digital fire control will help ensure any counter fire lands on empty positions. The turntablemounted Cobra 120mm mortar system from RUAG Defence, for example, now has an all-electric traverse and elevation system with a load-device and a computerised FCS. And the Spanish Alakran 120 mm Light Mortar System (LMS) from Everis Aerospace and Defense and New Technologies Global Systems (NTGS), which can be integrated into the rear of a variety of vehicles such as a Toyota 4x4 Land Cruiser, is connected to a computerised FCS. This enables rapid laying of the weapon once lowered to the ground via an electro-mechanical system.

Along with MFCSs, a number of mortar systems are now adopting the use of muzzle velocity radar -- MVR. In the case of the CARDOM 10 120mm recoil mortar from Elbit, each system will have an MVRS-700SC MVR fitted under the barrel from Danish maker Weibel. The MVR measures factors such as temperature, humidity and barrel conditions, all of which will impact the final MV of a departing mortar bomb. Data from the MVR is fed to the FCS with which it is integrated so that individual mortar settings can be adjusted accordingly to ensure accurate final elevation and bearing and fuse settings are entered resulting in as accurate a fall of shot as possible.

CARDOM's FCS is based on NATO's S4 software and with inputs from both the MVR and additional meteorological data, can deliver a very accurate result, eliminating the need for adjustment of fire and enabling fire for effect from the very first rounds. This FCS-enabled accuracy is crucial in keeping time on position to a minimum; missions can be fired and mortar crews move before counter-fire has a chance of success. CARDOM 10 uses an auto-laying system; an electric drive delivers the weapon to the correct elevation and bearing/traverse, as well as being fast enough for the system to be capable of delivering MRSI. The FCS is networked with the parent unit's battle management system and fire mission orders are now typically received through digital communications direct from forward observers into the FCS. The forward observer can also still use voice comms via tactical VHF radio to the mortar team. [Elbit Systems of America was awarded a deal in 2017 to provide mortar fire control systems for the US Army consisting of the Mortar Fire Control Systems Mounted (MFCS-M), Mortar Fire Control Systems Dismounted (MFCS-D), and a lightweight handheld mortar ballistic computer.]

In September last year Expal launched its E-COMPAX system, an electronic aiming device for the provision of firing aiming data to mortars, covering metrics such as orientation and elevation even in a denied or degraded GPS environment. The system reduces the time to firing to only 30 seconds and the after-firing adjustment to less than five seconds. An easy interface and software implement all necessary functionalities to perform aiming, either in a standalone mode on its own tablet, or integrated into an FCS computer, such as Expal's own TECHFIRE system, which can be used and integrated with the company's EIMOS Integrated Mortar System. TECHFIRE enables highly precise firing data to be provided to the mortar including information from unmanned forward observers, such as the company's UAV Shepherd-Mil, and is totally integrated from the sensor to whichever mortar system it's integrated with. It automates and accelerates all tasks related to direct or indirect fire missions, whether in a single mortar, or in a unit, increasing precision and control over supporting fire processes. The intelligent systems developed for TECHFIRE integrate an automatic target acquisition system to improve precision and its software enables real-time ballistic correction, meteorological compensation, and aiming adjustments. TECHFIRE (also suited for use with artillery) is also compatible with a wide range of mortar ammunition and their associated firing data tables. It can also link with a variety of communications and data management systems, as well as laser rangefinders. Through its trol experts, Maszengrange, provides rapid and accurate ballistic firing data for light and heavy mortars in man-portable, towed or self-propelled configurations. Designed as a flexible standalone system, the Morzen Mk3 is typically deployed at the mortar command post as the primary or back-up ballistic computer or alternatively at the weapon platform to perform ballistic calculations, providing significant redundancy to the user. The rugged, lightweight system incorporates an intrinsic, high-capacity power cell and an



TECHFIRE is compatible with a wide range of mortar ammunition and their associated firing data tables.

interactive and user-friendly graphical interface, the system enables operators to deal with all kinds of fire control, process data, and exchange operational information and orders among key stakeholders in the mortar mission command chain.

The 'Mortar Company' as some refer to them, Hirtenberger, also offers an MFCS solution in its portfolio comprising a forward observer computer responsible for detailing observer locations, fire mission planning functions, introducing variable correction options into a mission, as well as conducting up to four simultaneous missions. The FCS takes into account weapon position information, aiming data, has an integrated mapping function including satellite views. Complementing the forward observer computer on the weapon position are the mortar computer and a GPS-enabled military handheld computer. The former performs multiple weapon control functions, keeps track of ammunition, assesses calculation options and performs fire plan functions.

Not to be missed, the Morzen Mk3 portable handheld computer from fire coneffective, reliable charging system. The company also offers the Morfire MFCS, which enables effective, responsive and accurate fire and is capable of providing rapid firing solutions to all known smooth bore mortars. Morfire links observers with command post nodes and weapons and comprises a MFC platform, a Mortar Command Post (MCP) platform and a Mortar Data Unit (MDU) platform. Voice and data communications from MFC to MCP is by Combat Net Radio, and voice and data communications from the MCP to the MDU is by data-enabled personal role radios.

Last but by no means least, Turkish company, Aselsan, offers an integrated MF-CS, which includes a Fire Control Computer, an Inertial Navigation System (INS), and an MVR. The system enables rapid deployment and continuous location by means of an INS and provides rapid and accurate ballistic calculation using data from the MVR and forward observers via digital radio; it has a menu-driven graphical user interface and battlefield information is also displayed on digital maps.

### **Dual Use** Military Equipment and Techniques Transferred to the Law Enforcement Environment

#### **David Saw**

There is an idealised image of policing, often called "community policing," where the police are on the ground locally, working with the local community to resolve disputes and are present to deter low-level crimes and be in place to tackle more serious crime. Unfortunately, the current situation facing many law enforcement organisations is far from this idealised image, and demands new thinking and new equipment.

One of the most significant developments of recent years is the growth of common ground between the missions of the military and the requirements of law enforcement. That is a situation that has not always been the case, for the majority of western militaries their primary objective has, obviously, been dealing with conventional military threats. This was the classic scenario for militaries in the Cold War era, yet even then the military still found itself from time-to-time having to become involved in the civilian sector.

Military involvement in the civil sector, characterised by many as 'military aid to the civil power' would see military assets deployed to aid civilian authorities in times of crisis. This might see troops and equipment

#### ENOK – the Agile Vehicle for Special Operational Situations

ACS Armoured Car Systems GmbH, based in Derching near Augsburg, Germany, is comanufacturer of light, protected tactical vehicles known as ENOK. Since 2010 different variants of the ENOK 5.4 and ENOK 6.2 vehicles (in 5.4 and 6.2 tonne weight classes) have been successfully deployed by the German Armed Forces.

Two years ago (special) police units began to introduce the vehicles. When asked "What makes the platforms unique as agile, offensive vehicles?" Tanja Paeske, Mem-



ber of the Management Board of ACS, answered: "Above all, the technical parameters such as the excellent power-to-weight ratio, the narrow turning circle and the steep incline capability, combined with a vehicle width of less than two metres. These increase tactical manoeuvrability and give users significantly more flexibility without having to compromise on payload or protection. Urbanisation is continuing, but how many cars are

wider than two metres? With our vehicles, we enable active forces to rescue, salvage and protect and to move as easily as possible. We want them to have maximum protection with the lowest possible vehicle weight and, above all, that they return safely from all tactical situations!"

The police and military both want reliable, protected platforms, but need complete vehicle systems, with armament and other extras. User-specified vehicle configuration and equipment is another strength of ACS Armoured Car Systems GmbH: even with small orders, ACS can respond to the customer's needs and implement them while maintaining high quality standards.

Due to its urban and off-road capability, with the highest possible level of protection for the vehicle weight, as well as customised equipment options, the ENOK is a highly suitable offensive vehicle for special operational situations.

deployed in the circumstances of a natural disaster, which is a logical move. The military has the ability to deploy rapidly, has the people and has engineering and other equipment that could make a vital contribution to disaster relief/recovery. Such uses of the military in support of civilian government were totally uncontroversial, other facets of military involvement in the civil sphere were not always that welcome. The use of the military in cases of civil disruption caused by strikes or demonstrations is not new, although it is certainly never that welcome by the military. A somewhat benign version of the military helping in this regard comes from 1977, when British fire services went on strike and the military was tasked to take over the fire fighting mission. Fortunately, as a part of civil defence preparations in the 1950s, the then Auxiliary Fire Service (AFS) had been equipped with large numbers of Bedford RLHZ GREEN GOD-DESS fire engines, these were put into store when civil defence was cutback and resurrected and given to the Army in 1977 to fight fires. When this industrial dispute finished, the GREEN GODDESS vehicles were put back into store, but reappeared in 1978/79 during another strike. The GREEN GODDESS fleet made its last appearance during the fire service strikes in 2002/2003, after which they were retired. There were fully equipped and trained fire fighters within the British military, but the vast majority of troops deployed with the GREEN GODDESS equipment could hardly be considered as fully trained fire fighters. Which means it was fortunate that they did not find themselves over-committed to dealing with serious conflagrations.

In the past governments would often turn to the military option in order to deal with street disorder or to break strikes, fortunately this is now the exception rather than the rule. From the military perspective, the law enforcement mission is for law enforcement to handle. The military can assist other public services such as fire and ambulance, but again this is not their primary mission. In special cases such as disaster relief the military will inevitably have a key role to play. The most important point is that if the military is operating in the civilian space it must be operating under civilian direction, unless absolutely necessary the military should be providing assistance, it should not, unless directed by the higher civilian authority, be providing leadership.

#### **All-Encompassing Threats**

The recipe that works is that the military keeps to its primary mission, while law enforcement and the other emergency services occupy the civil space and fulfil their designated missions. Doing that keeps everybody happy, avoids misunderstandings and has the right people doing the right job at the right time. This is all well and good, but what do you do once the rules of the game change, when the barriers between dealing with military and law enforcement challenges start to blur. It was terrorism and the need to counter it that led to the blurring of lines between law enforcement and military solutions. The problem is that the terrorist threats that emerged in the 1960s and the 1970s have very little in common with the kind of terrorist threats that we face today. Today, the scope of terrorism is far broader than it has ever been before and it is therefore far harder to counter. To complicate matters even further there is the growing nexus between terrorism and organised crime, the vast sums of money that can be made in trafficking narcotics are incredibly attractive to terrorist groups, an example of this would be the Revolutionary Armed Forces of Colombia (FARC) that was heavily involved in narcotics. Since FARC signed a peace accord with the Colombian government in 2016, some elements of the organisation have turned their back on the peace process and have returned to narcotics trafficking. Hezbollah, a group with tremendous global reach, has funded its operations through drug trafficking from South America and also from the Middle East. Apart from the money involved, drug trafficking networks also provide a highly effective means of moving people, equipment and funds between countries without the knowledge of their governments. There was a time when a national response to terrorist threats would primarily be seen as a law enforcement issue, the same would be true of dealing with drug trafficking. This is where matters become very difficult, the threats being faced are no longer domestic threats, there is a much broader context to these threats, often far beyond the resources or understanding of national law enforcement. Furthermore these threats increasingly have access to weapons and equipment that allow them to 'out gun' local law enforcement.

One possible solution to terrorist threats having more firepower than law enforcement can handle is to deploy troops in support. In France troops have been deployed for many years in support of the Vigipirate anti-terrorist plan. Even in Britain which, with the exception of the situation in Northern Ireland, has gone out of its way to avoid deploying troops on the streets has used the military to guard key sites such as Heathrow airport in the past. Despite its reluctance to use the military on the streets, the British government did sanction the use of the military to protect key areas during the 2012 London Olympics.

The Islamic State-inspired wave of terrorism in recent years has led to a rethink of military assistance to civilian law enforcement. In France Vigipirate has evolved into Opération Sentinelle post-the November 2015 terrorist assault on France.

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Paris Police snipers train on a 100 metre range with their Steyr Mannlicher SSG69 rifles in 7.62x51 mm. After the November 2015 terrorist attacks the police in Paris received new military grade weapons, including Heckler & Koch (HK) G36 assault rifles.

This sees the deployment of both troops and the Gendarmerie to guard sensitive points, it also saw changes in rules of engagement. Previously the military had to go through a time consuming process before it could use live ammunition, now soldiers can use live ammunition and their weapons are loaded. In Belgium Operation Vigilant Guardian saw the Belgian Army on the streets of Brussels in November 2015 and March 2016. While in England the military was deployed on to the streets in Operation Temperer in the wave of the Manchester bombing of May 2017, with a further military deployment in the wake of the Parsons Green bombing in September 2017.

#### **Responses**

Being realistic there is nothing to be gained from involving the military in active measures against domestic terrorism or in the struggle against narcotics or organised crime. Beyond national borders the military can be used as the primary response force, it can also be used to patrol against drug trafficking or more active drug interdiction missions. For dealing with domestic issues, that is those within national borders, it is for law enforcement to take the leading role. The problem here is that law enforcement is under resourced for the missions it is expected to undertake. The general public want to have to police being far more vis-

Photo: Gerhard Heiming



The medium weight armoured-wheeled vehicle SURVIVOR R as a solution for police forces was jointly developed by Rheinmetall MAN Military Vehicles (RMMV) and the Austrian company Achleitner.

ible and devoting far more time and resources to crimes against the person and crimes against property, things that impact on their quality of life. Unfortunately, this represents only a small part of what government expects its police force to do. In London the Metropolitan Police is short of hundreds of detectives, it is also short of officers that it could use to patrol the streets. However, the Mayor of London found the money and the police numbers to set up a unit dealing with 'hate crimes,' particularly the online version of such crimes.

On the other hand, positive steps have been and are being taken to improve the capabilities of law enforcement and those of other emergency services via the transfer of military equipment and related operational techniques. In the US as a part of the '1990-1991 National Defense Authorization Act', Congress inserted language that called for the transfer of excess Department of Defense (DoD) equipment to other federal and state authorities as part of the 'war on drugs.' This was the '1033 Program' and it was later expanded to include equipment for counterterrorism. Under the '1033 Program' all sorts of surplus equipment can be supplied to law enforcement agencies at low or no cost. The acquiring agency is responsible for the cost of transferring the equipment to their location and for its maintenance.

For US law enforcement agencies the '1033 Program' allows them access to all kinds of equipment from military small arms up to helicopters. In terms of vehicles, the HM-MWV can be acquired in all formats. Additionally with the drawdown in Afghanistan and Irag there were large numbers of Mine Resistant Ambush Protected (MRAP) available as surplus. For law enforcement the MRAP provides a host of possibilities such as protected mobility and anti-riot use, for example breaking down barricades. The acquisition of military equipment by US law enforcement has seen allegations of militarising the police, this is not true and it should be noted that it was Congress that started the '1033 Program,' not the DoD or law enforcement.

Elsewhere, other law enforcement agencies have used armoured vehicles as standard equipment. In France the Gendarmerie still have some 70 Berliet VXB 12.7 tonne wheeled armoured vehicles in service, some of these made an appearance on the streets of Paris during the Gilets Jaunes demonstrations of 2018/2019. Both the Gendarmerie and the Police Nationale are interested in a new armoured vehicle and one of the possibilities for this role is the Véhicules Blindés Multi-Rôles (VBMR) Léger SERVAL, built by Nexter and Texelis for the French Army Scorpion programme. More than 2,000 are to be acquired and a French Gendarmerie/ Police buy could benefit from the economies of scale that this provides. Elsewhere, the Rheinmetall SURVIVOR R wheeled armoured vehicle has been selected by a number of police authorities in Germany.

Dealing with a terrorist incident or a disaster will require the involvement of the police, fire, ambulance and other rescue workers. Problems have arisen in this process due to the fragility of communications between the different services involved, often they just cannot talk to each other, complicating coordination and potentially increasing risk. The London Fire Brigade (LFB) has discovered that their communications are often not robust enough to cope with the conditions they operate in, for example in tunnels or in larger multi-storey buildings. All of this creates a need for a robust communications infrastructure for such emergency services, potentially an ideal environment for the use of military communications and networking systems. Utilising military-based solutions would also allow the emergency services to communicate with the military during emergency situations.

The growth of terrorist threats in recent years has forced police agencies to look at military-grade solutions to deal with the threat. In France after the major terrorist attacks of 2015 it became apparent that the police were not equipped to deal with threats of this nature. Prior to 2015 in times of perceived terrorist threat it was not unusual to see a single police officer outside a local Commissariat de Police wearing ill fitting body armour that might perhaps have been viable twenty years before and equipped with an M12SD 9x19 mm sub-machine gun (Beretta PM-12 produced under license in France), with the weapon usually looking totally uncared force.

Post-2015 in France the police suddenly became far better equipped, deliveries of the Heckler & Koch (HK) G36C and G36K assault rifles in 5.56x45 mm commenced in March 2016 and were completed by mid-2016. Also acquired was new and more effective body armour, body armour performance has progressed at a tremendous rate since the early 2000s driven by improved materials technology and by investment to meet operational demands driven by experience in Afghanistan and Iraq. These were all positive steps, but the police certainly remain week in terms of night vision, whether thermal or image intensification, although military demand has driven performance growth in this area as well.

Despite the growth of terrorism, increasing levels of violent crime and, of course, drugrelated crime, police personnel numbers and budgets have not really grown in response. The fact that the police can look to acquire military-grade equipment is a great benefit, allowing them to take advantage of economies of scale or the opportunity to acquire surplus equipment. There is also the opportunity to take advantage of military research and development in areas of joint interest, for example in less than lethal systems and munitions.

The ongoing wave of demonstrations in France has demonstrated that the non-lethal/less-than-lethal munitions being used by law enforcement are inflicting severe injuries during protests, and this is becoming increasingly unacceptable. Consequently being able to tap into military non-lethal research and development or acquire military systems could be a major advantage. To conclude, in an era of terrorism and organised crime, it is inevitable the relationship between military and law enforcement will become closer in terms of operational interaction and, on a case-by-case basis, equipment and training.





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### Taking The Long View Day and Night Optics for the Sniper Team

#### **David Saw**

The modern sniper team is a highly skilled and extremely valuable asset that offers a force commander a set of unique capabilities. These capabilities include being a reconnaissance asset and an offensive asset capable of long-range engagement and neutralisation of hostile targets. In the current operational environment these reconnaissance and target engagement capabilities have to be available both day and night, and in all weather conditions.

he United States Army Sniper Course (USASC) at the Maneuver Center of Excellence, Fort Benning, notes that: "The Purpose of Sniper Training is to train individuals to perform Sniper missions in a combat environment to include: precision fires on enemy personnel and equipment, intelligence gathering, counter-sniper operations, infiltration and overwatch of NAIs (named area of interest), occupation of and operations in support by fire positions, ballistic



British sniper taking part in the Sniper Commanders' Course working with an Accuracy International L115A3 sniper rifle in .338 Lapua, the scope is a Schmidt & Bender. The British Army instituted a Sniper System Improvement Programme (SSIP) to upgrade sniper capabilities after combat experience in Afghanistan.

#### Author

**David Saw** is a specialist defence writer based in Paris, France. He has a long and comprehensive record of writing and managing defence magazines at the highest level, from the USA through Europe to Asia, and is now a regular contributor to ESD. interdiction of IEDs, and disruption of enemy operations." The USASC course at Fort Benning is seven weeks long and is said to have an attrition rate for students of around 60%.

The USASC course description and the fact that only 40% of those who take the course pass it demonstrate the complexities of the art of the modern sniper. The sniper does not act alone though;

the sniper is part of a team with the second member, often called the spotter, with the latter providing the shooter with the critical information such as range, wind direction and so on to allow effective engagement.

Of course sniper team organisation is not set in stone. Different forces have different methods of managing the sniping mission. For example, there is the role of the spotter. For some this is the junior member of the team who will, once experience is gained, become a sniper team leader in their own right at a later date. For other operators it is the spotter who is the experienced sniper and is in charge of the sniper team, planning entry into and exit from the operational area and the parameters of the mission. How you organise your sniper team impacts on your choice of weapons, sights, sensors and ancillary equipment. The importance of the sniper team has grown tremendously over the past two decades, with combat experience in Afghanistan and Iraq demonstrating how vital snipers are as a combat, reconnaissance and surveillance asset. Recognition of the importance of sniping capabilities has inevitably led to investment in technologies and equipment that improve sniper effectiveness. Hence major improvements in weapons, ammunition and sights. Another development that adds further context to the importance of the sniper team is a tendency for commanders to provide force protection elements to cover the insertion of the sniper team into the operational area and for some even that is not enough. Reaction elements are provided to extract the sniper team in case of emergency or forces to support/protect the sniper team are forward deployed into the area of operations.
#### **Designated Marksman**

Recent combat experience has also led to the broadening of the parameters of military sniping, hence the new emphasis on the Designated Marksman Rifle (DMR). There is nothing particularly new in having a "designated marksman". For example, the Swedish Army had the Ak 5B variant of their standard Ak 5 (FN FNC) 5.56x45mm assault rifle. The principle difference between the Ak 5B and standard rifles was the installation of the British SUSAT L9A1 4x telescopic sight on the Ak 5B.

Arguably, it was Afghanistan that led to the arrival of the DMR as an essential capability. The requirement to engage targets beyond the 300 metre distances envisaged for standard small arms created a demand for a 7.62x51mm weapon that could accurately engage from 300 metres out to 800 metres and beyond, led to the DMR. Significantly, meeting the operational requirements of the DMR led to an investment in sighting systems that previously would have been associated with pure sniping solutions.

The British Army selected the Lewis Machine & Tool LM308MWS for their DMR which was then classified as the L129A1 rifle. In the DMR variant the selected day sight was the 6x48 Trijicon ACOG TA648 on a Picatinny rail; additionally, there is a Trijicon Rugged Miniature Reflex (RMR) red dot sight. The L129A1 also has another role as the Sniper Support Weapon (SSW) where it is used by the spotter in the sniper team, in this application it is fitted with the Schmidt & Bender 3-12x50 PM II daylight scope, with the FLIR AN/PVS-27 MUNS (Magnum Universal Night Sight).

France has recently selected its DMR system to meet the fusil de précision semi-automatique (FPSA) requirement. The weapon in question is the FN SCAR H-PR and this will be equipped with the Schmidt & Bender PMII ShortDot Dual CC day sight and the OIP Sensor Systems TIGRIS clip-on sights in two variants, image intensifier and infrared. Germany utilises the G28 as its DMR system. This weapon is based on the MR308 competition rifle and shares 75% parts commonality with the HK417 military rifle. The weapon is available in two variants, the G28 E2 (Standard) that features the Schmidt & Bender 3-20x50 G28 scope, while the lighter G28 E2 (Patrol) features the Schmidt & Bender 1-8x24 G28 scope. Both variants also feature Aimpoint red dot sights mounted over the scope.

The US Army adopted a variant of the G28E-110 to meet its M110A1 Squad Designated Marksman Rifle (SDMR) requirement, with between 5,000 and 6,000 weapons required. The weapon is equipped with SIG Optics TANGO 6 1-6x24 optic and it is to meet a requirement for precision engagement between 300 and 600 metres. Prior to the SDMR, the US Army had selected the G28 to form the basis for its Compact Semi-Automatic Sniper System (CSASS) requirement with engagement ranges out to 800 metres; here the sight is In the British Army the initial level of dedicated sniping systems is accounted for by the L115A3/A4 rifle from Accuracy International in .338 Lapua Magnum (8.59x70mm) calibre. This is characterised as a long-range precision rifle. Later, many elements of the L115A3 were utilised as the upgraded L115A4 was introduced. The L115A4 features the Schmidt & Bender 5-25×56, whereas the original L115A1 had the Schmidt & Bender 3-12×50mm PM II/MILITARY



A Danish Army sniper team participating in the US Army Best Sniper Team competition held at Grafenwoehr, Germany. The spotter is using the Kestrel Instruments weather meter with applied ballistics to check wind conditions. The rifle is a Sako TRG-42 in .338 Lapua; note the Spuhr ISMS scope mounting system.

the Schmidt & Bender 3–20×50 PM II Ultra Short. The scope choice is significant. Previously, the US Army has opted for Leupold scopes. Indeed, the M110 Semi-Automatic Sniper System (SASS) that will be replaced by the CSASS used the Leupold Mk 4 3.5-10x40 mm M2.

#### The Sniper Envelope

The image of sniping does not reflect the reality. The image of a single shooter with a highly accurate bolt-action rifle in a standard calibre, firing match grade or specialist ammunition and with a scope on top is still the dominant picture. In reality, it is much more complex than that. Current sniping systems and technology allow accurate engagements at extremely long ranges and have also allowed sniper systems to grow into effective anti-materiel weapons. MKII 3-12×50. For night engagements the weapon is fitted with a clip-on night sight known as the Sniper Thermal Imaging Capability (STIC) produced by Qioptiq.

Operations in Afghanistan saw the British institute the Sniper System Improvement Programme (SSIP) and this led to the deployment of the L115A3. In November 2009, a British soldier using the L115A3 successfully engaged and neutralised two Taliban at a range of 2,475 metres in Helmand Province, Afghanistan. Other systems acquired under the SSIP included night sights, spotting scopes, laser range finders and tripods. This has seen the acquisition of equipment from Pyser, Safran Vectronix, Qioptic and Kestrel Instruments. The British Army also uses larger calibre sniper systems in the long-range sniper/anti-materiel role. Again, these are



US Army National Guard snipers train for long range engagements at the Orchard Combat Training Center, Idaho. The weapon is the Barrett M107A1 in 0.50 BMG. For long range sniping, as well as for anti-materiel and anti-structure missions, 0.50 BMG has become the calibre of choice.

sourced from Accuracy International and using the 0.50 BMG (12.7x99mm). There is also the L135A1(Barrett M82) in 0.50 BMG for long-range anti-structure missions.

The Canadian Forces also demonstrated that their sniper units were capable of long-range engagements in both Afghanistan and Iraq. They employ the PGW Defence Technologies C14 Timberwolf Medium Range Snipers Weapon System (MRSWS) in .338 Lapua. Initially, a Leupold scope was fitted and clip on night sights from FLIR. The C15 Long Range Sniper Weapon is the MacMillan TAC-50 in 0.50 BMG. Initially, a Leupold scope was used, but the weapon later received a Schmidt & Bender scope.

The C15 demonstrates the ranges that can be achieved with a high quality weapon/scope combination. In May 2017, a Canadian Forces sniper in Iraq neutralised a target at a range of 3,540 metres. Prior to that, in March 2002, Canadian Forces snipers had neutralised a target at a range of 2,475 metres and another at 2,430 metres. It should not be forgotten that Barrett, who pioneered long range 0.50 BMG sniping, have some extended range performances to their credit as well. In April 2012, an Australian sniper with a Bar-



rett M82A1 in Afghanistan neutralised a target at 2,815 metres. Other Barrett users include the German Army whose G82/G82A1 (M107/M107A1) rifles use the Zeiss 6-24x72 scope.

There can be no doubt that Afghanistan and Iraq have created a renaissance in the world of sniping and also a tremendous expansion in the scope of the sniping mission. One aspect of this mission growth is the use of sniping in the counter-IED and EOD mission. The Danish Army Engineer Regiment uses 0.50 BMG weapons in the EOD role for example. However, larger calibre weapons also have great utility in the counter sniper role.

Beyond the military sector one should also note the increasing importance for law enforcement agencies of having a credible and capable sniping capability. Obvious applications here are hostage rescue and counter-terrorism, added to which is the increasing threat of criminal organisations with access to military grade weapons, such as the cartels in Mexico. It is often the case that law enforcement can find itself 'out-gunned' by criminal and terrorist groups. In these circumstances, an effective sniping capability can help to restore the balance in favour of law enforcement.

#### **Industrial Landscape**

Certainly the requirements of the military and law enforcement communities are primary drivers in the development of sniping systems and equipment. Additionally, what should not be forgotten is the importance of the hunting and shooting sports sectors in stimulating developments in weapons, ammunition, sights and other areas. Admittedly some of these commercial developments are not built to full military specification. That accepted, the point is that the broader the market space is, the more space there is for innovation and for a diverse industrial space. Consequently, a company such as Meopta in the Czech Republic can supply binoculars, rifle scopes and spotting scopes to both military/law enforcement and civil customers, as part of a diverse defence/ aerospace and commercial optics business. On the other side of the coin, you have a US company like Bushnell which is centred on hunting, shooting sports and outdoor activities, but can offer tactical products to military users. Another US company that successfully covers both the hunting/outdoor and military/ law enforcement sectors for scopes and

#### British Army Seeks To Enhance Night Vision Capabilities

Photo: UK Ministry of Defence

(David Saw) In the asymmetric wars of the past two decades one of the most significant advantages enjoyed by western forces is their possession of effective night vision capabilities. This confers both operational and tactical advantages to western forces facing terrorist or insurgent adversaries. Continuing to develop and field advanced night vision technologies is essential to keeping these operational and tactical advantages.

Over time European forces did manage to cure at least some of their previous night vision deficiencies, but the US military still seems to have an advantage in terms of night vision provision. An example of a European programme to enhance night vision capabilities is taking place in Britain. Here the contracting authority is the Land Equipment, Soldier Training and Special Programmes area of the Ministry of Defence (MoD) and their acquisition programme covers the following: "the procurement of mounted Night Vision Goggles and Thermal Imaging (TI) clipon sensors. This requirement has the capability that enables the individual Dismounted Close Combat (DCC) soldier the ability to manoeuvre in low and zero-light and in addition engage targets, without significantly degrading the effective range of their Support Weapon. The initial procurement is for 1,000 Goggles and 260 thermal imaging clip-on systems with options to procure up to 3,500 Goggles and 910 thermal imaging clip-on sensors." The equipment suppliers will be expected provide support for two years with three years options. Estimated contract



A British sniper equipped with the L115A3 with an image intensifier fitted takes part in a night training shoot. The British Army is looking to enhance its night vision capabilities and is currently looking for Night Vision Googles - Enhanced (NVG-E) and thermal imaging clip on sights in a contract that could be worth up to £50M

value, according to the tender document is between £15M and £50M. According to the tender: "The Night Vision Goggle — Enhanced (NVG-E) shall provide the user with a capability that in low-light conditions enables troops in the DCC role: to perform all operational tasks effectively, both mounted and dismounted and to acquire and engage targets accurately, without the need for artificial illumination, up to and beyond 150 metres." Contract value for this procurement is given as between £25M and £35M, if all options are taken up. As regards the clip-on sights, the tender calls for similar performance parameters, but notes that contract value is estimated at between £10M and £15M, again if all options are taken up.

As this tender was issued before the end of January 2020 it was compliant with EU regulations, post-BREXIT a different set of regulations might yet emerge. That being said, it is unlikely that the British defence procurement process will change that dramatically, it is also important to note that post-BREXIT there will be no additional obstacles placed in the way of European companies attempting to do defence business with the UK. In the context of this night vision tender, the list of potential suppliers is long, with domestic contractors, plus European and international companies all having suitable products to meet the requirements. Beyond that the most important aspect of this whole affair is that British Army night vision resources are to be improved which will be an important addition to combat capabilities.

## 

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British soldier with the L129A1 Designated Marksman Rifle (DMR) taking part in an international sniper competition hosted by 3<sup>rd</sup> (UK) Division on Salisbury Plain. The L129A1 is a 7.62x51 mm weapon and is fitted with a Trijicon ACOG 6x48 optical sight and can also be fitted with the FLIR AN/PVS-27 MUNS (Magnum Universal Night Sight).

spotting solutions is Nightforce Optics. Looking at matters in a European context, it becomes very clear that Europe is in a very fortunate situation as far as provision of equipment for snipers is concerned. Thus far, we have mentioned a number of European vendors in the sector, but there are more to consider, for example, Beretta Defense Technologies (BDT). Under the BDT umbrella you have Sako sniper rifles and ammunition, as well as Steiner providing rifle optics, binoculars, laser rangefinders and night vision systems. Another major player is Hensoldt, who offer both sighting and night vision solutions. Indeed, in terms of clip on sights and broader night vision solutions for the sniping community Europe is incredibly well served, with contractors ranging from SME operations up to major multinationals.

There can be no doubt that that sniping has moved from being a peripheral issue for ground forces into becoming one that is a key capability. It was the asymmetric conflicts of the past two decades that led to the increased emphasis on sniping, with confronting non-state actors and terrorism likely to remain a key future mission. Thus enhanced equipment for the military sniper is more than justified. One should also note that snipers have an important role to play in conventional conflicts as well. Sniping will also be a key law enforcement capability, essential for both counter-terror and hostage rescue situations. All of which indicates that industry will continue to provide state-of-the-art solutions to meet the needs of the sniper team.



## **Israeli Spotting and Sniping Optics**

#### Arie Egozi

In low-intensity warfare and urban warfare, armies use snipers. This to neutralise specific threats without harming the uninvolved.

The Israeli Defense Forces (IDF) are using very advanced simulation tools to get ready for combat. The simulation tools used by the IDF and the other Israel security organisations have been developed by Israel's defence industry. Most of the IDF's operations in recent years have been against terrorists. Realising that the shape of war has changed, the IDF adapted one of its bases to become the main training place of soldiers in antiterror actions.

#### **Simulation Facilities**

Underground warfare, tactical breaching, and robotics are just a few of the specializations that the "Lotar" Counter-Terror School teaches IDF soldiers. These instructors are responsible for training all IDF units in counter-terrorism. They are combat soldiers who train others and, if needed, take part in operational activities. The school is divided into different sections according to specialization. The facility is highly classified but it can be said that it changes sometimes on a daily basis according to the planned action.

The other body in the forefront of antiterror is the Special Operations unit of the border police (YAMAM). This unit is now considered one of the most advanced antiterror units in the world. The training and simulation tools used by this unit are highly classified but we were allowed to learn about some of them.

#### Author

Arie Egozi served in the Israeli Defense Forces (IDF). After completing his service, he studied political science and journalism at Tel Aviv University. Egozi worked as aerospace and defense correspondent for Israel's largest daily "Yedioth Ahronot". He writes about the IDF and the Israeli defence industry from a wider perspective. He is currently the Editor in Chief of the Israel Homeland Security website (I-HLS). In 2019, a unique facility has been opened in the heart of the Judean Desert, near Ma'aleh Michmash a few miles north east of Jerusalem.

The site looks like a Hollywood set, with huge greenhouses, exact copies of the Damascus Gate in Jerusalem, of a street years upgraded their sniping capabilities – mainly by a lot of training and the introduction of very advanced systems.

Israel's leading developer and manufacturer of sniping systems is Meprolight, a subsidiary of the SK group which also owns Israeli weapon industries (IWI), a small arms



The Mepro M21 Self-Illuminated Reflex Sight mounted on an assault rifle

leading from the Old City of Jerusalem, and part of the Sharona restaurants and store centres in Tel Aviv. All these places saw terror attacks in which Israelis were killed. The training area was built with attention to the smallest detail up to the level of authentic smells and muezzin voices coming out from a loudspeaker of a model mosque.

The Israeli border police spokesperson said that the facility serves "fighting units of the IDF" but he declined to be more specific.

#### **Sniping Systems**

A common ingredient of these special units is the sniper who is also being trained by using "combat scenarios" created by these simulation facilities. To be able to cope with very complex combat scenarios, the IDF, mainly the special units, have in recent manufacturer prominent for the UZI SMG and the GALIL assault rifle. Meprolight is focused on developing aiming devices for a wide variety of applications.

#### The MEPRO Family

One good example is the MEPRO NYX-200 family, which, according to the company, is an innovative, compact and lightweight multispectral weapon sight and hand-held device available in multiple configurations. Ilan Abramovich, Meprolight VP marketing told ESD that this high-resolution  $640 \times 480$ ,  $17\mu$  thermal core, and high-resolution day/ night digital camera enables soldiers to detect targets in total darkness while still seeing image details. "This unique sight enables the fighter to get a comprehensive view of the battlefield and a very good situational



The company SmartShooter is manufacturing the SMASH 2000 plus, an optical device that can be mounted on many small arms.

awareness necessary for making precise, faster decisions to complete missions better and safer." The company's official added that the advanced power saving capabilities based on motion sensor technology assures mission completion without power failure. He pointed to the integrated dual wavelength device that he claims supports various tactical scenarios including CQB (Close Quarters Battle) and covert night operations. "We built this special sight with a special internal shock absorbing mechanism that keeps the effectivity even after using the sight on powerful weapons with a wild kick" he revealed that in some cases, the sight is attached to an external shock absorbing mechanism to maintain accuracy after it gets the shock waves involved mainly in using high power ammunition"

The MEPRO NYX-200 family he added, provides image capture and video record-





Rafael's LAND SPOTTER Hostile Fire Locator

ing on an internal SD card. All images and videos can be transmitted via a video out connector.

According to the Israeli company, another aiming system, the Mepro FORESIGHT, provides benefits not seen before on an optic - Battery Level, Five Preset Reticles (from the sight memory database), Digital Zeroing, Built-in Compass, Leveller and Real-Time Projected Data - providing the shooter with critical ballistic data needed to assist in accurate shot placement. The FORESIGHT mounts to the Picatinny rail of the weapon and once the individual ballistic data is saved, the sight can be removed and placed back without having to re-zero. The FORESIGHT app allows the shooter to store up to 10 zeroing profiles for 10 different guns, regardless of the calibre or save the shooting profiles of 10 different individuals. Previously stored profiles can be uploaded from the mobile app to the sight. The app also contains an extensive list of reticles that can be uploaded and used. The Israeli company's official said that the Meprolight FORESIGHT's digital zeroing takes the hassle out of zeroing the weapon. All five reticles are immediately co-witnessed. The built-in compass provides direction and the leveller ensures that the shooter is set up for the shot, which is critical on longer distance shots with larger calibre rifles. "The data from this highly advanced yet easy to use optic is projected on a transparent optical lens to keep the shooter informed at all times. The built-in light sensor automatically adjusts the reticle to changing light conditions".

The FORESIGHT has Bluetooth interface to connect to the Mepro FORESIGHT App

and the unit is powered by a rechargeable battery using a USB cable. The energy efficient system features an automatic shutoff and automatic power-resume diode to extend battery life between charging. The large viewing window allows the shooter to keep both eyes open for increased situational awareness.

Another very advanced aiming device manufactured by Meprolight is the Mil-Spec Mepro M21 Self-Illuminated Reflex Sight. According to the company, this aiming device is used by militaries and law enforcement agencies worldwide, and is unique in that no batteries are needed. Illumination of the point of aim reticle is achieved by a fibre optic collector system during the day and by a miniature self- powered tritium light source at night. Meprolight says that a large 30mm display window allows the shooter to keep both eyes open for better battlefield situational awareness. The shooter has the option of five reticles -4.3MOA dot or 5.5 MOA Triangle, Bullseye, and X. Day or night, no matter the weather conditions with the M 21.

The Israeli company says that the M21 has a large field of view that enables quick shooting in urban areas. Another aiming device made by Meprolight is the HUNTER X4. This is a compact and lightweight night vision weapon sight, with x4 magnification based on Gen-II or Gen-III image intensifier tubes. The company says that it features a highly durable design for the most demanding battlefield conditions. It's high accuracy red projected reticle and brightness adjustment ensures fast ballistic compensation in long and medium range targeting. Powered by two commercially available "AA" type batteries, the sight provides up to 60 hours of continuous operation under normal conditions.

#### **Snipers as a Threat**

While snipers are a very important asset of a fighting unit, at the same time they are a very serious threat. High-powered rifles with suitable optics can inflict heavy casualties. In recent fighting in Lebanon and the Gaza Strip, the IDF had to take various steps to avoid sniper fire. One way of dealing with the problem was to quickly spot the sniper's location and apply counter fire to neutralize him.

Rafael Advanced Defense Systems, one of Israel's leading defence companies, has developed a system that helps ground forces locate enemy snipers. The company says that today's battlefields present significant dangers for ground and mobile forces, including Time Critical Targets (TCT) and undetected enemy fire from small arms, RPGs and ATGMs. In response to the casualties they cause, large amounts of ammunition are often inaccurately fired, missing the targets. This inefficient and costly action disrupts combat plans while enabling the enemy to gain the initiative.

#### The LAND SPOTTER

According to RAFAEL, the answer to this critical scenario is the ultra-smart, vehicle-mounted LAND SPOTTER, a passive electro-optical Hostile Fire Detection and Location solution. The Israeli company says that with pinpoint accuracy, the system immediately detects and locates enemy fire, whether coming from stationary or on-the move positions. This extremely precise, pixel level input allows forces to quickly gain a clear situational picture and neutralize the enemy, thus ensuring the upper hand on the battlefield.

Rafael says that the systems can be perform rapid day/night, all-weather detection, pinpoint location, and verification of enemy fire and in addition it is unaffected by environmental conditions. A company source said that the systems is achieving a high Probability of Detection (PD) and has a very low False Alarm Rate (FAR). "The system is rapidly closing the sensor-toshooter loop even in urban areas, which today is a main challenge". The system weighs less than 30 kg, including two very small, low-profile sensors, a smart display and cables. The source pointed to the fact that the systems is unaffected by environmental conditions including wind, noise or echoes. The LAND SPOTTER consists of two very small, low-profile Forward-Looking Infrared (FLIR) sensors, delivering a 360° horizontal FOV and +35° vertical FOV as well as a connecting harness and an HMI unit. The total weight of the system is less than 30 kg.

#### The SMASH 2000

The growing demand for aiming devices has brought many small companies to invest in the development of advanced systems. One is SmartShooter. This company is manufacturing the SMASH 2000 plus, an optical device that can be placed on many small arms, including the M4 Carbine, and tracks potential targets using a traditional red dot sight picture.

According to the company, once a target is found, the device issues a firing solution that compensate for the soldier's breathing and fatigue which would normally pull his aim off target; all the soldier needs to do is hold down the trigger.

"What we promise here is that almost every bullet will be on target, by controlling the exact moment when the bullet is released so if you're not on target, you won't be able to fire," Abraham Mazor the company's business development VP, told ESD. The company's official said that the systems is based on a very advanced algorithm combined with an imaging processing capability. SMASH 2000 is being used by the IDF and is combat proven. According to Mazor, the system ensures that each round finds its target, in both day and night conditions, as well as keeping friendly forces safe. "Our proprietary target acquisition and tracking algorithms are integrated with sophisticated

addressing sniper fire and last year unveiled MAY, a wide area acoustic based situational awareness solution. Accurately defining and geo-locating events, the system offers a powerful tool for security and law enforcement agencies. The system provides real-time autonomous wide-area acoustic based intelligence that significantly enhances situational awareness and response time of security forces operating in urban and border areas. Developed by Elbit Systems EW and Elisra, a subsidiary of SIGINT, MAY is based on high-end acoustic sensors which operate interactively within an area of interest. Compact and durable, these fixed-installation sensors sustain long-term,



MAY is a wide area acoustic-based situational awareness solution.

image-processing software into a rugged hardware solution, providing an easy to use and cost-effective solution that creates the required overmatch."

The system works by tracking potential ground and aerial drones, using a day or night mode with a traditional red-dot sight picture. Once found, it works out a firing solution even as a soldier's natural breathing and fatigue draws his aim off target. All a soldier has to do is hold the trigger down. When the solution is calibrated, the round is let loose, hitting the target and nothing else, a SmartShooter official told ESD.

According to Mazor, the system has been in use by the IDF for several months along the Gaza border, taking out drones and incendiary balloons launched from the blockaded coastal enclave. "There is a lot of interest around this product because of the drone threat and the balloons from Gaza," he said, adding that the main customer of the system is the US Special Forces, and that the company is preparing to work with Europeans and other countries. "We have tested the system and others have. They are very happy with it – and results are very successful so far," Mazor said.

Elbit Systems, one of Israel's major defence industries, has also invested in the field of

outdoor 24/7 operation using either wired or wireless communications. MAY continuously senses its surroundings, detects acoustic abnormalities and provides a realtime analysis of emanating sounds based on advanced algorithms and deep-learning. Once it detects an acoustic anomaly such as gun-fire, the system identifies the event, classifies the sound type, pinpoints the geo-location of the signals and automatically provides actionable information to operating forces. MAY can also detect and process a variety of other public safety related sound signals including screaming, alarms and vandalism sounds.

Deploying MAY dramatically reduces response-time of first responders, increases efficiency by avoiding irrelevant event interactions and introduces a strong deterrence factor to urban environments. This makes it an effective solution for Homeland security and law enforcement agencies tasked with maintaining order and providing public safety.

It is clear that in urban warfare snipers are very crucial in dealing with many operational scenarios. Based on the vast experience of the IDF, Israeli defence industries have developed spotting and sniping systems that allow "first shot- first kill".

## **Enhanced Urban Assault Technology**

#### Sidney E. Dean

Whether Russia in the Caucasus, Israel in Gaza and southern Lebanon, or the United States and its allies in Iraq, many sophisticated armies have experienced urban warfare over the past two decades. Urban assault has many unique challenges.

U rban terrain generally favours the defender, who can prepare defences, utilise deception, install traps and explosive charges, and monitor the attacker from a myriad of hard-to-detect locations. Even boulevards are narrow compared to open

ment mix to the specific conditions being faced. Urban assault operations require a combined arms approach including aerial reconnaissance and ground support, engineering support, signals intelligence, armoured forces, and a strong infantry



The EITAN AFV is optimised for urban operations, and is scheduled to enter service with the IDF in 2020.

component for house-to-house combat and clearing operations.

#### Optimising Heavy Armoured Vehicles for Urban Warfare

As with warfare in conventional terrain, a balance must be struck between mobility, protection and firepower. Large, heavy vehicles such as main battle tanks (MBT) can use their long-range large calibre guns to destroy enemy strongholds and their secondary weapons to suppress enemy fire while infantry advances. However, they cannot access all points of the urban battlefield. And while they have the maximum level of protection, MBTs move slowly through the cluttered urban environment. A slow or stalled MBT becomes an inviting target for anti-tank weapons or large roadside bombs. Tanks must work in concert with armoured personnel transports, a category which includes infantry fighting vehicles (IFV) mounting support weaponry, and lighter armoured vehicles. While IFVs face many of the same urban obstacles as MBTs, moderate-to-lightly armoured wheeled vehicles utilised as assault carriers have the ad-

terrain, constricting mobility and channelling attackers into urban canyons overwatched by enemy snipers, ATGMs (Anti-Tank Guided Missiles) and RPGs (Rocket-Propelled Grenades). The presence of civilians as human shields inhibits offensive operations (at least by those armed forces which place a premium on international law and human rights); lack of intelligence regarding opposition force dispositions is another serious threat multiplier. Optimising offensive urban operations

therefore requires careful preparation, preferably adjusting the force and equip-

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A D9 bulldozer with slat armour operating near the Gaza border during Operation Protective Edge in July 2014.

The Israeli Defence Force (IDF) has focused on improving its urban combat capabilities - with a special focus on force protection - since losing 67 troops (at least 13 of them killed while riding in armoured vehicles) during the 2014 incursion into Gaza. The IDF is currently upgrading its NAMER IFV specifically to meet the urban warfare challenge. The NAMER, introduced in 2008 and produced by Israeli Military Industries (IMI), is basically a MERKAVA MBT on which the 120mm gun turret has been replaced by a weapon station mounting machine guns. Removal of the turret allows the MERKAVA chassis to be reconfigured to carry a nine-person infantry squad in addition to the vehicle crew. Beginning in 2017, the NAMER is receiving an unmanned remotely operated turret mounting a 30mm chaingun. This will permit the vehicle crew to provide more effective firepower for the dismounted squad. The Raphael TROPHY Active Protective System (APS) mounted on the turret will augment the already considerable armour protection of the MERKAVA chassis.

vantage of speed, manoeuvrability, and the capability to enter narrower thoroughfares to approach targets or pursue adversaries.



Installation of the ABRAMS Reactive Armor Tile (ARAT) on an M1A1 ABRAMS MBTs at Grafenwoehr Training Area, Germany

Israel took the step of introducing and then upgunning the NAMER specifically to enhance its urban operations capabilities. "An APC equipped with a turret and cannon gives it an advantage during urban warfare," said Brig.-Gen. Baruch Matzliach, head of the Tank Program Administration, when the upgrade was introduced in 2017. "The shortened cannon makes it more manoeuvrable, and [gives it] the ability to provide firepower to infantry soldiers." For the same reason, the IDF is also outfitting its new EITAN 8x8 Armoured Personnel Carrier (APC) with a 30mm cannon (range: 2,500 meters) and ATGMs, as well as the TROPHY APS. The weapons turret is remote





AMPV optimised for special forces role



Protoype of Protolab Oy's 6x6 armoured troop carrier





The General Dynamics Small Multipurpose Equipment Transport SMET will support US army infantry forces in urban settings and in the field.

controlled, eliminating the need for soldiers to expose themselves to enemy fire.

The United States army has been taking urban warfare requirements into consideration when developing upgrades to armoured combat vehicles. For the US and other NATO forces this is all the more relevant since any potential war in Europe is likely to include significant urban combat as well as field combat.

The ABRAMS M1A1 MBT is being outfitted with new reactive armour to provide added protection against ATGMs and RPGs. The ABRAMS Reactive Armour Tile was installed on US Army MBTs stationed in Europe in 2017. The tiles can be mounted at an angle, depending on the mission environment. For urban environments, where adversaries are expected to attack from second or third stories or rooftops, the tiles can be angled so that their blast would push out and upwards toward the threat. The US Army is also actively working to equip the M1 with the TROPHY APS, while seeking viable APS solutions for the services' other armoured vehicles.

The ABRAM's offensive capabilities are also being bolstered through introduction of the Advanced Multi-Purpose (AMP) round. The AMP, developed by Orbital ATK is replacing the four specialized 120mm shells fielded on the ABRAMS. It has a programmable fuse which allows the gunner to select the shell's performance on target after the round is chambered. The parameters are entered via an ammunition data link developed by Northrop Grumman. Point Detonation mode and Airburst mode have the greatest relevance to urban warfare. The former can destroy vehicles or defilades on impact or breach walls to open access routes for friendly infantry. The round provides added capability to breach reinforced walls, with the ability to penetrate 20 centimetre thick walls of reinforced concrete. The fuse can be set to detonate on impact or with a delay, in order to maximise effects inside the targeted building. The Airburst mode can detonate the round above but near entrenched enemy fighters including sniper, artillery and missile personnel in defilade or on rooftops. It can also be aimed to enter an open window and kill enemy fighters inside a specific room.

#### Light Armoured Vehicles for Urban Assault

Heavy armoured vehicles need to be supported by lighter, agile protected vehicles capable of getting infantry within striking distance of the enemy. Wheeled armoured vehicles, while field capable, are usually well suited for urban operations. Three new developments in this area are Protolab's 6x6 Protected Multi-Purpose Vehicle (PMPV), Rheinmetall's 4x4 Armoured Multi-Purpose Vehicle (AMPV) and Rheinmetall's SURVIVOR R Multirole Protected Vehicle.

The Finnish armed forces are currently testing the PMPV prototypes. "We designed the Protolab PMPV 6x6 to meet the requirements of today's soldier and today's asymmetric battlefield," Juha Moisio, Protolab Oy Business Development Director said upon presentation of the prototypes. The PMPV is certified to satisfy NATO STANAG mine and ballistic protection level 2a/b (with possible upgrades to STANAG 4), and is capable of accepting an armoured external weapons

mount. The 14-tonne vehicle carries a crew of two plus ten combatequipped soldiers. At 2.55 metres width the PMPV is narrower than most armoured combat vehicles, enhancing mobility in urban settings.

Rheinmetall and co-developer Krauss-Maffei-Wegman presented the AMPV prototype to the German armed forces in 2009, and subsequently offered the vehicle to the Polish armed forces. At 2.24 metres width, 5.34 metres length and 2.14 metres height, the highly agile AM-PV can access any place that an SUV can go. The turning circle is 15 metres. The vehicle can accept a choice of remote-controlled weapons stations mounting up to a 12.7mm machine gun or a 40mm grenade weapon, plus a day/night sensor system including a laser rangefinder and a sniper detection sensor. The weapon can be elevated up to 70 degrees, making it ideal for urban operations; depending on armament choice, effective range can be up to 2,000 metres.

The SURVIVOR R protected vehicle is also optimised for urban operations, and can be configured for either military or police requirements. The vehicle is a joint development of Rheinmetall and Achleitner. The vehicle is based on an MAN 4x4 truck chassis, with an armoured crew compartment and state-of-the-art vectronics by Rheinmetall. The gas-tight monocoque seats ten combat-ready soldiers including the driver. Additional armour and a rooftop weapon station are optional, as are searchlights, non-lethal effectors such as smoke systems, protective grids for windows, and a

dozer blade. The 2,7-metre-high chassis is 2.5 metres wide (2.9 metres counting rear-view mirrors).

#### Infantry Force Multipliers – Sensors

The US Army is introducing technology which allows soldiers to fire their weapons around corners without exposing themselves, a capability which is especially valuable in urban terrain. The system involves two separate, newly developed pieces of equipment: the Family of Weapon Sights – Individual (FWS-I) which is mounted on the individual assault rifle, sniper rifle or squad automatic weapon; and the helmet mounted Enhanced Night Vision Goggle-Binoculars (ENVGIII).

The binocular goggles can be utilised in standard daylight mode with image intensification, or in infrared mode. Unlike previous night vision devices, the new goggles require no ambient light, so they can be used in tunnels or windowless buildings. The infrared capacity also ensures detection of enemy forces through smoke or other vision-inhibitors. The maximum visual range with the device is 1,500 metres. A blue-force overlay is wirelessly transmitted from the soldier's digital map, preventing friendly fire incidents. A toggle allows the soldier to wirelessly transmit the picture from the





A soldier demonstrates the use of the Enhanced Night Vision Goggle III, paired with a Family of Weapons Sights-Individual

digital FSW-I to the goggle display. This capability allows the shooter to remain under cover and only extend the weapon around a corner or over a barricade; guided by the display of the FSW-I's reticle on the goggle, the soldier can aim the weapon and engage the enemy from cover. The new system is currently undergoing operational testing at the 1st Infantry Division, which received 640 sets in September 2019.

Other sensors suitable for urban operations are being pursued. These include handheld radars which can penetrate walls and other barriers to determine whether there is a human presence or any other potential threat. Lumineye, a small technology firm located in Boise, Idaho, is already marketing such devices to civilian agencies such as police and fire departments. The US Army awarded a 250,000 Dollar development contract to Lumineve in November 2019, with the goal of adapting the firm's tablet-sized LUX for military applications. The device sends out pulsed radar waves that can penetrate most solid materials. The LUX applies signal processing software to evaluate the returning radar signal and differentiate between humans and objects. The motion detection capacity is so sensitive that it can tell that a person hidden behind a wall is breathing. While it cannot differentiate between combatants and civilians, it does enable soldiers to prepare for resistance before entering or breaching a room or building. The device could also help locate hidden rooms, trapdoors, and other





US Marines test a weaponised version of the General Dynamics MUTT remote controlled robot.

concealed spaces within a building. The effective range of the radar is 15 metres in the open; the range of detection through walls depends on the barrier's density and composition.

#### Infantry Force Multipliers – Unmanned Ground Systems

Finally, there is an increased focus on unmanned ground systems for urban operations. This includes small-to-medium sized armed robots, remote controlled support vehicles, and logistic robots. Several nations, including Russia, the Ukraine and Israel, have been experimenting with remote controlled armed robots ranging in size from a golf cart to a bathroom scale. These smaller unmanned systems are most relevant for urban operations. The US Marine Corps has been pursuing several models, including the Modular Advanced Armed Robotic System (MAARS) developed by Qinetic. The tracked robot can be armed with am M240 machine gun or a 40mm grenade weapon with lethal or non-lethal munitions. Capable of functioning up to one kilometre from the operator, the robot can be used for armed reconnaissance outdoors or within a building (the tracks enable the climbing of stairs).

Other robotic projects include four-legged machines the size of a large dog. Sometimes referred to as "mules", these systems are under consideration as reconnaissance assets or as "beasts of burden" to carry a portion of a squad's gear while patrolling or advancing, or for resupply of units in advanced positions. In 2019, the US Army awarded General Dynamics Land Systems a contract for the first tactical logistics robot. The tracked Small Multipurpose Equipment Transport (SMET) will carry up to 450 kg worth of supplies, equipment and weap-ons. The first production units are expected to be delivered around 2021.

Larger unmanned systems are also already deployed. In 2018, Israeli Aerospace Industries (IAI) delivered the first D9T PANDA remote controlled armoured bulldozers to the IDF. The PANDA is a further development of the manned CATERPILLAR D9R and the unmanned D9N already in service. Armoured bulldozers have become indispensable for urban operations in Gaza, where the IDF has deployed them to collapse tunnels, destroy defilades and buildings, clear suspected explosive charges or overrun manned firing positions. In addition to slat armour against RPGs, the D9 family is also equipped with the TROPHY APS.

# Small Arms Ammunition Developments

#### Sidney E. Dean

A wide variety of ammunition choices is available for military small arms, a category which encompasses man-portable, non-crew served weapons such as pistols, assault rifles, submachine guns, sniper rifles, light machine guns, squad automatic weapons and shotguns.

n recent decades, small arms munitions (with the exception of shotgun ammunition) have taken the form of copperencased bullets with a lead core and a penetrator tip made of a harder material such as steel or tungsten alloy. The bullet is seated halfway inside a brass casing, with the bottom portion of the casing filled with propellant. A primer is placed at the bottom of the cartridge to initiate combustion of the propellant.

Experience in recent operations, such as the two-decade-long conflict in Afghanistan, has led to some criticism of currently fielded NATO-standard ammunition, especially the 5.56mm round used in most European and US rifles. Many many soldiers report that the 5.56 has displayed inadequate range and stopping power. Currently, armed forces are attempting to retain or gain a battlefield edge by introducing new types of small arms ammunition, including the utilization of alternate materials.

#### **Green Ammunition**

A major development over the past decade has been the introduction of environmentally friendly small arms ammunition in 2010. Surprisingly to many, the US Army took a leading role here, replacing its copper jacketed, lead core M855 assault rifle ammunition with the lead free M855a1 EPR (Enhanced Performance Round). The new 5.56mm ball bullets have a copper jacket and solid copper core. The bullet's top half or penetrator is made of hardened steel. To compensate for the lower weight of the projectile's

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Using a stripper clip to load M885 5.56mm ammunition into an M-16 magazine

core, the new bullet is three millimetres longer than the original M855 to achieve the same 62 grain weight. The M855A1 also uses a new propellant, which burns faster than the older bullet's powder, creating higher muzzle velocity while reducing flash. The bullet is compatible with the M4, M16 and Heckler & Koch assault rifles as well as the M249 machine gun. The lead free 7.62mm M80A1 bullet was introduced in 2014.

Environmental contamination of training grounds and firing ranges through lead munitions was the initial motivation for exploring so-called 'green munitions' alternatives to lead core bullets. However, operational experience in Afghanistan and Iraq demonstrated that the new munition actually displayed superior effects.

"What started as a programme to be more environmentally friendly became a significant upgrade in military small arms capability," wrote Major (now Colonel) Glenn Dean, who had participated in the leadless-bullet development programme, in his 2011 e-book 'In Search of Lethality'. Soldiers reported that the new bullets were better at penetrating protective barriers and in incapacitating enemies than the softer-core ammunition. This field experience confirmed the data gathered during testing of the new munition. The steel-core bullet can penetrate a 3/8-inchthick steel barrier at twice the distance of the lead-core munition. The new 5.56mm bullet can also penetrate concrete masonry at a distance of up to 75 yards, while the old bullet could not penetrate concrete at any range. When striking soft targets, on the other hand, the M855a1 will yaw sooner than the original ammunition, making it more likely to consistently inflict significant trauma, thereby enhancing stopping power. The original M885, by contrast, would - under certain circumstances - fly straight through an enemy soldier while producing less kinetic effect on the target. This was especially the case during close-quarters combat in urban or cave-clearing operations.

Some negative factors include greater wear and tear on rifle barrels, bolts and



The 5.56 M855A1 Enhanced Performance Round, shown here, is sometimes called a 'green round' due to its copper-only core. It has proven more effective against hard targets than the 5.56 M855 round it is designed to replace. The new round is equal to the M855 round against soft targets in terms of effectiveness but is more consistent in its performance.

magazines. To this end the US Army also developed a special 'green magazine' for the new munition. After initial doubts, the US Marine Corps also adopted the M855a1 in 2017. European firms such as Germany's MEN-DefenseTec and Norway's Nammo are also producing lead free munitions in NATO standard calibres 5.56x45 and 7.62x51. According to Nammo, these have been purchased by the armed forces of several European countries.

#### "New" Calibres

Some armed forces are experimenting with unconventional calibres. Fiocchi, Nammo and RUAG, for instance, all offer ball and armour piercing ammunition as small as 4.6mm for submachine guns and personal defence weapons, such as the Heckler & Koch MP7. The US Special Operation Command (SOCOM) has introduced a new sniper ammunition, the 6.5mm Creedmoor round. At 125 grains, the projectile is only marginally lighter than the 130 grain 7.62x51mm round, but the new munition is notably longer and slimmer, enhancing long-range performance. Joint testing by SOCOM and the US Army determined that - when compared to the current 7.62mm round - the new round had twice the hit probability at a range of 1,000 metres. The Creedmoor also displayed a 33% greater effective range, a 30% increase in energy on target, a 20% higher velocity at 915 metres, a 40% decrease in wind effect on the bullet's trajectory, and a reduced recoil. The formal decision to introduce the Creedmoor - which was developed approximately ten years ago - was taken in March 2018. A presolicitation notice was

Photo: MAC LLC



Nammo and US company MAC LLC are together offering .50 cal ammunition with lightweight polymer cases.

issued in October 2019 for a conversion kit to replace the upper receiver for the current 7.62mm M110 Semi-Automatic Sniper System (SASS). Conversion of the SASS inventory to the 6.5mm calibre is expected to be completed by 2023.

The US Army is currently developing a new family of infantry weapons to be fielded in 2023. This Next Generation Squad Weapon (NGSW) programme includes a new assault rifle, submachine gun, SAW, marksman or sniper rifle, pistol and shotgun. The rifle and SAW are to be fielded with a unitary 6.8mm calibre. This 'intermediate' sized round is intended to offer significantly better ballistic performance (extended range and accuracy, controllable recoil) than 5.56mm projectiles, while weighing less than the 7.62mm round. "We're looking to reach out around 600 metres and have lethal effects even if the target is protected by body armour," Colonel Geoffrey Norman, Force Development Division Chief at Headquarters, US Army, said in a press interview in February 2018. "We need to have lethal effects against protected targets and we need to have requirements for long-range lethality." Then Army Chief of Staff General Mark Milley declared in October of 2018 that the round would have an accurate range "far in excess" of any assault rifle munition currently in service.

Notably, this is not the first effort to reduce weight and enhance performance by using a 6.8mm projectile. The .276 Pederson round was successfully tested by the US Army in the 1920s, but was rejected on logistical grounds (the Army still retained large stockpiles of .30 calibre or 7.62 munitions left over from World War I). SOCOM and Remington Arms developed the 6.8 Remington SPC round in 2002-2004 in an effort to overcome the various deficiencies of the NATO standard 5.56mm and 7.62mm calibres. At the time, the 6.8mm round was found to be effective for urban combat settings, but displayed poor performance at longer distances. The US armed forces decided in 2007 not to procure the 6.8mm calibre, although Jordan and Saudi Arabia subsequently did introduce the munition.

#### Caseless and Telescoped Ammunition

Two of the three remaining contenders in the NGWS programme are presenting unconventional case designs to further reduce the weight of the 6.8mm ammunition. General Dynamics is teaming up with True Velocity to develop a composite cased cartridge. True Velocity currently produces and markets military grade composite ammunition in 5.56mm, 7.62mm, .338 (8.5mm) and 12.7mm calibres. The ammunition is composed of a steel case head and a composite case body. The composite casing is 50% lighter than a conventional brass case. The fully loaded bullet is still 30 per cent lighter than a conventional cartridge. According to the manufacturer, the composite casings also display superior heat dispersion inside the weapon's chamber, thus reducing heat stress on the rifle and also minimising muzzle flash.

Textron takes a different approach. The firm plans to offer cased-telescoped ammunition (CTA) in the NGWS. CTA uses a plastic or polymer cartridge case instead of a brass case. The US Army has been studying CTA technology for a decade with an eye to developing a lightweight family of munitions, with Textron conducting the Cased Telescoped Small Arms Systems programme for the US Department of Defence.

The CTA projectile is normally completely enclosed in the case, together with the propellant. The casing is sealed with a flat top like a shotgun shell. This configuration has earned the technology the moniker 'lip-stick' ammunition. CTA munition is generally not only lighter but much shorter than conventional brass-cased munitions. Therefore, the case is somewhat thicker than a conventional cartridge. For this reason, Textron proposes a 20 round magazine for the NGWS assault rifle. A belt-fed system for the prospective LMG/SAW has also been developed.

Textron already offers CTA in the 5.56 and 7.62 calibres as well as in 6.5mm. The firm introduced the 6.5 variant on their own initiative in 2017, describing it as 35 per cent lighter weight but 30 per cent more lethal than the standard 7.62x51 round. Compared to the 5.56mm round, the 6.5mm CTA has three times the energy downrange, according to a Textron statement. This would translate to significantly greater range and stopping power. The CTA programme is currently at Technology Level seven, which signifies that the prototype is performing at or near the requirements for an operational system.

Caseless munitions have also been proposed as one way to reduce infantry weight load. The term 'caseless' is somewhat of a misnomer as this type of ammunition – which closely resembles CTA rounds – does enclose the projectile in a case. The difference is that the cartridge case actually consists of a solid propellant (such as nitrocellulose) with the primer and bullet firmly lodged inside. Advantages such as low weight and no spent casings are, however, offset by the technical complexity of the concept. There are currently no active programs to develop military-grade caseless ammunition.

#### **Supercavitating Ammunition**

Supercavitating bullets are a special category of ammunition. Used by special operations forces, these projectiles are effective even when fired underwater or fired from above water at submerged targets. The supercavitation effect is created by placing a comparatively rounded but sharp-edged tip on the projectile. This displaces water ahead of the bullet, creating an air bubble, which extends along the sides of the projectile, significantly reducing friction and drag.





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A cased-telescoped lightweight ammunition belt



The 4.73x33mm caseless ammunition used in the G11 rifle (which never entered into service), shown disassembled. The components are, from left to right, the solid propellant, the primer, the bullet, and a plastic cap that serves to keep the bullet centred in the propellant block.



.223 Remington cartridge on the left and a 4.73x33mm caseless cartridge on the right

The Norwegian manufacturer DSG has been pursuing supercavitation for the past decade. It introduced prototype munitions as early as 2011, but has only recently reached the stage where serial production is viable. The firm is now actively marketing its Cav-X family of small arms ammunition which is available in 5.56x45mm, 7.62x51mm, .300 BLK and 12.7x99mm. Several calibres are available in standard and armour piercing variants. Cav-X is currently being evaluated by the US Special Operations Command, which would represent the largest single potential customer for the Norwegian firm. DSG states that the ammunition is already being procured by other unidentified governments.

DSG describes Cav-X as a Multi-Environment Ammunition, suitable for engaging targets that are above water, partially submerged or fully submerged. The ammunition can be fired in four distinct modes: conventional engagement with both the shooter and the target being outside the water; underwater engagement, with both the shooter and the target being submerged; engagement of submerged targets by shooters who are outside the water; and the precisely reversed scenario where divers fire at targets which are above the surface. All

Photo: US Arm

Comparison of the standard 7.62x51mm round with Cased Telescoped Ammunition in three calibres.

rounds can be fired against human targets (where the supercavitating properties enhance trauma, increasing the likelihood of death or incapacitation). Armour piercing rounds can also be used against torpedoes, submerged mines, unmanned underwater vehicles, and even against manned submarines operating in shallow waters.

Cav-X munitions are available in two variants: A2 and X2. The A2 variant is produced in all of the previously stated calibres. These rounds must be fired from outside the water, but can engage submerged targets. The A2 variant is designed for rifles and machine guns deployed on boats, helicopters, or at the water's edge. The X2 load is designed for combat swimmers and other special operations personnel who operate There has also been speculation about arming UUVs with this ammunition. These bullets can be fired from submerged positions against targets that are either under water or above water. X2 rounds are currently available in 5.56x45mm, 7.62x51mm, and .300 BLK calibres. When fired from near the surface, these munitions could have sufficient momentum to attack low-flying helicopters and UAVs.

The new ammunition is designed to be compatible with the majority of firearms currently in service with NATO armed forces. According to DSG, Cav-X rounds achieve effective underwater ranges between 12-14 metres (5.56mm and 7.62mm) and 60 metres (12.7mm) against soft targets. Alternately, during testing performed by the company, the 12.7mm variant has penetrated two centimetres of steel after passing through 17 metres of water.

## The Art of Protecting Flight Crews

#### **Aircraft Self-Protection Systems**

#### **Georg Mader**

Control of the air remains a key function of air power for all current and future warfare. But what was once largely a fight between planes has now become a much more complex equation of ground and air-based sensors and self-protection.

Nevertheless, it is still the case today that "the one who sees first wins" – as was the case in the trenches of Flanders during the First World War. Today, however, a great deal of self-protection should take place long before the sensors on board start screaming and flashing.

Oddly enough, the idea of the "immunity" of stealth planes has become firmly established in the public imagination today. However, we are still a long way from a Harry Potter-like "cloak of invisibility". At its core, stealth is about reducing radar signature in relatively narrow frequency bands rather than making aircraft completely undetectable. But at least stealth aircraft are able to reduce the detection range to such an extent that they can either fly through the now larger gaps or through the "bubbles" created by radar and air defence coverage, or get closer enough to the source trying to detect the aircraft and then, ideally, eliminate the source.

#### A Game of Cat-and-Mouse

In the end, this is a cat-and-mouse game and aircraft maybe losing that because even stealth aircraft have Achilles' heels. Noise, heat, visual signature, various electromagnetic emissions (from V/UHF, datalinks, jammers, IFF-interrogation, TACAN etc.) and even certain angles or aircraft configuration allow chances of detection. Moreover, modern surface-to-air missile (SAM) systems and even airborne radars are looking at new slices of the electronic spectrum to use frequencies that render

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A C-130H flaring

current stealth designs less(er) effective or even defunct which means that the airborne cat-and-mouse game will go on. However, while we have seen that the major air powers each develop their own versions of stealth aircraft, perhaps the greatest advances have been made in the development of detection and interception technologies. So in the medium term, aircraft may lose this "arms race", not least because they cannot carry tonnes of generators and antennas. The increased performance of sensor computing power results in exposing a wider spectrum (visual, infrared and noise), which will further increase the vulnerability of cloaking aircraft in the coming years. However, overloading a defence system or creating a complex or ambiguous image can provide valuable time to reduce detection or at least response time. Every effort is made to create maximum confusion – the more unpredictable the better.



The SA-7 MANPAD depicted here in Libya has been one of the most widely distributed threats to aircraft.



The evolution of threats posed by MANPADs in recent decades

It is important to remember that today camouflage aircraft account for only a fraction of even the most modern and prosperous air forces. First and foremost, it is still the other tools and tactics available to flight crews in today's combat space that are at stake. The rules of this "game" are quite simple and a combination of physics and technology. It all boils down to three "basic" techniques: 1) Stay out of detection, 2) Blind hostile target acquisition, or 3) Deceive them to search elsewhere.

Staying outside hostile detection range or at least reducing it is what stealth characteristics are aiming to achieve. By reducing detection range, you can actually decrease standoff and, in extremis, penetrate an enemy's defence system. Knowing where the enemy's GBAD systems (Ground based air-defence) are located is a vital prerequisite for staying out of his detection range. Thus long-term as well as long-range surveillance is suggested, aiming to gather their locations and electronic signatures in libraries. Even more critical are missile flyout and engagement parameters – respectively, the weapon's legs and the practical envelope at which it can shoot down a target before it loses kinetic energy. These have in reality been much lower than the detection ranges. But modern systems are increasingly able to shoot over the horizon which is forcing strategic assets and force multipliers such as surveillance platforms, tankers or transports to back further away from the front lines.

#### **Noise Jamming**

Technologically, self-protective noise jamming is another simple technology which aims to deny or at least disrupt the detection of an aircraft. If these jammers are well tailored to known threats or powerful enough, they can generate so much electronic noise within an operating system's hostile devices that their operators have to detune them to drastically reduce detection areas or even shut them down. However, this technique has some drawbacks, as it requires considerable power for an air platform to overcome a more powerful ground-based system with higher generation capacity. But it can also act as a "beacon" for enemy sensors to home-in on your jamming, because in the end it is also a signal. Finally, it must be able to match the operating frequency of the targeted hardware, while today's GBAD systems are increasingly capable of jumping the frequency incredibly fast, requiring an equally agile interfering signal or jamming of a wide frequency band, which in turn requires considerable power. The same is true for various and sometimes bulky and expensive self-protection equipment, to have a last-line of self-defence once a missile is approaching.

This is why the final technique is one of deception and confusion rather than blinding which requires electronic signals that can decoy, distract or divert detection methods. They have become more prevalent in modern systems and can include the spoofy use of standoff, deployable and towed decoys. This is where we have to mention the art of cunning. There is an old fighter pilot saying that "if you're not cheating, you're not trying", and nowhere is this truer than in tactics employed to avoid detection. SAM operators, whether in a large battery or as a single MANPAD-shooter, are trained to spot patterns or assume certain behaviours which is why it is important to avoid predictable habits. By the way, the recent hype about drone swarms hints toward using these expendable platforms to divert attention from more valuable platforms

#### **Recent Developments**

In August 2019, a USAF statement titled 'Environmental Impact Statement' and issued to various Air National Guard facilities that would have Lockheed-Martin's 5th gen. F-35A based, revealed a recent development. The statement is on the potential release/handling of countermeasures during operations, such as infrared decoy flares and chaff. So far, chaff have been absent from the stealthy F-35's defensive suite of expendable countermeasures like flares and towed decoys, which suggests that it was indeed a capability the F-35 lacked and might not have needed, given its stealthy design. The statement says that "the ARM-210 chaff proposed for use by the F-35A is currently undergoing operational testing. It is expected to be available for use in 2020."

So far it remains unclear whether this applies to USMC's F-35B or USN F-35C variants as well, or any of the A- and -B's in service with foreign air forces. In 2014, the world's largest chaff-manufacturer ESTERLINE first mentioned chaff cartridges made by its subsidary ARMTEC for the F-35 and the F-22. And in 2018, a briefing by USN VA Mathias Winter, then head of F-35 Joint Program Office (JPO), included a reference to "advanced chaff" as part of the still-in-development and years away Block-4 upgrades for the LIGHT-NING II. Obviously, since the implementation of the JSF a quarter of a century ago, there must have been a change in threat perceptions in recent years, which lead to a weakly observable and thus radar-sensitive "immune" aircraft being equipped with radar-inhibiting chaff elements. It looks as if stealth is no longer a guarantee for the survival of such low-observable platforms in combat - if it ever was. But airframe-inherent stealth always was the promise' that justified such aircraft's subsequent design limitations in terms of speed, range and weapon payload. So, with the combat value which justifies these restrictions continuing to decrease, one might wonder whether the F-22 or F-35, but also Su-57 or J-20, are not just another fighter, only at a hefty price and with prohibitive operating costs.

#### **Active Countermeasures**

Once a radar or another location device has successfully achieved a firing solution for SAMs, a missile usually is on its way towards our aircraft. Now, other and faster self-protective measures are needed. When missile warners - mostly based on IR- or ultraviolett sensors that detect the missiles hot exhaust plume - alert the crew via their tactical threat display and/ or acoustic signals, active countermeasures are in dire need. In addition to the usual IR flares, the idea of "offensively" fighting the seeker of the incoming missile with a laser in order to distract or disturb it has become reality in recent years but only on large multi-engine transports, special-mission aircraft, and

**Defensive aid systems on a Finnish Air Force NH-90TT** helicopters; the swivelling little "turrets" are still too large and drag-prone to be integrated in supersonic fighter platforms. This, however, might change in the long run; artist impressions of 6th gen. studies on "Future Combat Air Systems" by manufacturers like Raytheon, BAE Systems or AIRBUS/DASSAULT show red or green laser beams smouldering incoming missiles. It is unclear, however, where the suddenly available high-power output burst should come from.

Therefore, new sets of DIRCM (Directed Infrared Countermeasures) are the current cutting edge in aircraft self-protection. Practically, all such systems are part of a Defensive Aids System (DAS) which unites capabilities in threat warning, selfprotection, countermeasures dispensing and in DIRCM itself. At the heart of the system, the DAS-Controller is able to assess multiple threats to the aircraft and prioritise the appropriate response using the Countermeasure Dispensing System (CMDS) and the laser/microwave firing DIRCM turret. Placed in blisters at the front and rear, IR and UV sensors are constantly on the lookout for missile and gunfire threats, providing long range, rapid and accurately-located alerts when they occur. The DIRCM is mostly present in a dual head drum, providing 360° protection and the ability to defeat

#### **Radar Countermeasures: Chaff**

Chaff dates back to WWII and originally consisted of aluminium strips cut to various frequency lengths. First use was by the RAF bombers during the 'Firestorm' bombing raids on Hamburg in 1943. Modern examples are using metallized synthetic fibres, which make them hang in the air longer, offering more persistent effects. A bundle of chaff consists of app. 5 million fibres which are cut to reflect radar signals. When dispensed, they form an electronic 'cloud' that ideally interrupts radar signals or temporarily hides the manoeuvring aircraft from radar detection and targeting. multiple threats simultaneously, by accurately directing a jamming laser onto the missile's seeker, confusing its guidance system and steering the missile away. Such an integrated and optimised threat warning/ threat defeat chain thwarts off sequential incoming missiles quickly and effectively. Not much is known about the operational experience with such self-protection suites, but the principle obviously works.

Among the leading manufacturers of such sensor-suites is Italy's LEONARDO. In partnership with THALES they are providing the MIYSIS system, allegedly an advanced DAS which protects the aircraft against latest-generation heat seeking IR missiles. MIYSIS consists of a THALES ELIX-IR threat warner, a LEONARDO DAS controller, the MIYSIS DIRCM as the centrepiece and THALES' VICON Countermeasures Dispenser. The system draws on experience gained in the development of the 2007 ECLIPSE technology, which has been tested against more than 100 missiles on international ranges with a 100% success rate and was trialled as part of the UK's CDAS (Common Defensive Aids System) demonstrator. It focusses on five key requirements: Protection of the full range of rotary, turbo-prop/ fixed wing and jet-transport platforms against advanced missile threats with a single design solution, a two-head configuration for spherical protection, a fully exportable product and – so they claim - the smallest, lightest and least powerhungry multi-head DIRCM system. At the recent DSEI show in London, MIYSIS won its first integration contract. The UK MoD ordered it for self-protection for the RAF's SHADOW ISTAR fleet, based on the eight KING AIR 350CER operated by 14 Sgn out of RAF Waddington. Because of its ISR role, they may be required to also



Photo: USMC



The working principle of the C-MUSIC system



A J-MUSIC suite on an Israeli B707T

fly through hostile airspace. The single source selection by the RAF follows the recent SALT-III international trials hosted by the FMV (Swedish Defence Materiel Administration) in Sweden. There, the integrated MIYSIS/ELIX-IR combo, using a jamming waveform developed by the UK MOD's Defence Science and Technology Laboratory, defeated IR missiles in live fire exercises. IOC (Initial Operating Capability) at 14 Sqn is targeted for early 2021. At the same occasion, LEONARDO reveiled that in Italy, it's Multiple Aperture InfraRed (MAIR) missile warning system made its first test flight in July off the Ligurian coast between La Spezia and Genoa on a testbed helicopter. The location was chosen because of the climatic conditions of warm air meeting the Alps, a rugged coastline, highways and plumes from industrial chimneys, which can give a similar signature to missile launches against a skyline. Further flight tests are to take place to test the system's full range of capabilities. The company is also using a fixed-wing aircraft, to complete its qualification campaign ahead of a potential production launch in the second half of 2020. On the fixed-wing segment, one is targeting the military transport in the first instance and may expand to civil aviation sectors like aircargo in the future. MAIR uses five interconnected optical heads to cover 360°×270°

#### Leonardo's UK Subsidiary

In late 2018, LEONARDO-UK's radar and advanced targeting business, which is part of the company's Airborne and Space Systems division, provided first details of MIYSIS DIRCM activities during a press tour at its Crewe Toll facilities near Edinburgh. The UK subsidiary has been at the forefront of the development of DIRCM systems for 20 years, beginning work with the UK MoD in the late 1980s and selected in 1995 as the supplier of DIRCM pointer/trackers for the AN/AAQ-24 (V) NEMESIS system, founding a successful partnership with US giant Northrop-Grumman. Since then, over 2400 combat-proven DIRCM pointer/trackers of various types have been built in Edinburgh and deployed on over 50 aircraft types. It will also be the research location for the self-protection suite of the UK's 6th gen. TEMPEST fighter, recently joined by Sweden and Italy. coverage, with a sixth sensor able to provide full spherical coverage against missile threats. Self-protection for UAVs is also under consideration which might become a lucrative market in the future, with unmanned systems getting more expensive and deployed to contested airspace.

Israel is another prominent player in this segment. Because the country fought several air-wars against its Arab neighbours during which it lost more than 100 IAF-jets mostly to Arab GBAD-assets in 1973, Israel's defence & electronics industry had to develop a much more swift and practical approach than other countries. For many years, ELBIT has been the biggest player in this segment. In 2019, it celebrated two important milestones in Europe. In June, it was announced that NATO (represented by the Dutch MoD) and AIRBUS have integrated and tested ELBIT's J-MUSIC (J-Multi-Spectral Infrared Countermeasure) DIRCM self-protection system into an A330 Multi-Role Tanker Transport (MRTT) aircraft of the NATO Multinational MRTT Fleet (MMF). The Haifa-based company said that its engineers had supported three days of integration flight tests led by Airbus at the end of May from Madrid-Getafe, monitored by NATO's Support and Procurement Agency (NSPA) and OCCAR (Organisation for Joint Armament Co-operation). The tests demonstrated the functionality of J-MUSIC, which defeated multiple simulated head-on, tailon, and side-on threats from various ranges and against an A330 MRTT conducting a series of flight manoeuvres at different altitudes. The first two MRTTs with J-MUSIC are scheduled to be delivered in 2020, replacing the RNLAF's two KDC-10 tanker/transports. The remaining six aircraft are due to be delivered to Eindhoven and Cologne-Wahn in 2021-24

#### Latest Self-Protection Suite for Luftwaffe A400Ms

In June 2019, ELBIT also received a US\$73M contract from DIEHL-Defence, to provide its J-MUSIC directed infrared (IR) countermeasure (DIRCM) systems to protect the German Air Force's 24 to 32 (out of 53) A400M transports. The contract includes an initial batch of 12 J-MUSIC turrets along with integration work in cooperation with DIEHL and AIRBUS. Each aircraft set involves the installation of three "turrets" - one under the fuselage and one on either side of the aft fuselage - to ensure maximum defence against hostile SAM-systems. All taken together, however, the current order could therefore only equip an initial four A400Ms with J-MUSIC.

AIRBUS and HENSOLDT concluded a longterm framework agreement for devel-

oping a European self-protection system for European platforms to cover the supply of a missile protection capability for AIRBUS military helicopters. Signed in late 2018, the agreement covers an initial 10-year period during which orders can be placed for the Airborne Missile Protection System (AMPS). A first order under the framework will result in 20 systems being delivered for the H145M in 2020. This comes as no surprise since the initial development of AMPS was carried out using the H145, and the first such rotorcraft produced were delivered with the protection system. The agreement also covers orders for integrating the system on the H225M and H135M variants, both of which have already deployed AMPS, which reduces or even entirely eliminates one-off costs. While AIRBUS said that the protection system is not exclusive to rotorcraft and customers can opt for other systems if they wish, HENSOLDT provides two standard versions of AMPS and customers/operators can choose their required modules and sensors based on the particular application. Modules include the Missile Launch Detection System (MILDS Block-2) and the Advanced Control and Display Unit in the cockpits.

The Spanish INDRA Group is one example where plans have already been executed and implemented; INDRA's e electronics division - also involved in the EF-2000 and EURODASS TYPHOON selfprotection programme - has developed INSHIELD, a system tailored for protecting aircraft from IR-guided missiles fired by MANPADs. In 2018, INSHIELD has undergone NATO trials, installed on a Spanish Army CH-47 CHINOOK helicopter at the WTD 91 test centre in Meppen, Germany. Co-funded by the Spanish MoD, the dual-use system for both military and civil aircraft is ready for service. Meanwhile, the company is working on a DIRCM variant so that INSHIELD can be installed in the nine Spanish-AF A400M tanker/transports.

#### **Precious Rulers and Leaders**

Two examples of recent investments into aircraft self-protection suites to provide safety for VIPs and VVIPs are India and Qatar. Earlier this year, the US State Department approved the sale of two Large Aircraft Infrared Countermeasures



An AAQ-24 and an AAR-54 on an Australian E-737 WEDGETAIL AWACS

(LAIRCM) self-protection suites (SPS) to India for roughly US\$190M. According to the Defense Security Cooperation Agency (DSCA), India requested two SPS consisting of a Northrop Grumman AN/AAQ 24(V)N LAIRCM, a Harris ALQ-211(V)8 Advanced Integrated Defensive Electronic Warfare Suite (AIDEWS), and a BAE Systems AN/ALE-47 Counter-Measures Dispensing System (CMDS), to protect two Boeing 777 head-of-state aircraft, with Boeing the prime contractor. Indicating how complex such suites usually are, the volume has to include 12 GUARDIAN Laser Transmitter Assemblies AN/AAQ-24 (V)N, with six installed and six spares. It would also include eight LAIRCM system processor replacements (LSPR) AN/AAQ-24 (V)N, with two installed and six spares, and also 23 missile warning sensors (MWS), with 12 installed and 11 spares.

As a similar cautionary measure for the safety of the rulers and their families, the Government of Qatar has requested the purchase of two such AN/AAQ-24(V)N Large Aircraft Infrared Countermeasures (LAIRCM) systems from Northrop Grumman to protect two 747-800 Head-of-State aircraft. This planned sale will also include the 12 GUARDIAN Laser Turret Assemblies (GLTA) and 23 Missile Warning Sensors (MWS) as well as other related equipment and the engineering, engineering and logistics support of the US government and contractors. And here we also know the cost of what such sets are traded for: The price is estimated at US\$86M.



The self-defence suite of an Indian Air Force AW-101



Northrop Grumman's LAIRCM on a KC-10A

# Simulation and Training in the Gulf Region

#### Joris Verbeurgt

Tensions in the Gulf region are increasing, and with them the demand for products, systems and services in the field of simulation and training (S and T), which can help to increase operational readiness. US and European military services are particularly in demand here.

he assassination on 3 January 2020 of Quasem Soleimani, General of the Islamic Revolutionary Guard and a high profile member of the Iranian Ayatollah regime, set a chain of events in motion of which the outcome is yet uncertain. Five days after the US drone attack on Soleimani, Iran launched a ballistic missile attack against two US military bases in Iraq in retaliation. Before the attacks took place, Iran had informed the Iraqi government, which In the powder keg that is the Middle East, one action almost immediately triggers a reaction. Having the correct information at the right time can, if combined with a good preparation and hard training, save lives as was demonstrated by the zero casualty outcome of the missile attack on the two US bases in Iraq. The opposite is also true, as demonstrated by the 176 casualties of Flight 752. The Gulf region (i.e. the Arab countries in



CAE has been delivering its Full Flight Simulators to a number of countries in the Gulf region.

passed the information on to the US military. The attacks caused no US casualties, thus avoiding a further escalation of the conflict. Hours following the Iranian missile attacks, a Ukraine International Airlines Boeing 737 crashed shortly after take-off from Teheran International Airport, killing all 176 passengers on board, including at least 130 Iranians. Iranian officials initially said that the plane crashed due to technical problems and denied that the crash of Flight 752 had anything to do with the missile attacks. However, on 11 January, Iran admitted to having shot down the plane as a result of human error, claiming their military mistook the plane for a 'hostile target'. the Middle East that border the Persian Gulf) is the world's primary source of oil and gas, and, therefore, the US and Europe have a long-term interest in the region. Shared security concerns and economic interests have led the US and European countries, like the UK and France, develop special relationships with a number of Gulf states, like Saudi Arabia, Kuwait, Bahrein, Qatar and the United Arab Emirates (UAE). Military training is an important part of these relationships. close and effective coordination with key regional partners demonstrate an enduring western security commitment to regional allies. The training of Arab armed forces has to prepare them

for assuming a larger share of responsibility in the area of regional security.

Saudi Arabia heads a coalition of forces that wages war against the Houthi movement in Yemen. At the same time, members of the Gulf Cooperation Council (GCC) joined their naval forces with their allied partners to execute missions in the Arabian Gulf and contiguous waters, such as escort missions and mine surveillance assignments. With Iran bordering the whole northern shore of the Persian Gulf, vigilance and preparedness is advised. Attacks on oil or gas transports in the Gulf (as have happened in June 2019) or attacks on oil refineries in Saudi Arabia (as have occurred last September), have a disturbing effect on the region and a potentially disastrous effect on the global economy.

#### Training and Simulation in High Demand

Tensions are rising in the Gulf region, and so is the demand for S and T products, systems and services that can help to increase the mission readiness of the Gulf states. US and European military services are sought after, not least because the military in many Arab countries is plagued by incompetence, corruption and nepotism (at all levels of society), poor logistical support, limited operational mobility and severe flaws in intelligence, reconnaissance and medical support. Although financial fortunes have been spent to create, among others, effective air force capabilities, the operational results, thus far, are rather disappointing. The costs and risks that are attached to using real high-tech military equipment for training purposes and mission rehearsal remain very high. Therefore, simulation in defence has become a top priority for governments and the industry. Simulation training devices were first developed for the air force to teach pilots how to fly while remaining on the ground. Now, simulation is also used to

practice combat flying and mission rehearsal. The hyper realistic simulators also allow practice with other aircraft and ground assets and are no longer limited to flying personnel. Air traffic controllers, ground based maintenance and emergency personnel can plug in and use simulation to develop and test their skills. It goes without saying that simulation is even more practical for the operators who fly unmanned missions.

However, the use of simulators for training purposes is no longer limited to the air force. Land forces use laser based simulation systems for combat practice, the development and maintenance of driving, shooting and tactical skills. Naval forces usually train their personnel in equipment maintenance on a simulator, while at sea or in a port, above or below the surface. Ship systems can be simulated to train weapon system operators, damage controllers and navigators all at once.

When not in operation or on a mission, the main task of the military is to train personnel for operations or missions to come. Effective training makes the difference between success and failure and is key to minimizing the loss of lives. Web delivered training has become common in the military. To allow large-scale training at an interoperable level, the military developed simulation games. These games allow, among others, for medicine, psychological and information operations, logistics, security and even special forces to participate in the training and to evaluate how each component behaves on the battlefield. They are also very useful for training and testing 'command and control' and communications.

Besides training, simulation is commonly used in the design and development phases of major weapons platforms in order to reduce the costs associated with their development. Costly prototypes and hazardous testing can thus be avoided, or at least limited.

The 'wear and tear' on major weapons systems and the risk of damaging them, is another reason why simulators are popular with countries that seek sophisticated devices. The extreme temperatures and the omnipresent sand in the region, only reinforces the move from the live platform to the simulator.

## The Gulf Cooperation Council as an S and T Market

In 1981, Saudi Arabia, Bahrain, Kuwait, Oman, Qatar and UAE signed an economic agreement that established the GCC. It strove for a customs union, a common market and a common currency (this last initiative was torpedoed by the UAE in 2006). Another important goal was a unified military, the 'Peninsula Shield Force', the military arm of the GCC. Through permanent cooperation and joint exercises, the GCC aims to strengthen and unify the existing military strategic concepts and plans among GCC states. Joint exercises are conducted on a permanent basis and for the command centres, annual exercises are held. The GCC also plays an important role in the prospection and acquisition of S and T products and systems. Air Base, south of the capital city of Riyadh, is the Office of the Programme Manager of the Saudi Arabian National Guard Modernization Programme, and the Office of the Programme Manager of the Facilities Security Force. Joint training exercises improve interoperability, and US military educational courses are regularly attended by officers (and often royals) from the Middle East, allowing the US to influence some of the region's future leaders. However, the



KMW Training & Simulation has built a training centre in Qatar equipped with the Advanced Turret Trainer, a high-precision simulator for the LEOPARD2 A7+ main battle tank and the PzH2000 howitzer. KMW's multi-channel MiLCIG vision system, combined with a curved projection screen creates a seamless, immersive environment in which trainees quickly get the feeling of what it is like to drive a real vehicle.

US and European companies that offer training and simulation products and systems to Gulf states, often work with third parties and local representatives. They provide local labour for installations, training and follow-on services. The primary role of these companies is initial installation support and often includes follow-on contracts for system operation and maintenance, depending on customer requirements. In that way, significant value can be offered to the end user by having knowledgeable and responsible personnel to operate and maintain the systems. Having local logistical support or distributors also provides another advantage: it provides intelligence on upcoming tenders, as well as on the geopolitical climate.

The largest market for training and simulation products and systems in the region is Saudi Arabia. In 2003, the US withdrew the bulk of its forces from that country. However, the US Military Training Mission to Saudi Arabia (active for over 60 years) remains a strong liaison point for the purchase of weapons and S and T equipment and systems. Also based in Eskan Village Pentagon recently issued a safety 'standdown' for Saudi military personnel in the US and restricted training for Saudi military students after an incident in December 2019 with a Saudi student at the Naval Air Station Pensacola in Florida that left three people dead and eight injured.

Some examples of S and T cooperation between western companies and the GCC states will illustrate its current and future importance.

## Canadian Aviation and Electronics

In May 2018, the Canadian Aviation and Electronics company CAE signed a contract to provide comprehensive constructive simulation solutions for command and staff training and to develop a Joint Multinational Simulation Centre (JMSC) in the Gulf region. At the JMSC, commanders and operators from the Army, Air Force, Navy and Staff Colleges use GlobalSim to conduct military training from the tactical to strategic level of operations. The constructive simulation system prepares commanders, officers and staff to make timely, informed and intelligent decisions across the full spectrum of operations. The JMSC is designed to be used for military training between allied countries and creates a comprehensive federation that offers command leadership a single, realistic, multi-resolution view of the full operational environment.

CAE is quickly expanding its S and T footprint across the region. It has currently six regional defence programmes: RQ1E Predator remotely piloted aircraft training programme for UAE Air Force; UAE Naval Training Centre; UAE Joint Aviation Command 407MRH and UH60M simulators; Joint Multinational Simulation Centre for an unspecified GCC member; Oman Aviation Academy and the KC130J Training Centre for the Kuwait Air Force.

In 2016, CAE was awarded with a contract by the UAE to design, build and maintain a Naval Training Centre and to provide a comprehensive naval training system in order to increase the service fleet's operational readiness for in-service and future ships. The main NTC in Taweelah should be ready for training in mid-2020 and includes courseware and reconfigurable whole-ship simulators representing multiple classes of naval ships, including bridge, combat information centre and machinery control room training. It should also provide multi-ship/aircraft warfare scenarios for task group training. Warfare missions to be addressed in NTC courses include anti-air warfare. anti-surface warfare, anti-submarine warfare and electronic warfare. Other courses that resonate with the UAE and other GCC navies include escorting and maritime interdiction operations. In the future, distributed training centre sites as well as networking with ships alongside and at sea are also possible options.

#### **Megitt Training Systems Inc.**

Megitt Training Systems Inc. (MTSI) is an important supplier of integrated live-fire and simulation weapons training systems for defence forces, law enforcement agencies and commercial shooting range owners around the world. It recently delivered live-fire ranges to the Saudi Arabian National Guard and land forces. Other customersinclude the UAE, Qatar, Oman, Jordan, Bahrain and Egypt.

MTSI is supplying the entire line of both live-fire and virtual training systems to its Middle East customers, ranging from private shooting clubs in Abu Dhabi to large training complexes for the Saudi Ministry of National Guard. The largest customer base to date is Kuwait with deliveries to



In November 2017, Sheikh Mohammed bin Rashid Al Maktoum, Prime Minister of the UAE, inaugurated the state-of-the-art Flight Training Academy in Dubai, which houses a wide variety of simulators.

the Ministry of Defence, Ministry of Interior and National Guard. Most recently, MTSI was commissioned a range renovations at the Ali Al Subah Military College in Kuwait. MTSI, along with its local partner company AIS-Kuwait, did the range design, supplied the ballistic protection, target system and a unique range ventilation system for a semienclosed range.

#### Boeing

Boeing is a major contractor in the Middle East with regard to the procurement of military equipment and systems. Sales projections for military aircraft in the Middle East point at US\$225Bn for the period 2019 – 2028. Training is an important part of these contracts and a priority for Boeing. It does not just deliver the products, it also provides the appropriate solutions for its customers and helps them to care for challenges related to attracting personnel in the region. For example, the delivery to the Qatar Emiri Air Force of 36 Boeing F15 Advanced Eagle attack fighters will be accompanied by support services, with a greater focus placed on performance-based logistics and training. The same package was provided for the AH64 Apache helicopter programme. The training is focused on making customers more efficient in support of his requirement. Including training services in the contract, therefore, creates a 'win-win' situation for both parties.

#### Barco

Barco is a global technology leader with headquarters in Belgium that develops networked visualization solutions for the entertainment, enterprise and healthcare markets. Although Barco does not present itself as a defence contractor, its components are highly valued in military S and T programmes. Barco projectors are deployed in training installations in the Middle East, including in Turkey, UAE, Qatar, Saudi Arabia, and Israel. The Barco brand is continuing to flourish in this part of the world, since it continuously follows the developments in the region and because it takes part in both smaller and larger programmes through key partners. For example, the Barco F70 projector was selected for a new helicopter programme in the UAE and the F70 was selected for an advanced jet trainer programme in the region as well. Additionally, Barco is involved in Saudi Arabia's F15 upgrade programme with the F70 Lumen Laser Projector. The new generation of Barco simulation projectors, such as F/ FS70 and FL/FS40, are designed to meet the demanding Gulf environment and have a sealed optical engine. This helps to keep a clean optical path with a bright, stable image over time. In addition, accessories such as pollution, dust or smoke filters and the projector installation - are well protected against the sandy and dusty conditions in the region. From Barco's regional office in Dubai, an essential care programme is taken care including the regular maintenance and cleaning of the projectors in order to keep the installation in premium condition all times.

#### **A Conflict Driven Market**

S and T companies from the US, Europe and beyond are supplying diverse products and services to the Gulf states. They supply regional customers with products, ranging from individual devices up to turnkey training centres and are often partnering with clocal companies to provide technical and other expertise. As host-nation and customer expertise in S and T expands, other efficiencies and returns on investment will be realized. Add to that the ongoing and rising tensions in the region, the increased hostility from and towards Iran, and it is clear that the region will remain a major market for S and T activities for a long time to come.

## WALRUS SSK Replacement Takes Centre Stage

#### The NIDV Defence and Security Exhibition in Rotterdam

#### **Pieter Bastiaans**

A small group of submarine manufacturers took centre stage during the NIDV exhibition in Ahoy, Rotterdam, the Netherlands. Rebranded into NIDV Exhibition Defence & Security (NEDS), the event held on 28 October 2019 attracted potential subcontractors including integrators, engineering companies and suppliers of components and naval mission systems.

Among the companies present were RH Marine, Thales Nederland, Van Halteren Defence, Bosch Rexroth, Solico, and Verebus Engineering. Organised into the NIDV's Dutch Underwater Knowledge Centre (DUKC), they were located around the booths of Damen-Saab, Naval Group, Thyssen Krupp Marine Systems (TKMS) and Navantia. And they had good cause to be so.

#### **Navy Requirements**

In order for the Royal Netherlands Navy (RNLN) to "provide almost all of the maritime forces requested by NATO", the alliance's latest Defence Planning Capability Review (DPCR 2018) considers "the replacement of the M class frigates, the mine countermeasures vessels, and the WALRUS class submarines a pressing issue as current capabilities are becoming obsolescent".

It is known that the aim of the Dutch government is to let Damen Schelde Naval Shipbuilding (DSNS) build two new frigates for its navy citing essential security interests under Article 346 of the Treaty on the Functioning of the European Union (TFEU). This is similar to the way that the Netherlands are dealing with their more pressing requirement for a new Combat Support Ship with a formal contract soon to be awarded to Damen. Meanwhile, the MCM proposal of the Naval Group/ECA Group consortium was

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recently selected to provide Belgium and the Netherlands with a next generation mine hunting capability.

This leaves the replacement of the navy's current SSK capability which is now planned to commence in 2028. Involving a budget of some  $\in$ 3.5Bn, the project's RFI or so-called A-letter was issued in accordance with the MoD's largest and most important procurement programme that is still in the bidding process, the Dutch government wants to make sure that potential suppliers take into account as much involvement of local Dutch industry as possible. Hence, during NEDS 2019, the international submarine industry was eagerly awaiting the project's next milestone or B-letter.



Damen-Saab's proposal for the WALRUS class replacement programme involves a Kockums A26 based expeditionary submarine; a mock up is seen here on display during NEDS 2019.

Defence Materiel Process (DMP) in June 2016. According to initial planning, the outcome of the information phase was to be made public by mid-2018. However, the publication of a national Defence Industry Strategy which eventually occurred in November 2018 led to some delay. With the WALRUS SSK replacement programme currently being the MoD's

Published on 13 December, it saw only Navantia being eliminated with the remaining three contenders being shortlisted pending a formal selection that is now expected to be finalised in 2022. More compelling demands on the Netherlands, not just by NATO which is confronted with a shortfall in ASW capabilities, but also politically by the EU have



For the Dutch SSK programme Naval Group has joined forces with Royal IHC offering a BARRACUDA family variant.

made the Netherlands look for synergies, during the development, building, and subsequent sustainment of submarines. This is the reason that the Netherlands joined the Conventional Submarine Cooperation (CSC) scheme which is aimed at streamlining submarine R&D, technology, training, operations, as well as inservice-support (ISS). Created in 2014 by Germany, CSC has also been joined by Italy, Norway, Poland and Portugal, all of them current users of TKMS sub technology except for the Netherlands.

In addition, the Dutch MoD has been monitoring developments concerning SSK procurement in partner countries such as Australia, Canada, Germany, Norway, and Sweden, the latter of which, unlike the other four countries mentioned, does not participate in the Netherlands Submarine Command Course (NLSMCC).

Initially a series of options for the replacement of the WALRUS class were considered by the Dutch MoD. They included a mere homeland security (or coastal defence) variant, going fully unmanned, or even the zero-option with systems other than submarines to be employed.

However, the Netherlands navy is now fully focused on acquiring another oceangoing SSK, albeit one that might be less



During NEDS 2019, TKMS showcased its SSK proposal based on the HDW Class 212CD.

future proof than hoped for, con-sidering it being called "a B-variant". While the Dutch remain committed to fielding four submarines of a MOTS design tailored to national needs, the current cap on funding will lead to a somewhat smaller submarine that likely has a less than optimal weapons and mission payload. With a premium on stealth, the desired followon submarine capability should anyhow be able to operate in shallow coastal waters in support of SOF or for intelligence gathering purposes, a requirement which was at the basis of the current Walrus class X rudder stern configuration. However, the navy's self-deployment requirement meant to enable out of area/expeditionary operations complicates possible cooperation with other countries as it leads to a relatively large SSK.

Ideally, the new 3,000 tonnes vessels are to be equipped with ASW/ASuW, provisions for land attack missiles, AIP, and offboard sensors such as UUVs and ROVs with non-penetrating masts being the norm for optronics. Having accommodation for both male and female personnel, the new subs will also require a high degree of automation in order to enable so-called "lean manning".

#### Industrial Solutions – Damen-Saab

Speaking to ESD during NEDS 2019, Robin Middel, working on behalf of Damen-Saab through Havana Blue Maritime PR, is convinced "80% of submarine building knowledge is still present in the Netherlands". To cover the remaining 20%, Damen has opted for a partnership with Saab from Sweden, which Middel emphasised "is an equal partner country with a similar culture unlike larger European countries such as France and Germany".

Featuring signature optimisation and a multimission portal for launching and recovering UUVs and other payloads, the modular Kockums A26 is at the basis of the Damen-Saab proposal to the Netherlands. Depending on hull diameter and length, the A26 family allows for a displacement potential in excess of 3,000 tonnes, hereby enabling an Oceanic Extended Range version that appears aimed at the Dutch requirement. For AIP, it features the Stirling system which burns a mixture of gasified pure industrial liquid oxygen and diesel fuel.

If chosen, Saab will build the submarine's hull parts in Karlskrona, Sweden. Assembly will then be conducted in Vlissingen, the Netherlands with maintenance to be conducted in Den Helder. Middel was adamant about the export potential of Saab-Damen's proposal, saying it would benefit both Swedish and Dutch industry, the latter by producing the required mission systems.

#### TKMS

Any submarine deal will see "a trade-off between capabilities aimed at meeting requirements, cost, both for procurement as well as life cycle costs, risk, and local workshare", one of TKMS' representatives present in Rotterdam told ESD (name withheld on request). Asked about risk, he emphasised the relevance of the company's "substantial track record" in developing and building conventional submarines. "We work with an actual production line work force. That is what makes us stand out"

TKMS is proposing a derivative of the company's 2,400 tonnes HDW Class 212CD submarine that was recently selected by Norway and Germany: "We have the ability to tailor it in order to meet Dutch requirements. The architecture of the KTA (Kongsberg, TKMS, ATLAS ELEKTRONIK) CMS for instance allows for integration of Dutch designed software". Vertical launch tubes are also on offer together with the company's Interactive Defence and Attack System for Submarines (IDAS).

"Specialised in automation", TKMS also touts its mature AIP fuel cell technology which is unlike that of other companies that are "still working on it", the representative boasted.

"Designed for maximum stealth", the TKMS proposal offers "a unique a-magnetic steel pressure hull". According to the company, this also helps to reduce costs of maintenance with TKMS claiming LCC typically encompass 70% to 75% of overall costs. If selected, TKMS will build the submarines in Den Helder, the Netherlands, which when linked to Kiel, Germany would create a so-called "Submarine Valley".

#### IP Transfer – Naval Group-Royal IHC

During NEDS 2019, ESD was also welcomed by Naval Group's Eric Chaplet. A former admiral and SSN, SSBN submarine captain of the French navy, Chaplet now leads the marketing department of Naval Group which has aligned with Royal IHC for the Dutch bid. The latter company is particularly well known for its experience in designing and manufacturing dredging vessels. Technically complicated as they are, experience in this field will contribute to a low risk approach for the consortium's WALRUS replacement offer, it is believed. Dredging vessels require "massive amounts of software code in order to operate, far in excess of the amount used to run a typical frigate for instance" according to Louwrens op de Beek, Royal IHC's commercial director defence.

Chaplet indicated the group's current offer is based on the 4,500 tonnes SHORT-FIN BARRACUDA oceanic diesel-electric design that was successful in Australia for SEA1000: "Like in Australia, we ina gap in expertise". Naval Group's uninterrupted involvement in submarine programmes for France as well as for export customers will prove beneficial according to Chaplet, who also said "the BARRA-CUDA family offers acoustic superiority".

#### Navantia

No longer appearing on the shortlist of possible submarine providers, Spanish Navantia was also present during NEDS. The company's services director, Jorge Garcia-Monedero, discussed the company's S-80 Flight 2 variant.



Proposing the S-80 submarine to the Dutch MoD, Navantia put its trust in the latest Flight 2 version, to no avail however.

tend to build as much in the Netherlands as possible". If selected, Royal IHC will build the submarine's modules with final assembly also to take place in the Netherlands. Although most design work would initially be done in Cherbourg, this capability would "shift over time to the Netherlands", Chaplet said. Naval Group and Royal IHC have already agreed on sending Dutch personnel to France starting from 2020 in order to learn relevant skills. Naval Group prides itself in being a leader in the transfer of intellectual property, this due "to recent deals in Brazil, India and Australia". Chaplet said: "Transfer of knowledge is guaranteed starting from the beginning, hereby allowing full autonomy".

Like his counterpart from TKMS, Chaplet emphasised the importance of a continuous track record: "It is difficult to overcome

Being confronted with weight issues early on during development, Navantia's 2,950t S-80 class required a redesign. However according to Navantia these problems have now been resolved. This view is supported by independent SMEs. Like Naval Group, Navantia offered precision strike, SOF, AAW and UUV capability as well as various AIP options using a "toolbox concept". The submarine's CMS, optronics and sonar suite can also be tailored to the customer's needs, Garcia-Mondero indicated at the time of NEDS 2019. Regarding workshare, he mentioned: "Apart from pressure hull testing, most work could be done in the Netherlands", although he suggested the Dutch government should seriously consider the merits and drawbacks of such a scheme, regardless of which supplier it chooses.

## **The Brussels Backdrop**

## The New European Commission

#### **Joris Verbeurgt**

ollowing the European Parliament elec-tions on 26 May 2019, on 1 December 2019 the new European Commission (EC) took office for five years. The former President of the Commission Jean-Claude Juncker and the former President of the European Council Donald Tusk were thanked for their services and replaced by the German Ursula von der Leyen and the former Belgian primeminister Charles Michel, who is also the son of the former EU commissioner Louis Michel. Von der Leyen is the first female Commission president. She was born in Brussels in 1958 as the daughter of the former leader of the state of Lower Saxony. She attended the European School in Brussels where she graduated two years before Boris Johnson joined the same establishment. The mother of seven entered politics after she had finished medical school and had overcome plagiarism accusations in connection with her thesis. She appeared on television singing with her family the choral "Wohlauf in Gottes schöne Welt" ("Well in God's beautiful world"). After her father was informed

that his family could be a potential target for the Red Army Faction terrorist group, she enrolled at the London School of Economics using the pseudonym Rose Ladson. In 1990, she joined the Christian Democratic Union and was a close acquaintance of Wolfgang Schäuble who was a minister in the Merkel governments. Von der Leven herself is the longest-serving minister in Angela Merkel's governments. She started as Minister of Family Affairs and Youth from 2005 to 2009, then as Minister of Labour and Social Affairs from 2009 to 2013, and finally as Minister of Defence from 2013 to 2019. She was the first woman to serve as German defence minister and is considered a trustee of Angela Merkel.

#### The European Commission

The EC is the executive branch of the European Union (EU) and is responsible for proposing legislation, implementing decisions, upholding the EU treaties and managing the day-to-day affairs of the EU. In order to

Photo: European Parliamen



In a speech to the European Parliament, Ursula von der Leyen outlined her vision as Commission President.

become an EU commissioner, your national government must suggest your name to the Council of the EU, that can then propose it to the European Parliament (EP). After approval by the EP, the commissioner is appointed by the European Council. Most commissioners have previously held senior political positions, such as being a member of the EP or a minister in a national government. This EC operates as a cabinet government, with 28 members of the Commission, so-called 'commissioners'. Each member state has one commissioner, but commissioners are bound by their oath of office to represent the general interest of the EU as a whole and not the exclusive interests of their home state. One of the 28 is the Commission President. The President is proposed by the European Council and elected by the European Parliament. The Council of the European Union then nominates the other 27 members of the Commission in agreement with the nominated President, and the 28 members as a single body are then subject to a vote of approval by the EP. Each commissioner has his own cabinet with

a team, based in the Berlaymont building in Brussels. An administrative body of about 32.000 European civil servants, organized into departments called directorates-general, completes the staffing of the EC.

#### Tasks of the European Commission

First of all, the EC proposes new laws. The EC is the sole institution that can initiate legislation which needs approval by the EP and the Council in order to become law. In theory, the EC produces laws to protect the interests of the EU and its citizens on issues that can't be dealt with effectively at national level. The EC also manages EU policies and allocates EU funding by setting the spending priorities (in cooperation with the Council and Parliament). It draws up annual budgets for approval by the EP and the Council and it







supervises how the money is spent through a Court of Auditors. Furthermore, the EC is responsible for enforcing EU law, for which it can count on the Court of Justice that ensures that EU laws are properly applied in each of the member countries. Finally, the Gabriel (Bulgaria) is commissioner for Innovation and Youth and Dubravka Šuica (Croatia) is commissioner for Democracy and Demography and will also lead work on the Conference on the Future of Europe. Three commissioners will be busy with the



Josep Borrell from Spain is the new High Representative of the Union for Foreign Affairs and Security Policy.

EC represents the EU at the international level: it speaks on behalf of all EU countries in international bodies, in particular in areas of trade policy and humanitarian aid. The EC also negotiates international agreements for the EU.

#### The Members of the European Commission

Since the EU counts 28 member states, 28 commissioners must be appointed. This leads to a fragmentation and overlap of competences and a certain amount of ingenuity to create a position for every commissioner. What to think of a commissioner 'for an Economy that Works for People' (Valdis Dombrovskis, Latvia)? There is also a commissioner for Values and Transparency (Vera Jourová, Czech Republic), for Protecting the European Way of Life (Margaritis Schinas, Greece, for Jobs (Nicolas Schmit, Luxembourg) and for Equality (Helena Dalli, Malta) and one for Cohesion and Reforms (Elisa Ferreira, Portugal). Mariya

internal organization of the EU: Maroš Šefčovič (Slovakia) is commissioner for Interinstitutional Relations and Foresight, the Austrian Johannes Hahn for Budget and Administration (who will report directly to von der Leyen) and Ylva Johansson from Sweden is responsible for Home Affairs. Didier Reynders from Belgium is commissioner for Justice, including the topic of the rule of law within the EU.

#### **Economics**

More important commissioners are responsible for the economic interests of the EU: Kadri Simson (Estonia) will take care of Energy and Sylvie Goulard (France) will watch over the EU's Industrial policy and Digital Single Market. She will also be responsible for the new Directorate General for Defence Industry and Space. Margrete Vestager from Denmark is commissioner 'for the Digital Age' and responsible for coordinating an agenda on a 'Europe fit for the digital age'. Then there are the more classical policy domains such as Trade (Phil Hogan, Ireland), Economy (Paolo Gentiloni, Italy), Agriculture (Janusz Wojciechowski, Poland) and Transport (Rovana Plumb, Romania).

#### **Environment and Health**

Three commissioners are concerned with the environment and the health of Europeans: Executive Vice-President Frans Timmermans from the Netherlands will coordinate work on the European Green Deal, which is estimated to  $\cot t \in 1,000Bn$ so that Europe becomes the world's first climate-neutral continent by 2050. He will also lead climate change policy, which is supported by the Directorate-General for Climate Change. The Lithuanian Virginijus Sinkevičius is responsible for environment and oceans, and Stella Kyriakides from Cyprus will be in charge of health.

#### **Defence and Foreign Policy**

Five commissioners are involved with the defence and foreign policy of the EU. We already mentioned Sylvie Goulard (France) who will not only preside over the EU's Industrial policy and Digital Single Market, but also over the newly created Directorate General for Defence Industry and Space. This is the first time that the EU takes action at such a high level to start work on a (more) unified European defence industry, which is a conditione sine qua non for the establishment of a European army in the future. Then there is a commissioner for International Partnerships (Jutta Urpilainen from Finland) and one for Neighbourhood and Enlargement (the Hungarian László Trócsányi). Janez Lenarčič from Slovenia is in charge of the EU Crisis Management. The most important of the five commissions responsible for defence and foreing policy, however, is Josep Borrell from Spain: he is the high representative-designate for foreign policy and responsible for the programme 'A Stronger Europe in the World'.

In the next Brussels Backdrop, we will elaborate on the defence and foreign policy of the EU and on the 'A Stronger Europe in the World' document.

## "A better system at a much better price"



Photo: GA-ASI

**ESD:** Which core features and technological developments characterise a modern unmanned aircraft system of the MALE (Medium-Altitude, Long-Endurance) class?

Fontaine: The current MALE systems were originally designed for combat operations and not in support of domestic operations. Today, however, there is increased demand from Homeland Security for Remotely Piloted Aircraft (RPA) to provide surveillance to monitor illegal immigrations and the resurgence of the Russian threat at EU-NATO borders, including in the maritime domain. In fact, their characteristics match perfectly with the requirements with one primary handicap: their inability to fly without special permission in most European airspace. GA-ASI is working to address this issue. The production process for our RPA has been changed in order to enable these systems to be certified to fly in civil airspace. The aim is for our RPA to operate in the European airspace like any other aircraft. For that, in addition to the production process to make it certifiable, key system modifications needs to be implemented. It mainly concerns their ability to Detect and Avoid (DAA) other aircraft, to fly in adverse weather conditions and to have a secure and redundant satellite communication datalink.

Interview with Christophe Fontaine, Director Strategic Development for Europe, General Atomics Aeronautical Systems Inc.

Christophe "Taraz" Fontaine is a retired French Air Force colonel of 30 years with experience in Intelligence, Surveillance and Reconnaissance (ISR). He held squadron level and staff positions related to ISR, Targeting, Combat Search & Rescue (CSAR), NATO doctrine and air operations. He was the first MQ-9 REAPER squadron commander and was deployed 28 times in operations. He is a graduate of the French War College and holds a Master's degree in both Criminality and Modern History. He has written and published more than 30 articles on ISR. He joined GA-ASI in 2018.

All these modifications are now included in the MQ-9B family of RPA, which continues to be flown by a trained military crew including a rated pilot.

**ESD:** What are the user requirements for such systems? (technological and regulatory)

Fontaine: The users are of two types. The traditional military users want cost effective endurance, an integrated plugand-play sensor suite, and weaponisation. They also require a certified aircraft, especially in Europe, in order to easily fly domestic missions. But the main requirement remains the operations capabilities that are now extended to the maritime surveillance domain. Lately, especially in Europe, the requirement of sovereign sensor integration and industry participation on the program are also prerequisites. This has increased the interest in MALE RPA from Homeland Security organisation. Their priority is to be able to fly unrestricted in civilian airspace and therefore, building an RPA that is certifiable is of utmost importance since these customers may end up flying in the same areas and face the same lack of human resources to fly and exploit the data of these systems. This makes the search for commonality between homeland and military missions paramount.

**ESD:** How does your customer base in Europe look like? Do you see an additional demand for your systems?

Fontaine: With the current security challenges that Europe and NATO are facing, the ISR requirements have now grown well beyond the traditional military or air force organisation. The resurgence of the Russian threat at the NATO borders requires the reestablishment of a persistent ISR capability in order to give the alliance warning of potential danger and collect strategic and operative multi-intelligence in support of EUCOM. In addition, the increase of the Russian naval and submarine activities occurs in a period were NATO nations have dramatically reduced their Maritime Patrol Aircraft (MPA) capabilities. MALE RPA are the perfect cost effective supplement. Then, in a global economy that relies heavily on maritime routes, their surveillance to prevent piracy becomes a greater necessity. Finally, the challenge of illegal immigration, pollution, and illegal trafficking or exploitation of natural resources reinforce the need for customs and coast guard surveillance capabilities. For all these reasons, the MALE RPA, thanks to its native endurance and multi-intelligence characteristics, is the most cost effective platform to perform these surveillance missions.

**ESD:** With EuroMALE, a European system should be ready by the mid-2020s. How do you perceive this development? What would be the advantages of transatlantic cooperation?

Fontaine: In order to preserve their defence industry, Europeans have a legitimate reason to develop their own capabilities and technological expertise in order to sustain and increase employment. This is understandable. However, the cost of this enterprise needs to remain reasonable. And it should certainly not be done at all cost in terms of performances or delivery delays to the armed forces. These ISR capabilities are desperately needed in the daily fight against terrorism. Therefore, GA-ASI's has offered its European customers to participate in the program by integrating their own sensors suite into the aircraft. GA-ASI's MQ-9 already integrates natively a number of European products: the radios are German, the landing gear is Dutch and the display for the cockpit is from Belgium. With the MQ-9B "EuroGuardian," the next step will be achieved. European nations will have the possibility to maintain the sovereignty for operations by the integration of their own non-ITAR sensor suite. GA-ASI would be in charge of the certifiable RPA and cockpit, and the customer will provide the sensor configuration. Therefore, thanks to the crypto devices and a SATCOM data link of choice, the sovereignty for operations would be ensured and the future of the participating European sensor companies would be preserved. By capitalising on GA-ASI's six million flight hours of experience, and the customer selecting their own sensors, the European taxpayers would have a better system for a much better price to support deployed operations and protect the homeland.

**ESD:** There are voices in the French Senate that suggest that the Franco-German cooperation is facing the problem of agreeing on a solution with one or two engines. Are two engines really necessary for the full integration of a MALE drone into civil airspace, as mentioned by the German side?

**Fontaine:** The reliability of turbo-prop engine enables certification of a single engine passenger aircraft all over the world. The single engine MQ-9 family, after 10 years of operation, has a better mission-capable rate than the F-16. In addition, on a daily basis, everyone accepts that single engine commercial aircraft are flown above Germany by weekend hobby pilots. The MALE RPA is flown by professional pilots and, for MQ-9B, will rely on an autoland system to further reduce the possibility of incidents during the landing phase. So there is no need to have a twin engine RPA to obtain the certification of the system and its integration in the civilian airspace. more important. So an improvement in performance would be very small, if not nil. The overall cost for development, certification, production and operation will also be very important. And the aircraft will be more complex to develop and maintain. The REAPER, with almost three million flying hours, has demonstrated that turbo-prop engines have reached an exceptional level of re-



France has decided to arm its MQ-9 REAPERs and make them available to the French armed forces of "Operation Barkhane" in Mali.

**ESD:** Please elaborate on the advantages and disadvantages of two engines from an operational and logistical point of view?

Fontaine: The first effects of a twinengine configuration is to augment the weight, the wingspan and of course, the cost per flying hours. With a twinengine configuration, the EUROMALE weighs twice as much as an MQ-9B. These MALE RPA platforms are designed to loiter by circling above a target. Therefore, a twin-engine aircraft brings no gain in terms of endurance, noise or flying characteristics. The only gain that can be achieved is a slight increase of the speed and of course, to give additional assurances to the certification authority. However, as the system will be more complex to develop, the cost of certification will also be

liability. Therefore, choosing a double engine configuration is therefore questionable especially as these platforms continue, even if the number of homeland ISR missions will increase, to be mainly used in combat operations. It is interesting to note that the two greatest RPA producers, who have been accumulated almost 10 million RPA flying hours, have chosen to continue with a single engine configuration. It is important to remember that an RPA facing an engine problem will remain flyable via the SATCOM link. It will glide and softly be grounded on a runway or an open area. This does not make it more dangerous than another platform, even with a pilot on board.

#### The interview was conducted by Waldemar Geiger.

#### Firms & Faces

#### **AAR to Produce Specialised** Shipping/Storage Containers

(ck) AAR Mobility Systems has been awarded a sole-source Indefinite Delivery/Indefinite Quantity (IDIQ) contract to produce specialised shipping/storage containers and accessories. The containers and accessories will be manufactured



in Cadillac. The sole-source IDIQ contract with the Defense Logistics Agency Troop Support in Philadelphia includes a twoyear base period, with an option to extend thereafter for three additional years, for an estimated value of \$90 million. This contract provides the US Armed Forces and its allies with a direct method for procuring AAR's rapid deployment products, which have been used by troops around the globe for over five decades. The products are designed to offer militaries worldwide a robust, modular and secure method for transporting their missioncritical equipment and for use by troops once deployed.

#### **Airbus Helicopters Appoints** Laurence Petiard as Head of **External Communications**



(ck) Laurence Petiard has been appointed Head of ExternalCommunications for Airbus Helicopters, effective January 2020. In this new role she will be in charge of coor-

dinating Airbus Helicopters' media relations, web, and social media activities. Laurence Petiard has been with the company since 2005 in various project management roles and has worked for the last five years in the Airbus Helicopters' media relations department. She succeeds Guillaume Steuer, who was appointed Head of External Communications for Airbus at the end of 2019.

#### **ASELSAN and SAPURA Establish** Partnership

(ck) ASELSAN has signed a Memorandum of Agreement (MoA) with Sapura Secured Technologies (SAPURA), a leading defence electronics company in Malaysia. The agreement covers the transfer of technology of Software Defined Radios (SDR) and was signed in conjunction with the KL Summit held in Kuala Lumpur, Malaysia in December 2019 under the auspices of President Recep Tayyip Erdoğan and Malaysian Prime Minister Tun Dr. Mahathir Bin Mohamad. According to ASELSAN, the agreement with SAPURA is a crucial step regarding the SDR technology transfer to friendly and allied nations. In accordance with Malaysia's long-term needs and the longstanding relations between both countries, SAPURA, under the terms of this



agreement, aims to continue to enhance in-country capability to design and develop defence technologies, specifically in military communication. ASELSAN will continue to look for opportunities to develop local cooperation and strategic alliances in Malaysia for its engineering and defence solutions.

#### **Andreas Schnautz Appointed CFO** of German Naval Yards

(ck)

the appointment



of Schnautz, German Naval Yards Kiel (GNYK) has gained an accomplished manager who will strengthen the shipyard in his position as CFO, as well as a being a member of the management board. Schnautz joins GNYK from marine electronics business ATLAS ELEKTRONIK, where he held the role of Chief Commercial Officer.

#### IAI and Mellanox to Cooperate on **Cybersecurity Issues**

(ck) Mellanox will join the Israeli Cyber Companies Consortium (IC3), the consortium led by Israel Aerospace Industries

(IAI), to market its products within the IC3 framework. In addition, Mellanox will collaborate with Custodio Technologies, a Singapore-based IAI subsidiary, in the codevelopment of an innovative cyber investigation solution that leverages Mellanox's



smart network cards and Custodio's CyVestiGO investigation system. The combined solution will enable extensive log collection in advanced server environments as well as guick analysis in detecting sophisticated cyber-attacks.IC3 was founded in 2016 under the auspices of Israel's Ministry of Economy to provide a comprehensive solution to cyber challenges faced by governments worldwide. The consortium, which offers a combination of the leading Israeli cyber technologies to customers around the world, includes companies like Check Point, Verint, Bynet, ECI, CyberX, Clearsky, CyberArk, BGProtect, XM Cyber, Mellanox, and IAI, which leads the consortium. IC3 has also established a national cyber centre in Latin America, which includes a national cybersecurity plan, risk assessment surveys, and an advanced monitoring and protection centre against cyber attacks.

#### **Indra Acquires SIA**



(ck) Indra has acquired SIA, a firm specialising in cybersecurity services, thus establishing itself as a leading player in the information security market in Spain and Portugal in terms of turnover of its

value-added services. SIA is a company with its own product and scalable capabilities for the delivery of services and the development of advanced cybersecurity solutions in Europe and the rest of the world. It has a diversified and stable customer base with more than 10,000 security projects, and is considered the domestic leader for identity and electronic signature solutions. Digital disruption is rapidly influencing different sectors of economic activity and in society in general, bringing great benefits and unprecedented progress but also risks in the areas of privacy and security. Indra seeks to become the trusted partner of companies and institutions in the protection of the country's critical private and public infrastructures, including cyber defence.

The joint range of products and services that SIA and Indra can generate a series of major synergies based on the leveraging of the sales networks, capitalising on Indra's vertical focus and SIA's specialised approach in Spain and Portugal and on the ability of Indra's sales and marketing network to position SIA's product on the international stage. The new combined capability portfolio includes significant areas of specialisation, such as:

- Identity and access management solutions;
- Electronic signatures (eSign);
- Integrated risk management;
- Infrastructure security;
- Threat and vulnerability management;
- The combination of Indra's anomaly identification platform and SIA's fraud operation service to identify fraudulent activity.

The new entity has also welcomed Luis Àlvarez Satorre (depicted here)) as CEO to lead the integration and the domestic and international growth plan in the coming years.

#### **Indra Chair of EUROCAE**

(ck) EUROCAE, the European Organisation for Civil Aviation Equipment, has entrusted Indra, one of the leading global technology



and consulting companies, with the presidency of the new working group (WG-115). It has been set up to develop the standards that will support the safe and harmonised implementation of anti-drone systems in airports and other environments. The group's launch meeting took place last December and was attended by 44 experts from 36 organisations, including the European Commission, the European Aviation Safety Agency (EASA), and Eurocontrol. During the meeting, the group voted to appoint Indra's representative, Jorge Munir El Malek, as president of the team.

#### JFD Acquires Ansti Test Systems Ltd

(ck) JFD has announced the acquisition, including all intellectual property rights and assets, of Ansti Test Systems Ltd, an independent global designer and manufacturer of test facilities for performance measurement of underwater breathing apparatus.



The acquisition, which significantly enhances JFD's global product testing capabilities and services, is part of the company's longterm ambition to provide underwater diving equipment with unparalleled safety and



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5 CONFERENCE

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#### Firms & Faces

performance, protecting and preserving life in the harshest marine environments. Ansti Test Systems provides turnkey packages, which utilise computerised data acquisition techniques to display the performance of breathing apparatus under test, in real time. The systems can be configured to meet bespoke requirements for any diving equipment and life support systems, ensuring a wide range of equipment can be tested to a varied selection of British, European and Worldwide standards and regulations. All services are delivered in the strictest confidence.

#### **Naviris JV Operational**

(ck) The first board meeting of Naviris, the joint venture between Fincantieri and Naval Group, has taken place. This partnership cements the shared desire of the two companies to build a future of excellence for the shipbuilding industry and navies. The alliance represents the evolution of the historical partnership between the two players. Throughout more than twenty years of cooperation, Naval Group and Fincantieri already have common achievements such as the HORIZON air defence destroyer programme (four ships) and the FREMM multimission frigate programme, ongoing since



2005 (twenty vessels). Naviris is regarded as a step towards the consolidation of the European naval industrial base in response to increasing pressure fromglobal competitors. Through Naviris, Fincantieri and Naval Group are pooling their strengths to develop a new strategic capability and respond to the needs of their customers. The two companies have established Naviris as a 50/50 joint venture. With the head office located in Genoa and a subsidiary in Ollioules, the Naviris team will focus on bi-national and export projects. Naviris' objective is to create value for its customers in the following key areas:

- Common R&D projects;
- Worldwide market presence;
- Prime contractorship and design;
- Procurement optimisation

Naviris foresees export and common French-Italians opportunities, such as the first studies for the Mid-Life Upgrade of the French and Italian HORIZON Class destroyers, as well as European projects such as the development of the European Patrol Corvette light frigates.

#### Ran Gozali Appointed as Head of Rafael's Land and Naval Systems Division

(ck) Rafael Advanced Defense Systems Ltd has appointed EVP Dr Ran Gozali as head of the company's Land and Naval Systems Division. Dr Gozali is replacing Mr Moshe Elazar who has been appointed as CEO of Aeronautics, recently purchased by Rafael, and

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Mr Avichai Stolero. Dr Gozali (50) holds a BSc from the University of Be'er Sheva, an MSc in electrical engineering from Haifa's Technion and a PhD from Virginia Tech. Dr Gozali joined Rafael in 2004 and has since served in various senior managerial-technological capacities. Between the years 2011 and 2014 Dr Gozali served as CEO of Goji, and upon returning to Rafael was appointed as head of the company's R&D and Engineering Division, presiding over more than 2,500 engineers and scientists.

## **Preview**

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