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Czech/Slovak Military Industrial Cooperation

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- Acquisition Programmes in Southeastern Europe
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NATO's Nordic Newcomers



As a result of Putin's attack on Ukraine, NATO is undergoing a change of perception in the public eye. More countries are harbouring membership intentions: Finland and Sweden could expand the number of NATO members to a total of 32.

In mid-April, the Government in Helsinki published a new security strategy, which is not least due to a fundamental change of mood among the population: After decades of scepticism - basically since the end of World War II - 84% of the Finnish population currently feel threatened by Russia, 68% of the Finns are in favour of the country joining NATO. This would mean that Putin, with his war of aggression, was able to prevent Ukraine from joining NATO - which was certainly one of his goals - but instead indirectly promoted the eastward expansion of NATO by two more members. Now, one may argue that Sweden - unlike Finland with a 1,340 km border with Russia - is not an immediate neighbour of the Russian Federation, but the distance between the Swedish island of Gotland and the Russian enclave of Kaliningrad is only 300km, with only the waters of the Baltic Sea in between. Against this background, Sweden had already moved heavy military equipment, including armoured vehicles, to Gotland and, contrary to its otherwise pacifist attitude, participated in arms deliveries to Ukraine. In Sweden, too, a narrow majority of the population is in favour of joining NATO. Both Nordic countries have been members of the European Union since 1995, which implies a duty of assistance for the other members, but does not provide for military intervention in case of defence.

According to reports, Sweden's Prime Minister Magdalena Andersson has already committed herself: Sweden's application for membership should be ready by the NATO summit in June. At the beginning of April, she met with her Finnish colleague Sanna Marin to ensure a coordinated joint approach on this issue.

In peacetime, the armed forces of both countries are small by international standards, but have a remarkable mobilisation potential. Including reservists, Finland can mobilise 280,000 soldiers in the event of a crisis, which is slightly more than the current manpower of the German Bundeswehr (265,000). While in most NATO countries not even a third of the population is comfortable with the idea of supporting their own country militarily in the event of a crisis, three quarters of the Finns are prepared to do so. Of course, this is also due to the long and often complicated history of the immediate neighbourhood with the Soviet Union and Russia. As the German online portal T-Online.de recently reported, air raid shelters are available throughout Finland, and not just as a planning figure on paper. The bunkers are ready for use at any time. The armed forces have combat vehicles and combat aircraft ready for action. The procurement project for 64 F-35 fighter aircraft has been underway since February, with up to 2,000 drones to follow.

It is to be expected that the accession of the two Nordic countries to NATO will significantly change the strategic situation - for the Alliance, but also for Russia. The length of the common border will more than double. The details of geography play into the hands of the Western Alliance: NATO membership of Sweden and Finland facilitates the protection of the Baltic states and consequently means another obstacle for a possible Russian intervention: the access routes to the highly armed Russian exclave of Kaliningrad, which is surrounded by Alliance territory on land anyway, will now also come under pressure from the sea. On 13 April, it was reported that Russian forces had moved a K300 BASTION coastal defence missile system to Vyborg near the Finnish border.

NATO can thus expect a fresh wind from the North in the near future. The approval of the members for the accession of the Finns and Swedes is considered certain. However, immediately after the accession plans of the two Nordic countries became known, the Vice-Chairman of the Russian Security Council, Dimitri Medvedev, threatened to station further weapon systems such as ISKANDER guided missiles, hypersonic weapons and naval vessels with nuclear weapons - for the Finns and Swedes within reach of "their own house". Considering the military dilettantism currently revealed on the Russian side in the war of aggression against Ukraine, and after it became known only recently that a new ISKANDER brigade is also to be set up in Russia's eastern military district - in view of the alleged threat from Japan and the USA (euro-sd.com reported) - observers may ask themselves how many of its "neighbourhood problems" Russia is capable of solving at the same time.

A handwritten signature in blue ink, which appears to read 'Jürgen Hensel'. The signature is fluid and cursive, with a long horizontal stroke at the end.

Jürgen Hensel

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■ Todd Corillo New Media Relations Manager at Newport News Shipbuilding

Photo: HII



(jh) Huntington Ingalls Industries (HII) has announced Todd Corillo would join its corporate communications team as a manager of media relations on 9 May. He will serve as HII's

spokesperson for the company's Newport News Shipbuilding division and report to HII's corporate director of public affairs.

As spokesperson for Newport News Shipbuilding, Corillo will focus on facilitating themes and messages to support the division's programmes, people and capabilities, community relations engagements, respond to media queries from local and trade media and more. Since 2012, Corillo has worked in Hampton Roads as a TV news anchor for WTKR News 3, where he also led military coverage. In that role, he took viewers inside defence operations across domains, highlighting the stories of military service members and those who support them. Corillo holds a bachelor's degree from The College of William and Mary and an MBA from ECPI University.

■ Kimberly Aguillard New Media Relations Manager at Ingalls Shipbuilding

Photo: HII



(jh) Huntington Ingalls Industries (HII) has announced that Kimberly Aguillard has joined its corporate communications team as a manager of media relations. She will serve as

HII's spokesperson for Ingalls Shipbuilding, a division of America's largest shipbuilder, and report to HII's corporate director of public affairs. As spokesperson for Ingalls Shipbuilding, Aguillard will focus on facilitating themes and messages to support the division's programmes, people and capabilities, community relations engagements, and respond to media queries from local and trade media. Prior to joining HII, Aguillard served as manager of marketing and media relations for the Mississippi State Port Authority

at Gulfport since 2014. She also served in nonprofit marketing and social media management positions in the Gulf Coast region. Aguillard holds a bachelor's degree in mass communication from Loyola University New Orleans and received, in 2017, an accreditation in public relations from the Universal Accreditation Board. Aguillard was the recipient of the "Young Careerist of the Year" award in 2021, presented by Lighthouse Business and Professional Women and has received multiple state, regional and national awards for public relations planning from the Southern Public Relations Federation, Public Relations Association of Mississippi and the American Association of Port Authorities. She is currently serving on the board of Mississippi Enterprise for Technology. Society of Mississippi and the American Association of Port Authorities. She is currently serving on the board of Mississippi Enterprise for Technology.

■ EuroTrophy GmbH Founded

(jh) EuroTrophy GmbH, a new German-based company for the marketing, sales and production of the TROPHY Active Protection System (APS) for wheeled and tracked armoured vehicles was incorporated on 28 March by Krauss-Maffei Wegmann (KMW), General Dynamics European Land Systems (GDELS) and Ra-

EuroTrophy

fael Advanced Defense Systems (Rafael), Rafael has announced in a press release. EuroTrophy GmbH is to focus its business activities on NATO and EU customers in Europe. The company is also expected to provide qualified vehicle integration services and related through-life support for the APS. According to Rafael, transfer of technology will allow for the local production of the TROPHY APS in Germany. Mr. Mark Stockfisch, Ms. Daniela Müller and Mr. Dan Kalfus are appointed management board members and will lead the newly established company.

■ Turnover Record for MBDA in 2021

(gwh) MBDA increased its turnover by €600Ms to €4.2Bn last year, CEO Éric Bé-ranger, announced at a press conference. He attributed the increase in equal parts to growth in domestic and export markets. Order intake in 2021 had also reached a record



Photo: MBDA Deutschland

level of €5.1Bn, he said. The order book had risen to €17.8Bn.

MBDA lists the most significant 2021 contracts in its home markets as:

- Development of the SAMP/T NG system for France and Italy
- Mid-life update of the ASTER missile for the UK and Italy
- Evaluation phase of FC/ASW for France and the UK
- Production of MICA NG in France and MISTRAL 3 for Spain
- Equipment for Greece's new RAFALE fighter aircraft
- Equipment for various naval forces, including Canada, Egypt, Brazil and Indonesia, as major export orders in 2021.

The overall positive development led to the creation of 1,100 new jobs at MBDA last year. A further 1,500 employees are to be recruited in 2022.

■ Raul Rikk Appointed Director of Science & Development at Milrem Robotics

(jh) Raul Rikk will become Director of Science and Development at Milrem Robotics from June 2022. He succeeds Mart Noorma, who will leave the company at the end of May 2022 after five years, Milrem writes in a press release. Rikk is currently Director of National Cybersecurity at the Estonian Ministry of Economy and Communications. He is the founder and developer of several international and national organisations, including NATO's Cooperative Cyber Defence Centre of Excellence and the National Cyber Security Department at the Estonian Ministry of Economy and Communications.



Photo: Milrem Robotics

■ MTV MANTICORE Unveiled

(gwh) The Undersecretary of State in the Dutch Ministry of Defence, Christophe van der Maat, has reported the unveiling of the MANTICORE 4x4 Medium Tactical Vehicle (MTV) on twitter. According to the report, 1,185 MANTICORE will replace many of the current off-road vehicles in the Dutch Armed Forces and military police. The rollout of the vehicles is to start next year, it said. In November 2019, the Dutch Ministry of Defence ordered 918 MTVs in the 12kN weight class from Iveco Defence Vehicles. As an option, another 357 vehicles were planned. Of these, 90 vehicles were "rebooked" on a project of the Marines. Iveco Defence Vehicle designed the vehicle from scratch. A ladder frame accommodates rigid axles, drive and the various superstructures. A Euro III turbo diesel engine with 207 kW powers the vehicle and enables a top speed of 90 km/h. Two separate power circuits, each with a 120 Ah battery, are provided for the vehicle and the electronic equipment. The vetronics are derived from the ASTRA truck and are partially compatible with the NGVA architecture. The MTV will be delivered in an unprotected version, but will be equipped with modules for ballistic and blast protection that can be fitted if

Photo: MoD The Netherlands



required. With an unladen mass of about ten tonnes, the vehicle presented has a payload of around two tonnes, depending on the version. Four variants are planned:

Crew.....	task
Patrols/Liaison (with hard or soft top).....	2+2
Transport (pick-up).....	2
Casualty transport.....	2+2 (lying) or 2+4 (sitting)
Security (Military Police/Air Force).....	2+6

For the transport vehicles, Dutch Military Vehicles (DMV) supplies 550 unarmoured logistics modules in four variants. Among them are versions for mobile workshops and command cells. Following performance and acceptance tests by the Dutch armed forces, series production is to commence with deliveries scheduled for the period 2023 to 2026.

■ RUAG Introducing 4-in-1 MISSIM (MK3) Test Device

(jh) Since the introduction of the MISSIM test device for self-protection systems in 2009, the second generation (MK2) has reached the end of its product life cycle and will no

Photo: RUAG



longer be sold. The service and availability of spare parts for the second generation of the test device are ensured for the years to come, RUAG writes in a press release. The latest 4-in-1 MISSIM (MK3) handheld test device is used to check the proper functioning of self-protection systems. According to RUAG, the sensor tester provides a "go or no-go" result for the forthcoming flight. The multifunctional sensor tester is compatible with most self-protection systems, does not require modifications to the flight system and can be used by both crews and manufacturers (OEMs), RUAG emphasises. In addition to improved ergonomics, the latest generation has an additional emitter. Reportedly, the test device can simulate almost all threat scenarios using a radar, laser, guided missiles (UV and/or IR profile) and hostile fire.

■ Hungary to Procure 12 L-39NG Aircraft

(Kristóf Nagy) According to Gáspár Maróth, the Hungarian Government Commissioner for Defence Development, the Hungarian Air Force will receive 12 L-39Next Generation (NG) aircraft from Czech aircraft manufacturer Aero Vodochody. The relevant contracts have reportedly already been put into effect. According to current plans, the light jet aircraft, designed as jet trainers, will be delivered in two versions by 2024. This should significantly improve the quality of pilot training and also create a new reconnaissance version, Maróth said and added that pilot training was one of the key elements of the Hungarian Government's force

Photo: Aero Vodochody



development initiative (formerly known as Zrínyi 2026), which began in 2016. Eight of the new aircraft will explicitly serve to fulfil this task. In addition to advanced training, the agile and comparatively small aircraft are also suitable to serve as operational trainers for the pilots of the JAS 39EBS HU. The Hungarian GRIPEN fleet was only geared up for the future at the end of last year by opting for the programme known as MS20 Block II and upgraded by the purchase of IRIS-T air-to-air missiles. The real innovation in the current aircraft procurement is constituted by the remaining four L-39NGs. According to Maróth, these are to be developed into a yet-to-be-specified reconnaissance version within the framework of a joint Hungarian-Czech research initiative and will be available to the air forces at a later date.

■ INS VAGSHEER Launched

(jh) INS VAGSHEER was launched today by the Defence Secretary of India, Dr. Ajay Kumar, Naval Group writes in a press release. INS VAGSHEER is the last of the six P75 SCORPENE class submarine entirely built by Indian Mazagon Dock Shipbuilders Lim-

Photo: Naval Group



ited (MDL). This was based on technology transfer and partnership with Naval Group. INS VAGSHEER is the last of the series of six KALVARI-class submarines ordered by India in 2005. MDL teams will now have to complete the integration and setting to work of the equipment and machinery onboard before beginning the sea trials, including weapon and sensor trials. The series of six submarines is fitted with a number of equipment built in India by industrial Micro, Small and Medium Enterprises. According to Naval Group, the French company and MDL have developed an industrial ecosystem of more than 50 Indian companies with their future projects not limited to submarines.

■ Lithuania Orders More BOXERs

(gwh) Lithuanian Defence Minister Arvydas Anušauskas has announced that the country will order more than 100 additional BOXER vehicles, radio and television station Lietuvos radijas ir televizijaen (LRT) has reported. The minister said that



Photo: Lithuanian Army

Lithuania intended to equip another two battalions with protected wheeled vehicles. "The infantry fighting vehicles of the second procurement phase will be a little different from the current ones, as we have to take into account the lessons we learned during the war in Ukraine", Anušauskas stated. Lithuania had ordered 88 BOXERs (Lithuanian designation VILKAS) in the infantry combat vehicle version with a 30mm machine gun and SPIKE missile launcher through OCCAR in 2016. Deliveries began in 2019, but could not be completed so far due to technical failures. In December 2021, Anušauskas said that he expected the final deliveries to be made by December 2022. No information was made available regarding the number of vehicles delivered so far. Earlier this month, the Lithuanian Defence Ministry announced that until 2027, it intended to spend more than €1Bn on defence equipment procurements from the USA and Germany in response to the Russian invasion of Ukraine. This is to continue the modernisation of equipment and strengthening the capabilities of the armed forces in all areas. The BOXER and the PzH 2000 self-propelled howitzer were announced as equipment items to be procured from Germany. In March 2022, Lithuania had received the last of 16 howitzers. In addition, 10-tonne trucks are to be procured.

■ AeroVironment Donates QUANTIX RECON UAS to Ukraine

(jh) In April, AeroVironment announced it would donate more than 100 QUANTIX RECON unmanned aircraft systems (UAS) and operational training services to the Ministry of Defence of Ukraine and territo-



Photo: AeroVironment

rial forces amid the ongoing war against Russia. The donation was presented to the Ambassador and the Defence Attaché at the Embassy of Ukraine in the US by AeroVironment Chairman, President and CEO Wahid Nawabi during a face-to-face meeting, the company writes in a press release. QUANTIX RECON is a lightweight, fully automated reconnaissance solution that provides on-demand actionable intelligence using high-resolution, georeferenced terrain, vegetation and infrastructure imagery. With its hybrid vertical takeoff and landing (VTOL) design, Quantix Recon combines the VTOL advantages of a multirotor drone with the range, speed and efficiency of a fixed-wing unmanned aircraft, AeroVironment emphasises. The UAS can survey up to 1.6 square kilometres, or 20 linear kilometres per 45-minute single battery flight. Delivery of the QUANTIX RECON UAS is independent of other AeroVironment tactical missile systems and UAS already being provided to Ukraine by the United States Government. The first half of the donated shipment was expected to be delivered before the end of April with operational training commencing in parallel.

■ IRON BEAM Laser Successfully Tested

(jh) Rafael, alongside the Israeli Ministry of Defence's Directorate of Defence Research (DDR&D) and Development has successfully completed a series of tests with a high-power laser interception system against steep-track threats, the company writes in a press release. The demonstrator intercepted:



Photo: Rafael

- UAVs
- Mortars
- Rockets
- Anti-tank missiles.

IRON BEAM reportedly provides Israel with a high-power laser technology at an operational standard with operational interception capabilities. The tests are the first phase of a multi-year programme led by the DDR&D and defence industries. The programme aims to develop a high-power ground and aerial laser system equipped to deal with long-range, high-intensity threats. The laser will complement the IRON DOME system.

■ The Netherlands to Modernise EW Equipment

(gwh) The Undersecretary of State in the Dutch Ministry of Defence, Christophe van der Maat, has informed the Dutch Parliament about the Joint Electronic Attack project. According to this project, the severely outdated and no longer serviceable Electronic Warfare (EW) systems, which are currently integrated with FUCHS armoured transport vehicles,



Photo: MoD Netherlands

are to be replaced by technology. The new digitised systems are to be used nationally and internationally for military purposes and also to support civilian authorities. The Joint Electronic Attack project consists of two sub-projects. On the one hand, the EW systems will be renewed and expanded for new tasks in the area of Cyber Electro-Magnetic Activities (CEMA). Secondly, BOXER armoured transport vehicles are to be procured as mobility platforms. The project budget for investments and operating costs amounts to between €100 and 250M, van der Maat said. Of this, €75 to 150M are earmarked for the mobility sub-project. This suggests an order volume of 15 to 30 BOXER vehicles. The Defence Materiel Organisation is to be commissioned with the implementation of the project. After the start of the project in the course of this year, the vehicles with integrated EW equipment are to be delivered from 2027. The project is scheduled to complete in 2028.

■ OPV Programme for Argentina Completed

(jh) The last of the four Argentinian Off-shore Patrol Vessels (OPV), OPV 87 A.R.A. CONTRA ALMIRANTE CORDERO, has been delivered to the Argentine Navy, Naval Group writes in a press release. The delivery and commandment handover ceremony of the last vessel of the series marks the completion of the programme. A.R.A. CONTRA ALMIRANTE CORDERO was delivered to the Argentine Navy on 11 April in Concarneau in the presence of:

- Francisco Cafiero, Secretary for International Defence Affairs at the Argentine Ministry of Defence

Photo: Naval Group



- Vice Admiral Enrique Antonio Traina, Deputy Chief of Staff of the Argentine Navy
- Alain Guillou, EVP International Development at Naval Group

It is part of the contract signed by Naval Group with Argentina in 2019 for the supply of four OPVs.

■ Hensoldt to Equip F126 Frigates

(jh) Hensoldt has signed a contract worth over €100M with mission combat system integrator Thales, to deliver its TRS-4D naval radar to the future class F126 frigates of the German Navy, Hensoldt writes in a joint press release. Contracted in 2020, F126 is the latest frigate programme for the German Navy. The F126 class will consist of four ships (with an option for two more ships). The programme also includes multiple land-based test and training sites. The first frigate F126



Image: Darnen

is expected to be delivered to the customer in 2028. The entire programme will run for over ten years. Hensoldt's TRS-4D radar will be installed in its non-rotating version with four fixed-panel arrays. The integration of the radar on the ships and at the shore installations will be done by Thales. First deliveries are scheduled for 2025.

■ Successful Interoperability Tests with ESSOR Radios

(gwh) Software Defined Radios (SDR) have been used to demonstrate the interoperability of military tactical communications based on the High Data Waveform (HDR WF) at Radmor Laboratories in Poland. The OCCAR-led European Secure Software Defined Radio (ESSOR) project aims to break the old paradigm whereby radios from different manufacturers cannot exchange voice or

data communications, according to OCCAR. The demonstration involved radios from Bitium, Leonardo, Radmor and Thales. The successful tests in front of representatives of OCCAR, the European Commission and the European ESSOR nations demonstrated that ESSOR technology enables forces from different member states to communicate with their own radios on the battlefield. The next interoperability demonstration in 2023 will also involve a radio from Rohde & Schwarz, who joined the a4ESSOR consortium in

Photo: European Commission



2020. ESSOR is a cooperation programme managed by OCCAR, the Organisation for Joint Armament Cooperation, on behalf of:

- Finland
- France
- Germany
- Italy
- Spain
- Poland

Its objective is to provide Europe with a military SDR capability and to establish a common industrial base to improve the interoperability of European armed forces.

■ EDA to Build European Terrain Database

(gwh) In a field test in the presence of experts from the participating nations, EDA presented the interim status and the working principles for the European Terrain Database. According to the European Defence Agency (EDA), a large number of images are taken for the database with several cameras in different spectral ranges (visible, long-wave infrared, short-wave infrared) and in different configurations (drone-mounted or ground-based) of different terrain sections. The stored images are catalogued and provide information and metadata deemed necessary or useful for military use in testing

Photo: EDA



and/or research activities. The unclassified images in different spectral ranges (visible wavelengths, infrared and microwaves) are to be made available to users from different participating member states on EDA-controlled servers. Once the database is established and fully accessible, it can be used, for example, for target detection, assessing and improving stealth, testing and improving sensors in different terrains, generating synthetic images or supporting modelling and simulation activities. The datasets can be used by the ministries of defence of all participating member states for R&T initiatives as well as for operational and training purposes, the EDA says in a press release. In the first section of the field test, the recording techniques were demonstrated in the different spectral ranges. In the second section, participants were able to experience the prototype terrain database and witness how sensor data acquired in the field was integrated with the database and made available for use. The multinational field trial was also an opportunity for the experts to explore potential cooperation opportunities between European defence test centres.

■ Earlier CH-53K Delivery to Bundeswehr Possible

(wge/jh) Sikorsky/Lockheed Martin (LMCO) CH-53K helicopters could be available as early as 2025 as part of the planned Foreign Military Sales (FMS) procurement of new Heavy Transport Helicopters (Schwerer Transporthubschrauber – STH) for the German Armed Forces, LMCO and its German industrial partner Rheinmetall announced at a press conference. According to the two industrial partners, the US Government sent the Bundeswehr information to this effect on 8 April. According to the two companies, an even earlier delivery might also be possible, provided the German Government files an official request. Apparently, the US Marine Corps (USMC) would be willing to cede some of the production capacity intended for the itself to the Bundeswehr if necessary. The Bundeswehr has been in the process of procuring new STHs to replace the fleet of 70 CH-53Gs in its current inventory for several years. In addition to the CH-53K (known as the KING STALLION in the United States and dubbed KILO in Germany), Boeing's CH-47 CHINOOK is also in the running. In both cases, the Bundeswehr is seeking to procure them in the scope of an FMS programme, although a Direct Commercial Sale (DCS) deal had originally been envisaged but was rejected for cost reasons. An Earlier Timeframe



Photo: Lockheed Martin

According to Rheinmetall and LMCO, delivery of the first CH-53K would take place from 2025 onwards from current series production. Training of German pilots with the USMC would also be possible earlier, according to the companies. Mike Schmidt, Managing Director of Rheinmetall Aviation Services GmbH, said that the CH-53K met all requirements of the German STH programme, is available and has a recognised certification (including air-to-air refuelling capability) from the responsible US aviation authority, Naval Air Systems Command. This certification has probably already been recognised by the German Armed Forces Aviation Office. After seven years of operation, 11 aircraft of this type are currently in service with the USMC. The CH-53K fleet is said to have an availability rate of 89 per cent and requires up to 30 per cent fewer maintenance personnel than older aircraft.

■ Final AWACS Life Extension Programme

(gwh) The first of 14 aircraft of NATO's NE-3 Airborne Warning & Control System (AWACS) fleet is being modernised by Boeing as part of a service life extension effort to keep the fleet operational until the planned end of service life in 2035. NATO has allocated around US\$1Bn for this programme. Boeing has been contracted by the NATO AEW&C Programme Management Agency (NAPMA) and will serve as the programme's prime contractor and systems integrator, the company writes in a press release. Under the Final Lifetime Extension Programme (FLEP), Boeing is partnering with some 16 European aerospace companies, including:

- Leonardo (Italy)
- Indra (Spain)
- Airbus (Germany)
- Thales (Belgium)
- Jacobs (Netherlands)
- Kongsberg (Norway)

The FLEP is expected to be completed in the first quarter of 2027 with the delivery of the last modified and modernised aircraft. NATO has already initiated the successor system under the name Alliance Future Surveillance and Control (AFSC). Recently, the NATO Support and Procurement Agency (NSPA) commissioned studies to assess possible solutions for information gathering and sharing in close cooperation with all 30 NATO countries, to develop realistic technical concepts and to analyse the feasibility and risks for implementation. The results of the studies include technical architectures, system specifications, life-cycle cost estimates and intellectual property rights analyses. Production and deliveries are scheduled to begin from 2025, followed by the training of crews and service personnel. AFSC is planned to be operational from 2035.

■ Bird to Demonstrate New Ground Defence System

(jh) Bird Aerosystems has announced that the company was chosen by the Israeli Ministry of Defence through MAFAT - the Defence Ministry's Directorate of Research and Development - to demonstrate a prototype of a new defence system to protect ground troops and high-value assets against



Photo: Bird Aerosystems

various kinds of threats and missiles, including anti-tank guided missiles (ATGM). The new defence system prototype will include a small radar based on the confirmation and tracking radar implemented in Bird's SPREOS sensor. The new radar is to conduct detection and verification of the threat, and then deploy and guide the system countermeasures to intercept the threat. Based on Bird's SPREOS DIRCM technology, the new defence system prototype will provide effective and precise protection to the ground

forces, Bird writes in a press release. The project is currently under advanced stages of development, and the company is expected to conduct a demonstration of the complete defence system during 2022.

■ British Army to Receive 100 More BOXERs

(jh) The British Government, represented by the European procurement organisation OCCAR, and ARTEC, a consortium of Rheinmetall and Krauss-Maffei Wegmann (KMW), have signed a contract extension to supply the British Army with an additional 100 BOXER wheeled armoured vehicles, Rheinmetall writes in a press release. The contract encompasses three previously ordered variants of the vehicle:

- Infantry Carrier Vehicle (ICV)
- Command Vehicle (CV)
- Field Ambulance,



Photo: Rheinmetall

With this order, the United Kingdom is exercising an option considered in the contract signed in 2019 for the Mechanised Infantry Vehicle (MIV) project, which includes 523 BOXER vehicles in several variants. ARTEC will be supplying the vehicles to the UK via OCCAR. The bulk of BOXER production will take place in Britain. Series production is currently getting underway in Germany, following which most of the BOXER vehicles already on order will be produced in British factories of Rheinmetall BAE Systems Land (RBSL) and KMW subsidiary WFEL. The additional vehicles just ordered will also be produced in both the UK and Germany. Here, the partners will be drawing on the knowledge and components of the established and expanding British supply chain, which already forms the basis of the first lot of 523 vehicles.

■ GA-ASI Selected for Japan Coast Guard RPAS Project

(jh) General Atomics Aeronautical Systems (GA-ASI), has announced the company's selection to support the Japan Coast Guard's (JCG) RPAS project. Operations will feature GA-ASI's MQ-9B SeaGuardian and begin in October 2022. SeaGuardian will be used to conduct wide-area



Photo: Boeing

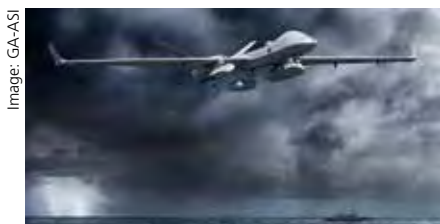


Image: GA-ASI

maritime surveillance to support JCG's missions, which include search and rescue, disaster response, and maritime law enforcement. This project follows a series of successful JCG flight trials in 2020 that used SeaGuardian to validate the same JCG missions in accordance with Japan's "Policy on Strengthening the Maritime Security Systems," using unmanned aerial vehicles to perform maritime wide-area surveillance. SeaGuardian features a multi-mode maritime surface-search radar with an Inverse Synthetic Aperture Radar (ISAR) imaging mode, an Automatic Identification System (AIS) receiver, and High-Definition – Full-Motion Video sensor equipped with optical and infrared cameras. This sensor suite enables real-time detection and identification of surface vessels over thousands of square nautical miles and provides automatic tracking of maritime targets and correlation of AIS transmitters with radar tracks.

■ Teledyne FLIR Introduces Long-Range Infrared Camera

(jh) Teledyne FLIR has announced the FLIR RS6780 long-range radiometric infrared camera system, designed for range tracking, target signature, outdoor testing, and science applications in all conditions, the



Photo: Teledyne FLIR

company writes in a press release. Featuring continuous zoom, the camera includes an integrated motorised three-position filter wheel and optional factory calibrations to support thermography applications up to 3000°C. The optional 3x zoom afocal lens attachment provides the option to change the focal range from the standard 50 mm – 250 mm to up to 150 mm – 750 mm, designed to get the most pixels on target and address dedicated application and testing requirements in the field.

■ Diehl Defence & Hensoldt to Deepen GBAD Cooperation

(jh) Diehl Defence & Hensoldt have agreed to intensify their cooperation in the field of ground-based air defence, the companies write in a press release. Based on latest technologies, the plan is to offer improved capabilities against new and emerging threats. The companies thereby intend to make a contribution to addressing the changed threat situation for Germany and in Europe. Diehl Defence and Hensoldt already work together in the field of ground-based air de-



Photo: Diehl

fence systems. In its medium-range system (IRIS-T SLM), Diehl Defence has integrated the battle management standard software IBMS-FC from Airbus, as well as active and passive radars from Hensoldt, transferred them to series production and already delivered them to an export customer. The IRIS-T SLM missiles are part of Diehl Defence's IRIS-T product family. IRIS-T SLM can be supplemented by elements of the short-range version IRIS-T SLS. This is already under contract in several European countries and is in operational use in Sweden, in order to also meet the requirements for so-called short-range and very short-range protection (NNbS). For this purpose, Diehl Defence has already presented a further developed variant which is under contract to an export customer.

■ ARROW 3 Missile Defence System Cleared for Export to Germany

(gwh) As reported by the Jerusalem Post with reference to the Chief of the German Air Force, Lieutenant General Ingo Gerhartz, Israel and the USA have agreed on the export of the ARROW 3 missile defence system to Germany. Confirmation from the relevant government agencies has not been available. The next step for Germany would be to obtain parliamentary approval for the budgetary funds by means of a so-called €25M bill (all defence investments in excess of €25M require separate parliamentary approval in Germany). Funding could be provided directly or indirectly through the



Photo: MoD Israel

special fund earmarked €100Bn by Chancellor Scholz but yet to be established. The budget requirement for the procurement of ARROW3 is estimated at €2Bn. Germany would be the first export customer for the system. ARROW 3 has been developed jointly by Israel and the USA since 1986 and is the third version of the defence system against long-range ballistic missiles, which can also engage exo-atmospheric targets. The system consists of long-range AESA radars (GREENPINE from Elta Systems), launchers with missiles and a fire control radar each on mobile platforms, as well as a central command and fire control system. When a target is detected, the command centre controls the launch of an ARROW 3 missile and the target is illuminated with the fire control radar. The missile heads for the target without any emissions of its own. It reaches a speed of up to Mach 9. The proximity fuse triggers a fragmentation warhead with an effective radius of 50 metres. Reportedly, Germany plans to deploy three mobile radars and launchers each in such a way that the entire national territory can be protected. The system is to be integrated with the air and space situation via the Combined Air Operations Centre and thus with NATO's missile defence system. Based on a procurement decision this year, ARROW 3 could be operational in Germany by 2025.

■ Nexter and HDS Sign Strategic Partnership

(jh) Nexter has signed a strategic partnership with Hellenic Defence Systems (HDS) to meet the Greek Army's requirement for modernised IFVs under the PHILOCTETES programme, Nexter writes in a press release. Designated PHILOCTETES in reference to the mythological hero of the Trojan War, this infantry combat system is based on a VBCI MkII equipped with a T40 turret. The VBCI is an 8x8, 32-tonne modular vehicle available in different versions (armoured personnel carrier, command post, 120mm mortar, medevac and vehicle recovery) and capable of carrying a 13-tonne payload. PHILOCTETES has a reinforced motorisation thanks to a new 600hp engine which is to ensure high tactical, strategic and operational mobility. The turret is remotely operated and equipped



Photo: Nexter

■ Rheinmetall Unveils AESA Radar

(jh) Rheinmetall has unveiled the Oerlikon AESA Multi-Mission Radar (AMMR), developed entirely at Rheinmetall Italia in Rome, the company writes in a press release claiming that the new radar is ready for series production. According to Rheinmetall, the new radar responds to highly challenging current and emerging short- and very short-range aerial threats detecting and processing mini- and micro-unmanned aerial vehicles; incoming rockets, artillery and mortars engaging in high angle attacks; as well as air/surface weapons and cruise missiles. AMMR can be integrated with a variety of platforms and

control centre, mobile launchers, and interceptors with RF seekers. The system was tested in India by both Israeli and Indian officers together with engineers and experts. As part of the trial, two interceptors were launched from a portable land-based system and two others from a naval-based system, operated from Indian Navy ships. According to IAI, the threats were detected by the system's radar, acquired by the interceptor, and successfully intercepted. MRSAM is an operational air and missile defence system that was developed by IAI in cooperation with IMOD and India's DRDO. The system is to provide regional defence against various maritime threats – from the air, sea, or land. The system is in use by the Navy, Air Force, and Army.



Photo: IAI

■ IAI Supplies First Air Defence and Surveillance Radar to the Czech Republic

(jh) Israel Aerospace Industries (IAI) has supplied the Czech Republic, via its Czech partners RETIA and VTU, with the first air defence Multi-Mission Radar (MMR), as part of a contract awarded in December 2019 by the Ministries of Defence of both the Czech Republic and Israel. The radar,



Photo: Rheinmetall

can track and classify multiple threats simultaneously, designed to operate in stationary mode or on the move, even under adverse environmental and jamming conditions, Rheinmetall emphasises. Besides, it is said to feature electronic counter-countermeasures. Reportedly, the radar is fully software defined, with a configuration capable of adapting to the specific operational scenario. In February 2022 Rheinmetall Italia held an Open Day event to demonstrate the new Oerlikon AMMR. The event was attended by representatives of all four branches of the Italian armed forces – Army, Air Force, Navy and Carabinieri – as well as representatives of the National Armaments Directorate, the Defence Staff, the Italian State Police, and the Presidency of the Council of Ministers.



Photo: IAI

which is operational and combat-proven in Israel, provides both surveillance and defence capabilities to customers around the world, and is integrative with NATO systems, IAI writes in a press release. Reportedly, the radar detects and classifies threats and supplies weapon systems with the data necessary to neutralise a number of those threats simultaneously. According to IAI, the radar provides situational awareness which is both precise and reliable, and includes the detection and identification of targets with low signatures. The company stresses that the MMR can deal simultaneously with multiple missions – including air defence against aircraft, UAVs and drones, artillery against varied enemy targets, and the identification and location of rocket launches, enemy artillery, and mortars, while locating both the launch and expected hit position, and controlling intercepting missiles launched against these threats. The MMR is the 'brain' of Israel's BARAK MX air and missile defence system, the IRON DOME, and DAVID'S SLING.

■ IAI and DRDO Complete MRSAM Trials in India

(jh) Israel Aerospace Industries (IAI), together with India's Defence Research and Development Organization (DRDO), completed a series of trials that resulted in four successful interceptions by the jointly-developed MRSAM air and missile defence system, IAI writes in a press release. The interceptions were carried out in an operational setting against various scenarios, at different interception ranges, interception heights and angles. The systems were operated by India's Air Force and Navy, alongside DRDO and IAI engineers. MRSAM includes a fully digital phased array radar, a command and

■ REMUS 300 Selected as the US Navy's Next Generation Small UUV

(jh) Huntington Ingalls (HII) has announced that its REMUS 300 has been selected as the US Navy's next generation small UUV (SUUV) programme of record. REMUS 300 has been designed to advance distributed maritime operations by conducting critical underwater missions. The initial phase of the programme includes the production and testing of REMUS 300 UUVs over the next year. According to HII, the vehicle incorporates advanced modularity and open architecture into a compact, man-portable design. The SUUV programme, also called



Image: HII

LIONFISH, is the next generation Mk18 Mod 1 SWORDFISH programme, which also utilises HII's REMUS technology. The selection follows a two-year rapid prototyping effort involving multiple user evaluations and spiral developments to refine the REMUS 300 design. The acquisition was facilitated by the Department of Defense's Defense Innovation Unit and their commercial solutions opening process via the other transaction authority, HII writes.

Submarine Rescue, Undersea Capabilities Including Defence Diving – An Important Challenge for Now and the Future

Increasing geopolitical tensions have heightened national and international defence considerations. As a consequence, numerous countries are increasing defence spendings, which in many instances is focused on the maritime domain.

With increasing energy supply restrictions, numerous nations across the world are looking to enhance their protection of critical national infrastructure, especially those related to energy production, which if located in the maritime environment, is particularly vulnerable.



Photos: JFD

The SHADOW SEAL tactical diving vehicle in semi-submerged mode

The global interest in submarines has also heightened over the last few years with many navies looking to enhance fleet capability, appreciating that these programmes take considerable time to implement. Seabed warfare presents an increasing area of interest, undersea capabilities will therefore continue to be important to counter the threat to navigation choke points and shipping lanes that carry so much global freight. The tri-nation partnership between Australia, the United Kingdom and the United States (AUKUS) announced in September 2021 reflects the growing importance of strategic alliances and the need for armed forces with an extended reach. As a consequence, global alliances are now working increasingly closer with defence industry partners in order to deliver cost effective solutions to complex challenges.

All these factors have resulted in JFD, a world leading underwater capability provider, receiving enquiries from new and current cus-

tomers seeking ideas on future design and innovation in submarine rescue and undersea capabilities.

As an established global provider to 42 navies, JFD delivers, and will continue to deliver innovative and technically advanced submarine escape and rescue solutions that improve safety and help preserve life in the event of a submarine incident. The company is a proven and trusted supplier offering capabilities that span the entire submarine escape, rescue, abandonment and survival (SMERAS) environment. JFD is unique in being able to deliver solutions across all these areas as global a one-stop shop for both new systems and for service provision.

For over 40 years of extensive experience and expertise within submarine rescue enabled JFD to offer a range of additional related services and solutions to the submarine platform sector.

In addition, existing submarine capabilities include testing, equipment design and manufacture, system integration, and asset management services are also available including a through life support capability focused on assured submarine operational availability. Combined with many years of experience in life support and safety this enables JFD to offer innovative and practical solutions to customers across the globe.

JFD is currently engaged in four international submarine programmes to provide design assurance and equipment as well as the provision of through life support to specialist systems. This includes both large and small conventional and nuclear submarines with international as well as UK customers.

Their innovative strategy is the creation of home markets, an example being JFD Australia where they are a trusted and reliable submarine rescue support for the Commonwealth and undersea combat support systems partner of the Australian Defence Force.

JFD has also announced the establishment of JFD North America, which will provide its world leading sub-surface engineering, technology, and special operations capability to the United States and to the Americas through a dedicated regional centre. Offices in Europe linking with armed forces and international partner company collaborations reflect a global dimension to a company who is looking to expand.

Demonstrating the importance of the UK market, JFD was awarded a contract by the UK Ministry of Defence (MoD) to be the provider of a novel capability support contract for the Royal Navy ASTUTE class submarines.

Special operations is also an important capability sector, and JFD provides a range of advanced and innovative tactical diving life support Systems and tactical diving vehicles that greatly enhance maritime Special Operations Forces (SOF) Underwater Manoeuvre (UWM) capability. These mission critical systems use both advanced and proven technology to support a range of operational profiles enabling a SOF team to carry out their mission effectively and efficiently.

In addition, JFD's Mine Countermeasures (MCM) and Explosive Ordnance Disposal (EOD) diving equipment is trusted by a large percentage of the world's navies and our experience in this area is unrivalled.

Responding to an international need for submarine rescue and undersea capabilities JFD is offering flexible solutions across MCM/EOD, underwater engineering, autonomous systems, infrastructure protection and security industries which are looking for a layered defence capability.

The oncoming months will be a challenge and JFD's aim is to respond with proven capabilities, innovation and dependability in assured availability of systems and services.



SHADOW life support system – front mount

■ Hensoldt Presenting New IFF Capabilities

(jh) Hensoldt has achieved a major technology development milestone which enhances substantially the detection capabilities of Ground-based Air Defence (GBAD) systems, the company writes in a press release. The company implemented and tested a software enhancement with its MSSR 2000 ID secondary radar that allows for precise tracking of aircraft in addition to the conventional surveillance mode of Identification-friend-or-foe (IFF) systems. A so-called "stop & stare mode" allows GBAD systems to pro-



Image: Hensoldt

cess identification tracks in specific sectors in near-real time and very precisely. The new feature uses electronic beam steering and automated antenna control in order enable the user to progress from the rather ordinary surveillance operation to a very focused lock-on and track mode. Thereby, distinction between friendly and hostile forces is substantially accelerated and thus the protection of forces on the ground considerably improved.

■ Babcock Achieves Ready for Sea Date on HMS SOMERSET

(jh) Babcock International Group has achieved a ready for sea date for the Type 23 frigate HMS SOMERSET at Babcock's Devonport facility, the company writes in a press release. HMS SOMERSET started her overhaul in November 2018. During that time, she has undergone a variety of upkeep measures, which have included:

- Repairs and updates to her hull and living spaces
- Replacement of the SEA WOLF with the new SEA CEPTOR weapon system
- Improvements to electronic equipment
- Replacement of her four diesel generators
- An enhanced propulsion motor clean
- Over 500 structural inserts

Overall, the project surpassed one million hours of work. The project team welcomed ship staff back on board at the end of last year and have since completed the final stages of commissioning, before handing her back to the Royal Navy to carry out sea



Photo: Babcock

trials. After completing the sea trials, HMS SOMERSET will return to the Royal Navy fleet. Meanwhile HMS IRON DUKE is the next frigate due to exit the Frigate Support Centre and continue her overhaul ahead of HMS ARGYLL and HMS WESTMINSTER arriving later this year.

■ OTO 127/64 for F126 Frigates

(gwh) Damen Naval, the prime contractor for the German F126 frigate programme, has contracted Leonardo to supply and supply the OTO 127/64 LightWeight (LW) VULCANO naval gun the four F126 frigates. The

contract also covers logistic support, as well as the delivery of simulators for crew training, Damen Naval and Leonardo write in a joint press release. According to Leonardo, the naval gun with a calibre of 127 mm and a barrel length of 8,128 mm (64 x 127mm) is the core of a fully digitised system. Communicating with operators and the on-board combat management system, it offers constant support in computing firing data during mission planning. The weapon can use the two variants of the company's 127mm VULCANO ammunition, Leonardo writes: Guided Long Range (GLR) and Ballistic Extended Range (BER). The gun extends the defensive capability of a naval unit up to 85km. Diehl Defence was involved in the development and qualification of the VULCANO ammunition. Diehl describes the GLR as a family of munitions featuring satellite-based navigation with laser or infrared sensors for

final approach with high targeting accuracy. The insensitive multi-purpose warhead with pre-formed tungsten fragments is said to be highly effective against soft targets, vehicles, semi-armoured vehicles, infrastructures and all types of infantry command posts. The F126 will receive the same naval defence system as the BADEN-WÜRTTEMBERG class frigates (F125). As the prime contractor, Damen Naval is to deliver four F126 frigates be-



Photo: Leonardo

tween 2028 and 2031. The contract includes an option for two additional units. The frigates are being built at shipyards in Kiel, Hamburg and Wolgast

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EVPU DEFENCE

Iran's Missile Prowess and the Nuclear Deal

Debalina Goshal

Amid the nuclear crisis, one thing that has remained constant in Iran's national security strategy is the development and testing of a sophisticated ballistic and cruise missile capability. Missiles form an integral component of Iran's national security strategy as such capabilities not only enable Iran to strengthen its hard power capability, but also promote soft power and coercive diplomacy. Missiles are integral to Iran's proxy wars that it supports in foreign territories.

In January 2022, there were reports that Iran displayed three ballistic missiles- DEZFUL, QIAM and ZOLFAGHAR of ranges 1000kms at an outdoor prayer esplanade in central Tehran. It would be interesting to know if these missiles are identical to the ones used in 2020 to attack US bases in Iraq following the killing of Iran's Iranian Revolutionary Guard Corps (IRGC), General, Qassem Soleimani. This display of missile capabilities came just when the nuclear deal reached a deadlock in January 2022. The significance of these three missile systems especially when the deal failed to reach any fruitful solutions is noteworthy.

It was a way to signal the United States that Iran, despite the sanctions imposed by the United States had the capability to strike US bases and keep its military at threat in the West Asian region. It was a message to the United States that Iran's conventional and long-range stand-off capabilities will keep improving despite the sanctions and even if the nuclear deal does not succeed to deter the United States in the Persian Gulf region. The United States under the Trump administration withdrew from the nuclear deal in 2018.

Again, in February 2022, just a day prior to the Vienna talks, Iran unveiled a 1,450km range missile with reportedly better accuracy and greater speed, greater manoeuvrability and hence, higher chances of being resistant to interception than other missile systems in its inventory. While Iran wants to save the nuclear

Photos: via author



DEZFUL is a surface-to-surface ballistic missile of the FATEH family. With a weight of 1.5 tonnes and a length of more than 12 metres it is said to reach a range of up to 1,000 kilometres.



ZOLFAGHAR is a road-mobile, [2] single-stage, solid-propelled SRBM believed to be derived from the FATEH-110 SRBM family. It entered service in 2017 as a longer range version of the FATEH-110 SRBM.

deal, it has conditions attached with it. The Iranians want assurance from the United States and the "European 3" - Germany, Britain and France - that the 'snapback mechanism' with the help of which sanctions can be re-imposed on Iran be removed. They also want the sanctions under the US Countering America's Adversaries Through Sanctions Act (CAATSA) and U-Turn sanctions on dollar transactions be lifted. Hence, displaying of hard power prowess that could threaten US power projection in the Persian Gulf could be a way to coerce the United States to rethink on these grounds.

One of the concerns of Iran's nuclear programme has been its 'Possible Military Dimension' (PMD). What made it worse was the development of survivable delivery systems- ballistic and cruise missiles that are capable of carrying nuclear warheads. Iran is not only using its ballistic missile capabilities as weapon of 'coercive diplomacy' but it has also used its

nuclear programme as weapon of 'coercive diplomacy'. In July 2021, Iran claimed that it had the capability to enrich uranium up to ninety percent- making its weapons grade. In 2021, Iran's new President, Ebrahim Raisi, a hard-liner, already planned to show less flexibility in dealing with the nuclear crisis and demanding more concessions- such actions have been well supported by Iran's hard power prowess and the signalling of a capability to be able to produce weapons-grade enriched uranium.

Conclusion

Sophistication in Iranian missile program will continue irrespective of the nuclear deal becoming a success or a failure. An enrichment capability that would be weapons-grade along with delivery systems that are survivable to enemy strikes gives Iran stronger leverage to make the nuclear deal at least 'a win' situation for Iran.

Author

Debalina Ghoshal is a Non Resident Fellow, Council on International Policy. Her areas of specialisation is on issues pertaining to nuclear, missiles, missile defence, space and artillery issues. She is the author of the monograph 'Missile Development in the Middle East' with the Middle East Institute.



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The European Search for Strategic Relevance

David Saw

Europe faces challenging times. Its economic success is under threat from inflation and rising energy and raw material costs. This creates a situation where energy security is more important than ever.

For our purposes, Europe comprises the 27 nations of the European Union (EU) plus Britain, Norway, Switzerland and Liechtenstein. Also included within the European strategic space are Albania (NATO member), Bosnia and Herzegovina, Kosovo, Montenegro (NATO member), North Macedonia (NATO member) and Serbia. The borders of the European strategic space are the Atlantic Ocean in the west, the Barents Sea in the north and the Mediterranean in the south. Turning to the eastern borders of Europe and adjacent, one sees Russia, Belarus, Ukraine, Moldova and Turkey (NATO member). These days it is to the east where the immediate European security problems lie. However, the strategic challenges facing Europe are far more challenging and multi-faceted than European leaders perhaps might be prepared to admit.

To begin with, it's worth looking at the positive side of Europe's strategic situation. Nobody can doubt that Europe is an economic powerhouse. According to EU figures: "The EU accounts for around 15 per cent of the world's trade in goods. The EU, China and the United States are the three largest global players in international trade." In fact globally, in terms of exports, only China exceeds the EU. The EU states that: "The total value of all goods and services produced (gross domestic product or GDP) in the EU in 2019, when the UK was still part of the EU, was €16.4 trillion."

The International Monetary Fund (IMF) provides some interesting data on the makeup of the top ten global economies covering nominal GDP in 2020 and denominated in billions of US dollars. According to the IMF, Italy has the eighth largest economy with a GDP of US\$1,848.22Bn, France seventh with a GDP of US\$2,551.45Bn, the UK fifth with a GDP of US\$2,638.30Bn and then Germany at number four, with a GDP of US\$3,780.55Bn. To put that into perspec-

Photo: Ukrainian Land Forces



A Ukrainian tank during a training exercise in early February, prior to the Russian invasion. Europe's confused responses in the build-up to and then after the Russian invasion show a lack of an integrated strategic vision, not helped by the fact that Europe had made itself dependent on Russian oil and gas.

tive, Japan has the third largest economy with a GDP of US\$4,910.58Bn, with China with a GDP of US\$15,222.16Bn and finally at number one, the US, with a GDP of US\$20,807.27Bn.

Looking at these IMF figures, it would be easy to be negative about European economic performance, but if you think about it, there is much to be positive about. Four of the top ten global economies are European countries. Then, if the nominal GDP figures of those four countries are added together you would get a GDP of US\$10,818.52Bn, easily surpassing Japan to become the third largest global economy by a considerable margin. Add in a few more European national GDP figures, for example Spain at US\$1,247.46Bn, the Netherlands at US\$886.34Bn and Switzerland at US\$707.87Bn, or US\$2,841.67Bn between the three countries, and Eu-

rope's economic strength becomes even clearer.

Negative Factors

While these headline economic numbers paint a very favourable picture, other factors have entered the equation and these will have a negative impact both socially and economically. First among these negative factors is COVID. As an example, we added together all of the deaths classified as caused by COVID in 12 European countries, namely: the UK, Italy, France, Germany, Poland, Spain, Romania, Hungary, the Czech Republic, Bulgaria, Belgium and the Netherlands as of early April. The total deaths numbered 1.041M people in just these 12 countries. A point to bear in mind is that many countries are adjusting their COVID death numbers, as they were often inaccurate as they failed

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Photo: EDF Energy



Sizewell B is one of six nuclear power stations operating in Britain, with 11 reactors, all run by EDF Energy. Sizewell B is the only Pressurised Water Reactor (PWR) in Britain and produces 1198 MW of power.

to take into account comorbidity and pre-existing medical conditions.

Whether the COVID death count in Europe is reduced is immaterial, the number of fatalities was still massive and the social consequences of efforts, such as lockdowns, to fight the pandemic have had their own unforeseen consequences such as a rise in suicide rates, particularly amongst the young. Then there is the economic and social dislocation caused by the pandemic and, of course, the vast and unsustainable costs of government measures to confront the pandemic.

Even now, with COVID measures either substantially relaxed or disappearing completely in Europe, elsewhere the situation is grim. Continuing with its 'zero-COVID' policy, the Chinese Government has locked down Shanghai, with its population of over 26 million. Shanghai is a major Chinese financial centre and a critical economic and global supply chain node. These days, disruptions in China inevitably spread globally and cause economic disruption around the world.

Before we even discuss current events and their economic impact, it is plain to see that Europe's economy was being hit by multiple negative trends. Rising prices in terms of fossil fuels (oil, gas and coal), higher prices in terms of energy and transportation, and in turn, raising prices throughout the economy. Raw material prices were increasing as well, all of which created an inflationary surge in the global economy. Those thinking of purchasing an electric vehicle to avoid fuel price increases, found themselves with even more to pay as Lithium prices rose enormously, battery grade lithium

carbonate prices are at historical highs.

Post-COVID, European economies were already stressed, which means that there will have to be some very clever economic policy decisions made by Europe's leaders. Unfortunately for them, before they could make those decisions, the build-up to the Russian invasion of the Ukraine occurred and then the actual invasion took place. Further energy cost increases create more economic damage, rises in food prices as Ukraine's agricultural exports and those of Russia cannot be guaranteed. Fertiliser costs are also rising adding to further cost pressures on food production. Costs increase, and wages go up to compensate, costs rise in turn and you

are in a spiral of wage-price inflation and there is a return to the economic trauma last experienced in the 1970s.

Energy Crisis

For all the talk about energy security in recent years, it has become clear that effectively outsourcing your energy requirements to countries like Russia was not a particularly shrewd move by European leaders! Assuming that gas prices would permanently remain low and that gas would always be easy to acquire on the international market, also proved to be a fallacy. Another failure was to not have enough storage capacity to meet gas requirements, an error that Britain is currently suffering from.

Fundamentally, the problem is that energy policy in Europe has been driven in recent years more by wishful thinking than any clear sighted analysis of energy requirements for a national economy, and how they might be met. It was so simple and so gratifying to talk about decarbonising energy and moving forward with renewables. The reality was that renewables had to be subsidised, with those costs covered by raising energy prices. Then there is the problem with renewables in that the sun does not shine all the time and the wind does not blow all the time, so you need to balance the inputs into your electricity grid and that is done with a gas-fired power station that can be turned on and off when needed, but is hardly very green and gas then has to be imported, which diminishes energy security.

Photo: Bundeswehr/Christian Timmig



A Luftwaffe Eurofighter TYPHOON pops flares during the Blue Flag joint exercise in Israel in October 2021. The Russian invasion of Ukraine seems to have persuaded the German Government to increase defence spending, as the previous policy appeared to be disarmament via neglect!

Of course, if governments are serious about decarbonising energy the only proven and logical solution at this time is nuclear power. This is somewhat unfortunate as green advocates have spent years demonising nuclear power. However, France, which is the leader in nuclear energy in Europe, will be introducing a new generation of nuclear stations to ensure energy security. Others are also turning to nuclear for their energy needs.

In Britain, some 15 per cent of national power requirements are met by nuclear energy, with six power stations in operation, all run by EDF, the British arm of the French energy giant. One station will start decommissioning in July this year, a new station Hinkley Point C is under construction (expected to come online in 2026) and EDF have proposed building a new station known as Sizewell C. EDF are also looking to extend the service life of the Sizewell B station, which provides 3 per cent of the UK's electricity, from 2035 to at least 2055. According to the British Government, "France currently has nine times more nuclear capacity than the UK."

In their "British Energy Security Strategy" released in April, the British Government committed to "increasing our plans for deployment of civil nuclear to up to 24 GW by 2050 – three times more than now and representing up to 25 per cent of our projected electricity demand." This new British energy security strategy is an important development, but it still puts too much emphasis on renewables.

Massive rises in the cost of energy will plunge countless Europeans into fuel poverty, add that to food and other key prices going up and you have a recipe for misery, all of which does nothing for social cohesion. On top of that, rising energy prices will inevitably force productive industry to relocate to more cost-efficient locations, further diminishing Europe's economic potential.

Facing Tomorrow

Current realities mean that Europe faces challenging times; its economic success is under threat from inflation and rising energy and raw material costs. This creates a situation where energy security is more important than ever before, but the problem for Europe is when the need for energy security comes into conflict with the European elite's obsessive environmental concerns. Onshore and offshore oil and gas exist in Europe, then comes the question of fracking. What is

needed is an open-minded assessment of energy demand and security of supply versus environmental impact. The French president might call for Europe to have 'strategic autonomy,' but that is not going to be possible to achieve if there is not enough power to keep the lights on in Europe.

Incidentally, media reports indicate that some western European nations are finally taking measures to reduce their dependence on Russian gas. The nations in

voice in condemnation of a potential conflict and taking steps to block such a conflict? The answer is no! Was the EU at the centre of the European response to the crisis? Again, no! The EU in Brussels always seems to take far too long to react.

The period before the Russian invasion was surely the time for Europe to speak with one voice and act together, but it never happened; there was too much posturing and too much self-interest.

Photo: EDF Energy



EDF Renewables Ireland has submitted an application to build a wind farm, with up to seven turbines, producing 50 MW of energy, in Old Leighlin, County Carlow, Ireland. Renewables might be politically popular, but an energy strategy based on renewables is not reliable, neither wind, nor sun are constant, thus fossil-fueled power is still required.

question are Belgium, France, Italy and Germany, all of whom have turned to Qatar to establish new gas supply relationships. Switching to energy dependence on a state in the Middle East does not seem to be the strictest interpretation of energy security. This is yet another example of Qatar's mastery of soft power; becoming a critical energy supplier is added to its massive investments in European companies and economies. The French president is also a proponent of greater European integration. We have spoken of Europe's economic strength, but there is more, as the EU itself states: "The EU covers over 4 million km² and has 447.7 million inhabitants." Why is it then that the EU leadership makes such little impression on the international scene? Cast your mind back to the period before the invasion of the Ukraine. Was Europe speaking with one

Brussels and those European states who call for further European integration look at Europe's economic strength, its large population and land area and see a superpower in all but name, perhaps the third superpower with China and the US. Ironically, now is the opportunity for Europe to assert great power status, especially since US foreign policy has become so unpredictable, and to seize the moment. The situation in Ukraine makes this the time for Europe to assert itself. Sadly, there is no evidence that Europe has the ability to become confident and forceful. There are still too many mixed messages emanating from Europe's capitals. Until European nations can work together, plot a unified course in foreign, defence and even energy policy, and learn to be a leader rather than a follower, Europe will not be able to assert strategic relevance. ■

Armoured Vehicles for the Visegrád Group

Robert Czulda

The acquisition of new armoured vehicles, particularly Armoured Infantry Fighting Vehicles (AIFVs), is among the top modernisation priorities for the Visegrád Group, comprising Poland, Czechia, Slovakia and Hungary.

Each member of the Visegrád Group, also known as the V4 (Visegrád Four), has its own political priorities and agenda, but at the same time they all share some similarities. For instance, this includes not only a strategic culture and history, but also a relatively common strategic outlook. They have all suffered from a very similar modernisation urgency – to phase out outdated equipment, which dates back to the times of the Warsaw Pact. They are all member states both of NATO and the European Union, where they cooperate (it is sufficient to mention the EU's Visegrád Battlegroup). However, despite many initiatives and plans – for instance regarding joint procurement efforts (assault helicopters or AIFVs) – the level of collaboration among the V4 States is relatively low. As noted in a Central European Policy Institute's report entitled "Towards a Deeper Visegrád Defence Partnership", "while there is general trust among the four countries on the highest political levels, the bureaucratic and military establishments are much more suspicious of collaboration (...). The Czechs see defence industrial collabora-

Photo: Czech MoD



The Czech Republic has been using the Pandur II 8x8 KBVPs, which was also offered by Tatra to Slovakia.

tion with Poland as a potentially valuable way to assimilate new technologies and win a foothold in the (much larger) Polish market. But the Czechs have been frustrated by the Polish government's protectionist attitude."

Financial constraints represent another obstacle hampering prospects of deep V4 military cooperation. The militaries of Czechia, Slovakia and Hungary, which are smaller than the Polish Armed Forces, have been affected by past economic crises, including the last one, a result of the COVID pandemic. Moreover, there is no consensus when it comes to strategic vision. Although, as mentioned earlier, they share the same principles, the V4 States differ when it comes to Russia, with Poland being the most vulnerable to the Russian threat, while Hungary remains essentially a pro-Kremlin state, even despite the war in Ukraine. Both Czechia and Slovakia seem to be somewhat detached from the current tensions.

Nevertheless, joint procurements would still offer potential benefits, including lower unit costs and savings in maintenance and logistics support. Moreover, the V4 would then accomplish a goal declared on numerous occasions by political leaders in Warsaw, Prague, Bratislava and Budapest – to integrate more closely, also in a military dimension, which would give them

Photo: Czech MoD



It is estimated that roughly 180 BVP-2s are in service with the Czech military – a replacement programme has not generated the results expected.

a chance to reduce their dependence on Western Europe (this is one of the goals set by the “Bucharest Nine” - a group founded by Romania and Poland in 2015, which also includes Bulgaria, Estonia, Latvia, Poland, Romania, and Lithuania). Closer collaboration is coherent with visions promoted by two initiatives, namely NATO’s Smart Defence initiative) and the European Union’s Pooling & Sharing concept.

Poland

Although Poland, with an annual defence budget of €12.44Bn, has the largest military among all V4 members (110,000 troops), its Ground Forces (Wojska Lądowe) have still suffered from the absence of a modern tracked AIFV. Nevertheless, in recent years Poland has introduced some new equipment (including LEOPARD 2A4/2A5 tanks, KTO Rosomak APCs or ŻMIJA long-range light reconnaissance vehicles). However, its mechanised battalions are still equipped with approximately 1,000 ageing Soviet-era BMP-1s (locally known as BWP-1, which stands for Bojowy Wóz Piechoty). The first batch of BMP-1s arrived in Poland in 1974 (as a replacement of the Polish-



Photo: Czech MoD

BVP-2s belong to the 7th Mechanised Brigade in Hranice, while some BVP-1s were sent to Ukraine in April 2022.

Czechoslovak 8x8 wheeled OT-64 SKOT APCs) and the last one in 1988 (altogether more than 1,300 vehicles). Due to the collapse of the Warsaw Pact, Poland has never had an opportunity to acquire a newer version – known as the BMP-2, not to mention the BMP-3. Despite several attempts of the Wojska Lądowe in the 1990s, Polish BMP-1s have never been upgraded, despite the fact that over the years several projects were proposed by Polish industry (including these known as BWP-2000 and PUMA). Given the fact that Poland has a relatively large industrial base, the Ministry of National

Defence decided that instead of procuring an off-the-shelf product from a foreign company, Wojska Lądowe would acquire the BORSUK (Badger) AIFV, designed and due to be manufactured by the Huta Stalowa Wola (HSW). The whole project, code-named NPBWP Borsuk (Nowy Pływający Bojowy Wóz Piechoty Borsuk – New Amphibious Infantry Fighting Vehicle Borsuk) was launched in 2013 in cooperation with OBRUM, Rosomak SA, Wojskowe Zakłady Elektroniczne (WZE), Wojskowe Zakłady Inżynieryjne (WZI), Wojskowe Zakłady Motoryzacyjne (WZM), Akademia Obrony Narodowej (AON), Wojskowa Akademia



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Photo: Hungarian MoD



The LYNX has been ordered by Hungary is currently on offer to the Czech Republic and Slovakia.

Photo: Nurol Makina



Hungary's GIDRÁN 4x4 is based on the Turkish EJDER YALÇIN vehicles by Nurol Makina.

Photo: Rheinmetall



Budapest will get 218 LYNX KF41 tracked AIFVs with the LANCE 30 mm turrets.

Techniczna (WAT), Wojskowy Instytut Techniki Pancernej i Samochodowej (WITPiS) and Politechnika Warszawska (PW). It was initially planned that the vehicle would be ready to order in 2017, but this deadline was not met. Before production is launched, the HSW still needs to accomplish another phase, namely the qualifying examinations.

The BORSUK AIFVs will serve alongside the ROSOMAK wheeled multi-role armoured vehicles (Patria's AMV). Both vehicles are expected to be equipped with the ZSSW-30/Zdalnie Sterowany System Wieżowy (Remotely Controlled Turret System), which is jointly produced by WB Electronics and HSW. The main armament of the ZSSW is the ATK Mk44 BUSHMASTER II 30 mm cannon with a co-axial UKM-2000C 7.62 mm gun and two SPIKE-LR ATGMs. Poland has also faced a large setback in this project – with production of the ZSSW-30 delayed by several years. It has not been launched yet, but early this year the HSW informed that it was finishing preparations for full-scale production. A total order could be for up to 1,400 ZSSW-30s. When deployed, it will be Poland's first advanced remotely controlled turret system. A full introduction of the ZSSW-30s is one of Poland's modernisation priorities.

Ten mechanised battalions of the Wojska Lądowe are expected to receive up to 588 vehicles in AIFV configuration by 2035. This means that it will be some time before all BWP-1s are retired. In the meantime, Polish defence companies are offering interim solutions until a new AIFV is fully introduced. For instance, in 2021, the WZM from Poznań presented a modernisation package for the BWP-1. The original 73 mm 2A28 GROM low-pressure smooth-bore short-recoil semi-automatic gun was replaced by the Cockerill 1030 remotely-controlled station integrated with the BUSHMASTER Mk44S 30 mm gun and a 7.62 mm machinegun. The same facility also presented a concept of a tank destroyer mounted on the BWP-1's chassis. WZM hinted that it could be integrated with ATGMs such as the SPIKE, which are already in Polish service. It is widely expected that the Ministry of National Defence will sooner or later announce a decision to modernise its BWP-1 fleet. Initial works in this regard were launched in 2020, but no decisions have yet been made.

Slovakia

With a defence budget worth €1.95Bn (2.1 per cent of GDP) and with roughly 18,500, Slovakia has an ongoing plan to phase out its BVP-1 (Bojové Vozidlo Pechoty), BVP-2 and BVP-2M vehicles. The Slovak Land

Forces (PSSR, Pozemné sily Slovenskej republiky) has approximately 177 of these vehicles in five mechanised battalions within the 1st Mechanised Brigade in Topoľčany and the 2nd Mechanised Brigade in Prešov. A replacement of Soviet era vehicles was recommended by the Slovak General Staff and is among the top modernisation initiatives. New AIFVs are also a core element of a deep modernisation strategy, which has been pursued by Slovak Defence Minister Jaroslav Nad'. Thanks to a technical upgrade, Bratislava expects to achieve two goals: to increase national defence capabilities and to meet the country's commitments to its NATO allies.

Bratislava launched a procurement procedure for tracked AIFVs in late 2021. During the first phase (by 2026), the PSSR is expected to receive 152 - not yet selected - tracked vehicles, which are to be acquired via a G2G (Government-to-Government) agreement. The estimated value of the procurement is €1.74Bn out of which €1.45Bn will be devoted to vehicles in several variants: 131 AIFVs (with a turret armed with 30/40 mm automatic cannon and ATGMs, most likely from Israel), 15 command vehicles, 3 mobile workshops and 3 recovery

vehicles). An additional 72 vehicles in various versions are expected to be acquired between 2027-2030. A key intent of this procurement is underlined by the fact that these vehicles are expected to become a core element of a new heavy mechanised brigade, the construction of which is one of the basic commitments of Slovakia to NATO. This elite formation will be based upon the current 1st Mechanised Brigade and will have three battalions of mechanised infantry, one tank battalion, one self-propelled howitzers battalion, one ISTAR battalion and several auxiliary units.

Bratislava's requirements include transparency, the involvement of local industry, as well as the best value for money. Initially, 33 potential suppliers submitted their proposals, with just four shortlisted. One of them is Poland's BORSUK, which was officially offered to Slovakia by the Polish Ministry of Defence on behalf of the PGZ (Polska Grupa Zbrojeniowa). This is the first time the BORSUK was directly offered to a foreign customer. Other contenders are: the Swedish Defence Materiel Administration (FMV) jointly with BAE Systems Hägglunds (CV90 in the latest Mk IV variant), General Dynamics European Land Systems (ASCOD

2) and Rheinmetall AG (KF41 LYNX, which would be co-manufactured in Hungarian facilities in Zalaegerszeg).

In order to select the best product, Slovakia asked for dynamic and static demonstrations of all submitted vehicles. The first such event was held in March 2021 at VTSU (Vojenský technický a skúšobný ústav) in Záhorie with a demonstration of the LYNX vehicle. In April 2021, similar trials were carried out with the ASCOD 2, while the CV90 was tested in June. It seems that the German offer has the highest chances of winning – Rheinmetall promised to exceed the 40 per cent requirement for direct content. The German company, which has already been cooperating with Slovak industry, has released its plans for a new factory in Moldava nad Bodvou (eastern Slovakia). The facility would be responsible for delivering the chassis and turrets for the LYNX AIFV, as well as handling systems integration, testing and paintwork. It would also provide maintenance for the Slovak AIFV fleet. In parallel to the acquisition of tracked AIFVs, Slovakia is looking for new tanks for its 2nd Mechanised Brigade (currently it is armed with a battalion of 22 T-72M1s, located in Trebišov). Most likely, Bratislava

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Photo: Honvédelem



Hungary has been using two variants of the BTR-80 wheeled APCs with a 14.5 mm machine gun.

Photo: Honvédelem



The first batch of 10 GIDRÁNs was handed over by Nurol Makina to the 25th György Klapka Infantry Brigade's military police in Tata in February 2021.

Photo: Honvédelem



Hungary still has a small batch of T-72 tanks, but new tanks – LEOPARD 2A7+ have been ordered.

will receive 32 tanks and 17 tracked bridge-layers based on the same chassis. It is worth adding that Slovakia initially decided not to procure 81 wheeled (8x8) vehicles, known as the VYDRA. This has also been a top priority for the Slovak military, which does not have any wheeled fighting vehicle/APC suitable for modern warfare. Initially, Patria's AMV-XP with the EVPÚ Defence's TURRA 30 remote-controlled weapon station was selected, but Bratislava was not satisfied with the cost and insufficient level of ballistic protection. Plans had to be changed.

The whole tender for new wheeled BOV (Bojové Obrnené Vozidlo) 8x8 AIFVs was then re-launched. Slovakia confirmed its plan to acquire 76 vehicles during the first phase (2023-2025 in three variants) for €332M and 500 in total (in 20 variants, including a combat variant with a 30 mm main gun and ATGMs). Five proposals were submitted: PANDUR II (Czech Tatra), PIRANHA-V (Romanian Uzina Mecanica Bucuresti, in cooperation with General Dynamics European Land Systems and Mowag), DRAGON VCR (Spanish General Dynamics European Land Systems-Santa Bárbara Sistemas), LAV-III (US General Dynamics) and the AMV 8x8 (Finnish Patria). Finally, in March 2022, Slovakia... once again selected Patria's offer.

Hungary

Apart from Poland, Hungary – with a defence budget worth €2.9 billion (1.7 per cent of GDP) – has the most mature AIFV programme. A modernisation of the Hungarian Defence Forces (MH, Magyar Honvédség), which has roughly 22,700 troops, became a priority for Victor Orban, prime minister since 2010. A critical milestone was reached in January 2017, when Budapest launched the "Zrínyi 2026" programme. This is the most comprehensive revitalisation initiative in the history of the Hungarian military. It also covers the Hungarian Ground Forces (MSH, Magyar Szárazföldi Haderő). Budapest's ambition is not only to procure "off-the-shelf" military systems, but also technologies to boost the indigenous defence industry.

Hungary has already ordered a new AIFV. The MSH, which is now being equipped with 44 LEOPARD 2A7+ MBTs and an additional 12 tanks in 2A4 variant for training purposes, will receive 218 LYNX KF41 tracked AIFVs with the LANCE 30 mm turrets. This procurement is crucial to phase out the old wheeled BTR-80 and BTR-80A APCs. KF41s were ordered in 2020 from Rheinmetall for €2Bn and will be integrated with Rheinmetall's STRIKE SHIELD hard-kill

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The BORSUK AIFVs will serve in Poland along the ROSOMAK wheeled multi-role armoured vehicles (Patria's AMV)

Photo: HSW



The main armament of Poland's BORSUK is the ATK Mk44 BUSHMASTER II 30 mm cannon and two SPIKE-LR ATGMs

BRDM-2 with MALUTKA



Poland has so far not been able to phase very old BRDM-2s with the 9P133 Malyutka-P guided missiles.

active protection system (APS) and will replace the ex-Soviet BTR-80 and BTR-80A APCs. The first batch of 46 LYNXs, as well as nine BÜFFEL armoured recovery vehicles, will be manufactured in Germany and delivered to Hungary by 2023, while the rest (172 vehicles) are to be produced locally in Zalaegerszeg. The foundation stone of a plant worth €169M was laid in 2020, which will become operational in 2023.

A plan to build national industrial capabilities will be boosted not only by the procurement of the LYNX vehicles, but also thanks to cooperation with Turkey. The GIDRÁN 4x4 armoured tactical vehicles – based on the EJDER YALÇIN vehicles produced by Nurol Makina – will be integrated with the Aselsan SARP remote weapon station. They were selected in 2020 and the first batch of ten vehicles was handed over by Nurol Makina to the 25th "György Klapka" Infantry Brigade's military police in Tata in February 2021. In total, Hungary is looking to acquire at least 300 vehicles with production of at least 100 expected to be carried out locally in Kaposvár. The facility will also be responsible for some additional works, such as equipping the Hungarian GIDRÁN with radio and other electronic devices.

Czech Republic

The Czech Republic plans to spend 2 per cent of its GDP on defence by 2025 (currently it is approximately 1.4 per cent). The Armáda České Republiky (AČR), which has 27,000 troops, has continued to use equipment mainly dating back to the times of the Warsaw Pact. Prague already has a modernised fleet of wheeled vehicles – the PANDUR II 8x8 KBVPs (Kolového Bojového Vozidla Pěchoty) has replaced Soviet-era OT-64 SKOTs. However, when it comes to tracked AIFVs, Prague has not been very successful. The AČR still has the BVP-2s, which belong to the 7th Mechanised Brigade in Hranice (BVP-1s are still in the arsenal, but only as mobilisation stock in the warehouses in Rančářov – some of which were donated to Ukraine in April this year). This unit, with two mechanised battalions, one tank battalion (with T-72M4CZs) and one light motorised battalion, is the strongest formation of the AČR. The 7th Mechanised Brigade has experience in international operations (under the NATO aegis in Latvia, Afghanistan and recently within the EU in Mali) and is expected to become fully compatible with NATO standards by 2026. New AIFVs are crucial for achieving this strategic goal.

The problems now affecting the AČR were unforeseen, as 210 new vehicles were



Photo: Robert Czulda

One of the latest successful acquisitions in Poland is a procurement of locally-made RAK 120 mm wheeled howitzers

promised as a replacement for the BVP-2s. The need to procure a new generation of AIFVs was first mentioned back in 2012 and a contract value, the largest ever in the history of the Czech military, was estimated at roughly €2.4Bn. As in the case of Slovakia, Czechia also required that at least 40 per cent of the programme needs to be carried out by local companies. In late 2017, Prague completed field trials of four AIFVs: ASCOD

(General Dynamics European Land Systems), CV90 (BAE Systems), LYNX (Rheinmetall) and PUMA (Rheinmetall Defense and KMW).

The winner was expected to be announced by mid-2018, however, the decision was delayed. In late 2018, three vehicles were shortlisted (CV90, ASCOD and LYNX), while in late 2021, the Czech Ministry of Defense halted the process and announced that none of three con-

tenders met the tender's requirements. The decision was a great disappointment for the Czech military establishment and negatively affected the national plan to boost defence capabilities. In March 2022, Defence Minister Jana Černočová, admitted openly that a delayed tender was a crucial element both for boosting the Czech military and for Prague's contribution to NATO.

Future Projects

Despite some orally expressed hopes of various experts and commentators, the close industrial cooperation among the V4 States and joint procurement efforts of armoured vehicles, remain unlikely. Each member has chosen its own development path, which does not assume cooperation with the others.

When it comes to the most preferred industrial partner, Germany seems to be a leader and there doesn't seem to be anything to indicate any change in this regard. Hungary has already ordered German AIFVs, while both the Czech Republic and Slovakia were also offered vehicles from Germany. Berlin is seen not only as an attractive political partner, but also as a valuable industrial provider of modern technologies, willing to invest in local economies, which is also one of top priorities of V4 States. ■



Photo: Slovakia MoD

The CV90 has already been tested by Slovakia - they are offered with an offset and a loan.

Czech and Slovak Military Industrial Cooperation

Eugene Kogan

To date, the two countries' military industrial cooperation remains limited in scope despite their respective ministers of defence wishing to make this cooperation tangible. However, words alone are not sufficient to turn wishful thinking into reality.

Perhaps leaders of the Czech defence industry need to change their approach and methods when it comes to dealing with their neighbour Slovakia. They need to offer higher quality products and additional financial and industrial incentives to the Slovak defence industry over the long-term period. The recent successes of the German company Rheinmetall for the 152 infantry fighting vehicles and of the Finnish company Patria for the 76 armoured fighting vehicles in Slovakia (discussed below) underscore the Czech defence industry's current lacklustre approach.

Photo: Rheinmetall



Rheinmetall won a tender to provide 152 KF41 LYNX infantry fighting vehicles (IFVs) to the Slovak armed forces.

Introduction

On 20 October 2021, in Bratislava, Slovak Defence Minister, Jaroslav Nad, along with MoD and Armed Forces officials attended a presentation of Czech defence and security companies. Also present at the meeting, which was aimed at identifying potential areas of cooperation between the Czech Republic and Slovak arms manufacturers, were representatives of the Slovak Security and Defence Industry Association, the main lobbying group on behalf of the country's defence manufacturers.

Speaking in front of the Slovak and Czech defence industry community, Nad said: "I am a supporter of intense cooperation between our countries and this is all the more true when it comes to defence and security." Nad emphasised that: "Cooperation in the defence and security environment is guided, above all else, by the principle of mutual benefit to both countries. Over and above the scope of our cultural closeness and good relationship, the high quality of equipment, the price offered, and the

role of our domestic industry in the project are the decisive factors." Almost five months later, on 18 March 2022, Minister Nad welcomed Jana Cernochova, his counterpart from the Czech Republic, for bilateral talks in Bratislava. Both ministers took a close interest in deepening their armed forces' modernisation and defence industry cooperation. Thanks largely to this, some [unspecified] defence programmes of the Slovak and Czech governments could be addressed at the G2 level. When exactly it is going to happen remains unknown.

Despite some encouraging words from Nad and Cernochova, the number of cooperative projects between the two countries remains limited. In part, this is because the Czech defence industry's offer proved to be less competitive compared to the recent offers made to Slovakia by the German company Rheinmetall that won a tender to provide 152 KF41 LYNX infantry fighting vehicles (IFVs) and the Finnish company Patria that won a tender to provide 76 armoured fighting vehicles (AFVs). This is also in part because the Czech defence industry is unable to match foreign manufacturers' qualitative performance and offset programmes. Therefore, Nad's words have not

yet been translated into defence industrial cooperation deeds. Despite such shortcomings, this article highlights several bilateral and trilateral projects.

Tracked and Wheeled (8x8) ZUZANA 2 Self-propelled Howitzers (SPHs)

In April 2018, the Slovak Armed Forces signed an agreement with the Slovak Konstrukta Defence Company (part of the DMD Group) to deliver 25 ZUZANA 2 SPHs which are also known by their export designation of Truck Mounted Guns (TMG). The total cost, including crew training, spare parts and ammunition, is €175M.

The first five out of the total 25 tracked and wheeled (8x8) TMGs – which are jointly developed by Konstrukta Defence and Czech holding Czechoslovak Group (CSG) and its majority owned Tatra Defence Vehicles, were delivered to the Slovak Armed Forces in April 2021. According to MoD Spokesperson, Martina Koval-Kakascikova: "By January 2022, six additional pieces of ZUZANA 2 systems had been delivered to the Slovak Armed Forces. An additional 14 pieces of ZUZANA 2 SPHs will be delivered

Author

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by the end of 2022. However, an agreement for the EVA 155/52 mm calibre artillery system, based on [the] TMG has not yet been signed." When it is going to be signed is not yet known.

The main difference between the original 6x6 TMG and the new 8x8 platform design is the new four-axle truck chassis which replaced the three-axle truck chassis in the earlier variant. This increases the vehicle's length and weight but could also increase its tactical mobility over most terrain types. The addition of the Auxiliary Power Unit (APU) also increases its field endurance, which enables the ordnance to be operated without running the main engine. The ZUZANA 2 has a greater range and accuracy and enhanced anti-mine and ballistic protection for the crew.

Tracked and Wheeled (8x8) Medium Armoured Fighting Vehicles

Unfortunately, for the CSG and its partner Tatra Defence Vehicles, the tracked and wheeled AFV tender was won by Finnish company Patria. On 30 March, the Slovak Government agreed to the MoD's proposal to procure 76 pieces of 8x8 AFVs through a G2 agreement with the Finnish Government. The total agreement price is €447M, (including logistics, munitions and infrastructure).

The following example highlights a potential for defence industry cooperation.

L-39NG Training and Light-Attack Aircraft

The Czech aircraft manufacturer AERO Vodochody AEROSPACE and the Slovak state-owned company Letecke Opravovne Trencin (LOTN) have signed a Memorandum of Understanding (MoU) in June 2021, which specifies the details of future industrial cooperation between the two countries. In the case of the acquisition of the new L-39NG by the Slovak Air Force, the cooperation will include not only the production of parts for the new L-39NG aircraft but also cooperation in logistic support for these aircraft in Slovakia or in providing a Ground Based Training. The extensive industrial cooperation angle was confirmed by AERO's Head of Sales, Jakub Hoda, citing "a long history with LOTN (on the L-29 and L-39 aircraft) in the past."

Hoda added that: "Our new L-39NG aircraft, which was certified in September 2020, opens up a wide range of opportunities to extend cooperation. We offer relocation of production of some parts of the aircraft to Slovakia, specifically the tail section,

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Photo: MoD Slovakia



Slovak servicemen begin their basic military training at Marin Training Ground. Despite encouraging words, the number of cooperative projects between Slovakia and the Czech Republic remains limited.

nose, air brakes and external fuel tanks. This would make LOTN one of the most important suppliers for the L-39NG. The signed memorandum also specifies other areas such as providing services related to the L-39NG operation and involvement in other development projects of AERO."

Lubomir Galko, CEO and Chairman of the Board of LOTN, said: "LOTN is open to further industrial cooperation with AERO Vodochody. If the Slovak MoD acquires the Czech L-39NG aircraft, we have signed a joint memorandum which contains specific areas for expanding our cooperation. This would bring LOTN new contracts and jobs, as well as interesting projects in terms of implementing new technologies in aviation." Koval-Kakascikova informed the author that: "Currently, the MoD is analysing potential suppliers and preparing a fea-

sibility study and following project for government approval. On completion of these processes, the tender preparation process will go ahead, the estimated date is the fourth quarter 2022 or later. If new training aircraft are procured, the MoD has the intention to involve Slovak (defence) industry in their production and maintenance. Every potential contractor has the same chances to deliver new training aircraft, if and when they fulfil all the technical and legal requirements for such a tender."

Whether or not a joint AERO and LOTN proposal has a chance to win the tender remains to be seen. If the tender goes to the joint Czech and Slovak bidder, it will undoubtedly strengthen the nascent military industrial cooperation between the two countries.

Photo: Karel Subrt / CC BY-SA 4.0



The first public presentation of the first preproduction Aero L-39NG aircraft at the 2019 NATO Days

Cooperation between Explosia and Unspecified Slovak Defence Companies

In the company's official answer to the author, it was stated that: "Explosia has been cooperating with some [unspecified] companies of the defence industry in Slovakia for many years. We are able to cooperate on orders in the field of large calibre ammunition, smokeless powders or explosives for industrial and military use."

Cooperation between RAYService, Rheinmetall in Slovakia

On 18 August 2021, RAYService and Rheinmetall signed a contract for the production of electrical components in Slovakia. It needs to be remembered that RAYService has a production facility in Zilina, Slovakia. The contract covers cables and harnesses for the LYNX KF41 programme of the Hungarian Army, worth more than €4M for the first batch until 2022. We may also expect RAYService participation in the LYNX KF41 programme of the Slovak Army. Even though the author contacted RAYService for elaboration on the company's participation in the Rheinmetall and the DMD Group in Slovakia, he received no answer.

Conclusion

The positive intentions of the two countries' ministers of defence to deepen defence industry cooperation is welcome. However, the main stumbling block for such cooperation is that Slovakia alone and its defence companies do not provide extensive opportunities for companies from the Czech Republic. Rheinmetall's recent success in winning the tender to manufacture LYNX KF41 IFVs, and equally so for Patria to manufacture AFVs in Slovakia, highlights the well-established European companies' qualitative edge over their Czech competitors. At the same time, the abovementioned case of the Czech company RAYService highlights the potential for trilateral cooperation via RAYService participation in the LYNX KF41 IFV headed by Rheinmetall and its partner in Slovakia, the DMD Group. As regards Explosia, the long-term cooperation that company officials did not want to elaborate on highlights a less explored or perhaps a less highlighted example of cooperation between the two countries. ■

The author would like to thank Martina Koval-Kakascikova, Spokesperson of the Slovak MoD, for her assistance in the preparation of this article.

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DEFENSE

PESCO – A Game Changer for Europe`s Defence Cooperation

Luca Peruzzi

Just nine days before the invasion of Ukraine by Russian Forces, in light of a deteriorating security environment, the European Commission put forward a number of initiatives to enhance security and defence cooperation within the EU framework. This was followed on 21 March by the presentation of the 'EU Strategic Compass on Security and Defence' where, in its foreword, the High Representative for the European Union for Foreign Affairs and Security Policy/Vice President of the European Commission (HR/VP) Josep Borrell, highlighted "the need to ensure that we turn the EU's geopolitical awakening into a more permanent strategic posture."

In the Strategic Compass chapter devoted to investing in defence expenditure, which elaborates on the EU's strategic orientation, the Council highlights the importance of the Permanent Structured Cooperation (PESCO), which, according to a concurrent HR/VP statement, "is a decisive contribution for the development of Europe's capacity to act autonomously. It is key for the development of strong and integrated defence capabilities available to the EU, which will allow us to react effectively to the most demanding circumstances".

A Treaty-Based Framework

PESCO is a treaty-based framework to deepen defence cooperation among the 25 participating member states (almost all EU nations except Malta and Denmark), who are capable and willing to do so. Established by the EU Council on 11 December 2017, setting out a list of 20 binding common commitments in the areas of defence investment, capability, development and operational readiness, PESCO differs from other forms of cooperation for the legally binding nature of the commitments undertaken voluntarily by the participating member states. PESCO's structure and governance is based on a two-layer structure – the Council responsible for the overall policy direction and decision-making, including the assessment on whether participating member states are fulfilling their commitments, where only the PESCO members participate in the vote, and the single project

Photo: EU



PESCO is a treaty-based framework to deepen defence cooperation among the 25 participating member states (almost all the EU nations except Malta and Denmark).

Photo: EU



PESCO will develop capability projects responding to the EU priorities identified by the EU Member States through CDP, also taking into account the results of the CARD. Eligible projects could also benefit from financing under the European Defence Fund (EDF).

level managed by the participating member states. The European External Action Service (EEAS), including the EU Military Staff and the European Defence Agency (EDA), jointly provide secretariat functions for all PESCO matters and a single point of contact for member states and institutions the PESCO Secretariat.

PESCO develops capability projects responding to the EU priorities identified by the EU member states through the Capability Development Plan (CDP), also taking into account the results of the Coordinated Annual Review on Defence (CARD) run by the European Defence Agency (EDA). Eligible projects could benefit from financing

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Photo: Mourad-Cherfi/MBDA



Among the key programmes for the defence but also the sovereignty and the autonomy of the EU, the most challenging is the TWISTER (Time-ly Warning and Interception with Space-based TheatER surveillance) capability project.

Photo: Airbus Defence & Space



On behalf of Germany, France, Italy and Spain, OCCAR awarded the European MALE RPAS Stage 2 contract to Airbus Defence and Space for the development and manufacture of 20 MALE air systems and more than 5 years of initial in-service support.

Photo: Rohde & Schwarz



The European Secure Software defined Radio (ESSOR) project is to develop an interoperable, secure defence communications system compliant with ESSOR and Software Communication Architecture (SCA).

under the European Defence Fund (EDF). The latter is 'a competitive industrial programme, providing financial incentives for industries to foster defence cooperation from research to the development phase of capabilities including prototypes through co-financing from the EU budget'. EDF actions supporting prototyping undertaken in the context of PESCO projects may benefit from increased EU co-financing through an extra 10 per cent bonus. By the end of 2022, the EDF will have invested €1.9Bn in defence research and capability development projects. The EDF has been preceded by the European Defence Industrial Development Programme (EDIDP) which is the first ever EU grant programme targeting defence capability development.

Mitigating Capability Shortfalls

The Council adopts PESCO projects, following a recommendation by the HR/VP. Currently there are a total of 60 projects put forward since March 2018 in four waves, the first two launched in 2018, one in 2019 and one in 2021, while the next call for project proposals will take place in July 2022. 'In the EU framework and notably through the PESCO and the EDF', the Strategic Compass highlights that the EU 'is already developing command and control systems, armoured vehicles, missile systems and artillery, patrol corvettes, unmanned air and maritime systems, electronic warfare capabilities, space surveillance, cyber rapid response and high-tech training systems.' However, there is 'a need to invest further in strategic enablers, and more generally in the capabilities necessary to conduct the full range of missions and operations as set out in our agreed level of ambition'. The EU will therefore enhance its efforts 'to mitigate critical capability shortfalls such as strategic airlift, space-based connectivity and communication assets, amphibious capabilities, medical assets, cyber defence and Intelligence, Surveillance and Reconnaissance (ISR) capabilities and Remotely Piloted Aircraft Systems (RPAS)' according to the text of the Strategic Compass. The EU needs to reduce fragmentation and develop next generation capabilities, committing to taking forward the recommendations of the first-ever CARD Report published in 2020, including the agreed six capability focus areas that would benefit from enhanced defence cooperation among member states: the Main Battle Tank, Soldier Systems, European Patrol Class surface ship, Anti-Access Area Denial capacities and Countering Unmanned Aerial Systems, Defence in Space and Enhanced Military Mobility.

PESCO Projects

The latest wave of PESCO projects launched in November 2021 has anticipated these efforts and recommendations with the establishment of 14 projects with a total participation of 21 EU member states within five military domains: land (2), air (6), cyber/C4ISR (2) and space (2). The five-nation (Germany as coordinator, Czechia, France, the Netherlands, and Slovenia) Strategic Air Transport for Outsized (SATOC) aims to fill the critical shortfall for strategic transport for outsized and heavy cargo, a crucial enabler for military missions and operations. SATOC involves a gradual three-step approach, firstly by identifying a sufficient number of project members (including third nations), harmonising requirements and finally identifying and agreeing on a common European solution for the transport of outsized cargo.

The four-nation (Spain as coordinator, Germany, Portugal, Slovenia) project Next Generation Small RPAS (NGSR) aims to develop a small (150 kg) highly deployable, multi-purpose and multi-role tactical RPAS, and deliver a first prototype in 2026. The



Photo: Naviris

The consortium including Fincantieri, Naval Group and Navantia, and coordinated by the Naviris joint venture between the first two companies submitted the industrial proposal related to the EDF's Modular Multirole Patrol Corvette (MMPC) in December 2021.

system will be able to deploy, take off, land and operate in a tactical environment without need for a runway. The NGSR will also provide an additional European tactical RPAS as less than half of the platforms currently in service which were manufactured in Europe.

The six-nation (France as coordinator, Germany, Italy, Poland, Portugal, Austria) Defence of Space Assets (DoSA) project aims

to increase the EU's operational efficiency in the space domain by making the best use of current and future space assets. Its main objectives include defining which technologies and identifying common operational needs will be needed tomorrow to defend space assets.

The fourth wave also includes the Essential Elements of European Escort (4E) for the maritime area, Future Medium-size



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Image: Airbus



The OCCAR agency is responsible for the Mk III contract for the mid-life upgrade of the TIGER combat helicopter, which was awarded on behalf of France and Spain to Airbus Helicopter and MBDA.

Tactical Cargo (FMTC), Rotorcraft Docking Station for Drones, Small Scalable Weapons (SSW) and Air Power projects among the air systems. The Main Battle Tank Simulation and Testing Centre (MBT-SIMTEC) and the EU Military Partnership (EU MilPart) are included in the land systems area, while the Common Hub for Governmental Imagery (CoHGI) is part of the space area. Lastly, Automated Modelling, Identification and Damage Assessment of Urban Terrain (AMIDA-UT) and Cyber Ranges Federations (CRF) are included in cyber defence and C4ISR (Command, Control, Communications, Computers) systems.

TWISTER

Among the other key programmes for the defence, but also the sovereignty and the autonomy of the EU, the most challenging is the TWISTER (Timely Warning and Interception with Space-based TheatER surveillance) capability project, which was implemented into PESCO in November 2019. Coordinated by France and including Finland, Germany, Italy, the Netherlands and Spain, the project seeks to develop a multi-role endo-atmospheric interceptor and a space-based early warning system to address emerging threats, with the funding support from the EDF. Last December,

an industrial consortium led by MBDA involving 51 companies from 14 countries, which according to the company's CEO Éric Béranger, responded to the EDF call for a concept exploration study for the effector, while the ODIN's EYE (multi-national Development INitiative for a Space-based missile early-warning architecture) project was established for the initial study on the development of a European space-based missile early warning (SBMEW) capability to create a situational threat awareness against ballistic and hypersonic threats and generate the basis for European or national actions. Financed by EDIDP 2020, the latter 24-month project is coordinated by a German company, OHB System, and involves industries from 13 countries.

The European MALE RPAS

On 24 February, on behalf of Germany, France, Italy and Spain, OCCAR awarded the European MALE RPAS Stage 2 contract to the Airbus Defence and Space for the development and manufacture of 20 MALE air systems and more than five years of initial in-service support. This is one of the two programmes which received a direct award - in this case to strengthen European sovereignty in a sector without a European product - the other being the European Secure Software defined Radio (ESSOR) to develop an interoperable, secure defence communications system compliant with ESSOR and Software Communication Architecture (SCA). The latest ESSOR programme achievement was the successful enabling demonstration of armies from different member states to communicate on the battlefield using their own radios.

The European Patrol Corvette

On 9 December, the consortium, including Fincantieri, Naval Group and Navantia, and coordinated by a Naviris joint venture between the first two companies, submitted the industrial proposal related to the Modular Multirole Patrol Corvette (MMPC) call of the EDF in order to develop the first common naval capability represented by the PESCO EPC (European Patrol Corvette) programme. The latter foresees the coordination of Italy and the participation of France, Spain, together with Portugal as an observer.

OCCAR is also leading the Mk III contract for the mid-life upgrade of the TIGER combat helicopter, which was awarded on behalf of France and Spain to Airbus Helicopter and MBDA last March. In conjunction, OCCAR awarded a contract to Safran Electronics and Defense, for the develop-

Photo: MBDA-Adrien-DASTE_BD



MBDA leads two missile system centric-projects developed under the PESCO framework: BLOS (Beyond Line Of Sight) and TWISTER (Timely Warning and Interception with Space-based TheatER surveillance).

ment and procurement of a new optronic system.

The EDIDP-financed REACT (Responsive Electronic Attack for Cooperation Tasks) programme connected to the PESCO Airborne Electronic Attack (AEA) project and aimed at providing a design for Air Electronic Attack Capability, allowing air forces to conduct operations in a contested anti-access/area denial environment, is on the verge to be implemented into OCCAR by its participating states including Spain (as REACT coordinator), Germany and Italy, with Sweden as a potential future participating nation until the process of joining is achieved.

LynkEUs

The LynkEUs is the first technological and industrial contribution to the objectives of the three-nation (France as coordinator, Belgium, Cyprus) PESCO EU Beyond Line Of Sight (BLOS) project led by MBDA France and involving 13 partners and subcontractors from five countries (adding Estonia and Sweden). The project aims to define a preliminary concept of operations for a BLOS European capability and demonstrate it through a full-scale firing campaign.

Among the other ongoing projects, the European Medical Command (EMC), coordinated by Germany, together with other 13

nations, to provide the EU with an enduring medical capability to coordinate military medical resources is operational, as for the Cyber Rapid Response Teams and mutual assistance in cyber security (CCRT). The latter is led by Lithuania and involves another five nations, and consists of a team of cyber specialists, which has been deployed by the EU for the first time in the context of the current conflict in Ukraine.

Within the EDIDP 2020, on June 2021, the EU allocated €158.3M to 26 projects, of which 15 are being developed in the context of PESCO.

The first PESCO Strategic Review was conducted in 2020 and as a result, the Council provided guidance for the next PESCO phase (2021-2025) in terms of overall aim, key policy goals, processes, as well as incentives to improve the fulfilment of the more binding commitments. A next review is foreseen by 2025. With the launch of the last wave of projects in November 2021, more information was provided on the status of the overall PESCO framework and projects, with the Council adoption of two recommendations which set out more precise objectives for the second initial Phase of PESCO 2021-2025 and on the progress made by the project members towards fulfilling their commitments. Of the 46 projects (the EU Training Mission Com-

petence Centre was successfully closed in March 2020 with a set of recommendations) approved in the first three waves covering all military domains, estimating the status of the projects' activities, it concluded that between 24 to 26 out of the 46 ongoing projects will reach an initial operational capability around 2025. Among the 26 identified PESCO projects that should produce concrete results by 2025, three relate to land and formations, three to maritime, five to cyber and C4ISR, eight to joint enabling and seven to training and facility capabilities. The successful implementation of the EU CRRTs project underscores how project timelines vary across different domains. Capability projects involving the harmonisation of requirements, development of complex prototypes with the involvement of industrial consortia will be delivered via a longer timeline. 'Larger capability projects have nevertheless taken smaller but significant steps forwards such as the European Patrol Corvette, while some projects such as military mobility have also seen third countries invited to join', highlighted the EU, referring to the participation of the US, Canada and Norway, which are not PESCO member states and which were authorised to participate in the Military Mobility project (coordinated by the Netherlands) since May 2021. ■



Photo: EDA

The Chemical Biological Radiological Nuclear Surveillance Reconnaissance Surveillance System (CBRN RSS) project is today managed by EDA, following a request by Austria on behalf of the four Member States participating in a related PESCO project, the Chemical Biological Radiological Nuclear Surveillance as a Service (CBRN SaaS) project, which is already supported by EDA since 2019.

Towed Active Sonar Systems – a Growing Industry

Luca Peruzzi

In recent years, the proliferation of quiet, conventionally and air independent propulsion submarines and technological developments in acoustics electronics have pushed manufacturers to develop Low-Frequency Towed Active Sonar (LFAS). This also applies to environmental tailored higher-frequency equipment as the sensor of choice for anti-submarine warfare (ASW), shrinking their weight and quarterdeck footprint of their associated launch-and-recovery systems to widen the portfolio of suitable platforms.

Aselsan

Turkish industry is working on a low frequency active sonar under the DÜFAS programme. The programme was launched in August 2018, with the research and development (R&D) contract awarded by the Presidency of Defense Industries (SSB) to the industrial team led by Aselsan group, including Armelsan and Nanotech. Its aim is to develop piezoelectric mono-crystalline ceramic materials and transducers. The programme is reported to be centred on the development and integration of active elements into a towed sonar system based on the torpedo detection towed array element of the Aselsan HIZIR torpedo countermeasures system. The towed element includes a passive array and a decoy, the latter being deleted in favour of the active elements in order to provide a complete active/passive capability in a single towed system. Trials with prototypes are reported to begin in 2022 from a Turkish Navy platform. Aselsan has also developed and now promotes the HIZIR/LFAS long-range low-frequency towed active sonar suite including a transducer array with low-frequency active transmission capability which is deployed, recovered and stowed with a dedicated winch system, operating in combination with the separate HIZIR torpedo detection passive (receive) array in a bi-static mode.

Atlas Elektronik

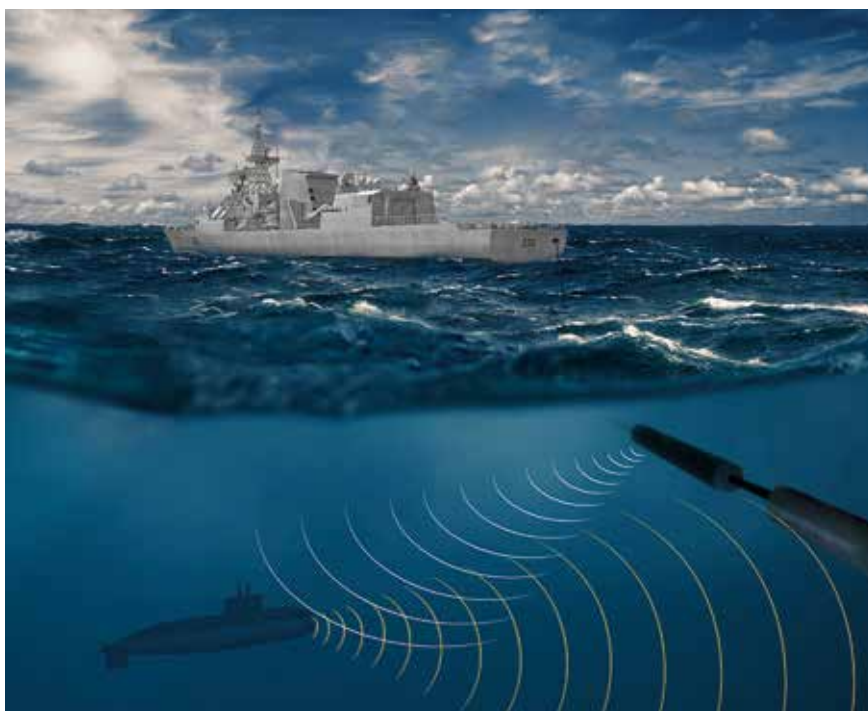
Derived from the LFTAS system prototype extensively tested by the German MoD, the Atlas Elektronik Active Towed Array Sonar

© NATO Photo by CPO FRAN Christian Valverde



More than 60 CAPTAS systems are in operation across 10 member navies and more systems and naval forces are coming. Depicted here is the towed passive array deployed by Italian Navy's CARABINIERE ASW FREMM.

Photo: Armelsan



Launched in August 2018, with the R&D contract awarded by the Turkish Presidency of Defense Industries (SSB) to the industrial team led by Aselsan group and including Armelsan and Nanotech, these companies are working on a national low frequency active sonar under the DÜFAS programme.

(ACTAS) system is a low-frequency ASW sonar system that operates simultaneously in active and passive modes and provides high-resolution target detection, according to the manufacturer. The ACTAS is centred on a towed body - housing the vertical transmitter (active) array (1.4-2.4 kHz) providing full 360° range coverage - with twin depressors for stabilisation, and associated passive reception array with triplet array to instantaneously resolve left/right bearing ambiguity. The launch and recovery equipment, associated power system and ancillaries have a total (inboard and outboard) 35 m², while the complete system weighs 20 tonnes (or less, depending on the configuration).

Designed to detect, track and classify submarines, torpedoes and surface vessels, including speedboats, and currently also available with the SONIX sonobuoy processing, ACTAS features over-the-horizon surveillance capabilities at ranges considerably above 60 km (depending on propagation conditions), according to Atlas Elektronik. Capable of bi/multi-static operations with dipping sonar, sonobuoys or submarines, the ACTAS is already operational with the Indian and Royal Thai Navies, while also being considered by other

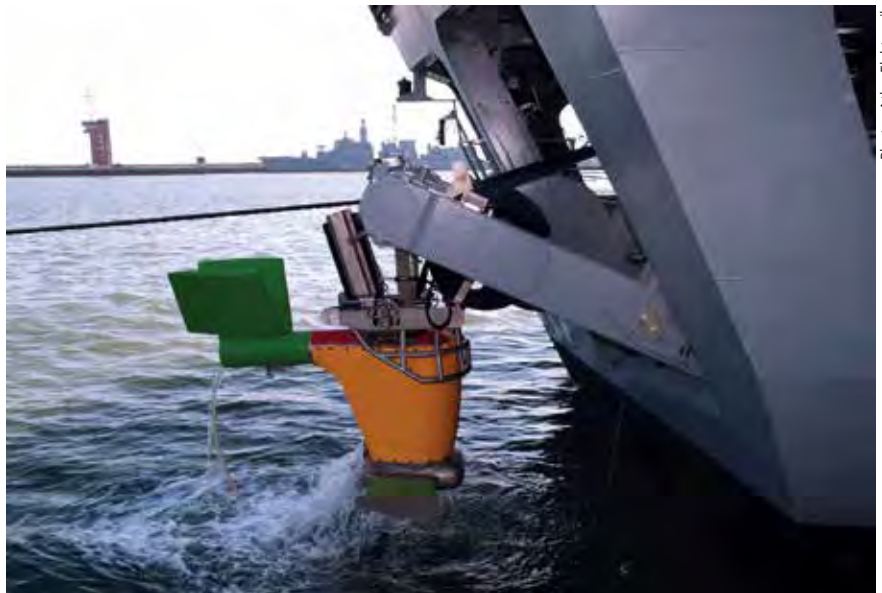


Photo: Atlas Elektronik

The Atlas Elektronik' Active Towed Array Sonar (ACTAS) system is a low-frequency ASW sonar system that operates simultaneously in active and passive modes and provides high-resolution target detection.

undisclosed customers. Based on a supply contract awarded in 2013 by Daewoo Shipbuilding & Marine Engineering (DSME), the Royal Thai Navy BHUMIBOL ADULYADEJ class DW-3000F frigate features an ASW suite based on an Atlas Elektronik ASO se-

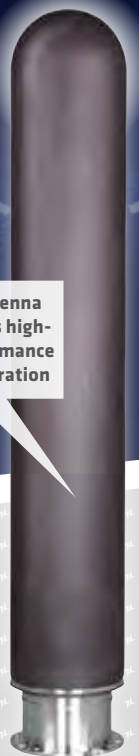
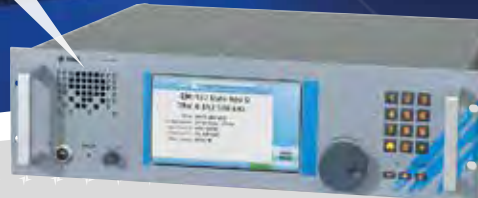
ries hull mounted sonar (HMS) and ACTAS system. In 2014, the Indian MoD procured the latter equipment in an initial lot of six ship sets, which are to equip TALWAR class frigates and DELHI class destroyers. The system was also identified on at least one

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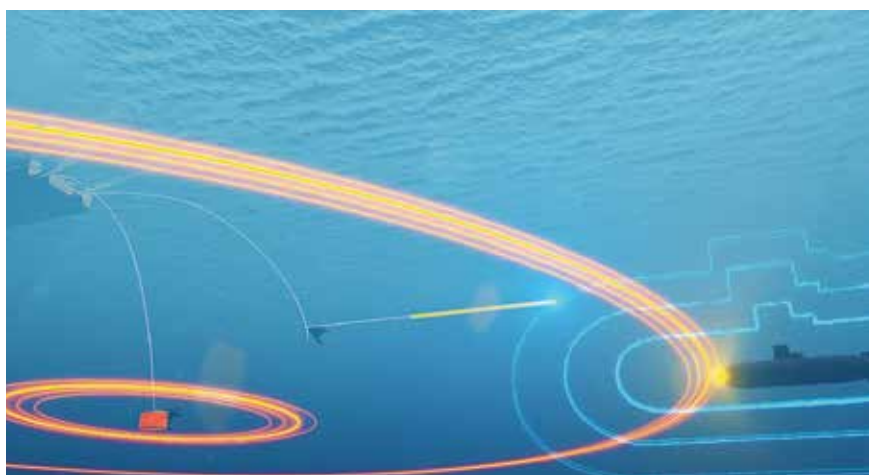
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Photo: Patria



Patria has been awarded a contract by Saab, the SQUADRON 2020 combat system contractor, for the design and delivery of a new ASW suite based on its SONAC DTS solution with VDS and TAS to equip the Finnish Navy's new POHJANMAA-class corvettes.

SHIVALIK class frigate, opening the way to potential additional procurement. The German Navy has declared a need for two containerised ASW mission modules equipped with both active and passive elements on a single towed array for installation on the new F126 frigates but no information has been released on the requirements and supplier.

DSIT Solutions

The Israeli company offers a cost-effective ASW suite centred on a Mission Control System (MCS), the BLACKFISH hull or bow mounted sonar and the SWORDFISH low-frequency towed array sonar. The latter is designed to operate in littoral and deep-water ASW operations with the medium-frequency BLACKFISH system, already sold to both NATO and non-NATO countries. Capable of underwater target search, detection, tracking and classification in passive, active and parallel modes, these sonar systems include machine learning technologies for automation of algorithms and reduction of operator workload. Suitable for surface vessels of various sizes, including small vessels such as fast patrol craft (FPC), the SWORDFISH comes in a modular configuration (MTAS) using medium-low frequencies, where the control system is housed in a container on board or on shore.

Elbit Systems

The company announced in September 2021 that it had been awarded different contracts for a total of approximately US\$56M to supply ASW capabilities to a naval force of an undisclosed Asia-Pacific region customer. Under these contracts, Elbit Systems provides SEAGULL unmanned surface vessels configured to perform ASW missions equipped with L3Harris HELRAS sonar, together with the company's autonomous combat and communications suite, alongside the Towed Reelable Active Passive Sonar (TRAPS) system to be installed on board the naval force's corvettes. Developed by Elbit Systems' Canadian subsidiary GeoSpectrum and designed to meet the requirement for a compact, lightweight

and low-cost active/passive VDS that can be accommodated on smaller ships, the TRAPS' unique advantage is that it employs an active sound source that uses a single-tow vertical projector array (VPA), which is stowed on a single winch drum together with the receiver array and tow cable. With a Curtiss-Wright Defense Solutions-provided winch of 1.8x2.3x2 m footprint, which can accommodate a maximum 650 m towed cable for a total weight of 1,200 kg, in addition to 250 kg for the operator console and the power amplifier, the TRAPS has a maximum operating speed of 17+ knots and a survival speed of 25 knots, although there are plans to upgrade this to 22 knots and in excess of 30 knots. Minimum and maximum operating depths are 10 and 150 m respectively. GeoSpectrum also offers a lighter variant called TRAPS-USV whose overall system weight is reduced by approximately 40 per cent and can be installed on manned and unmanned platforms as small as 12 m long.

L3Harris

In September 2020, L3Harris announced it had been awarded a contract to deliver two Low-Frequency Active Towed Sonar (LFTAS) systems to an undisclosed NATO member. Using proven technology derived from the HELRAS helicopter DS-100 dipping sonar, the LFTAS VDS-100 system is a small, lightweight, air-transportable, ruggedised system which has been successfully deployed on ships as small as 100 tonnes. It features a unique extension/retraction mechanism which transforms a compact tow-body configuration to a large-aperture multidirectional transmitter, to which a two parallel receiving towed arrays package is attached. The latter configuration operates at 1.38 kHz in active mode, together with advanced signal processing, which achieves instantaneous, unambiguous left/right target discrimination, providing full 360° coverage. With an overall weight of just over 6.5 tonnes, including winch & handling, towed subsystem and electronics, the system can operate at depths between 15 and 300 m, and thanks to a robust infrastructure, it is interoperable with the HELRAS helicopter dipping sonar and all key sonobuoys, thereby ensuring tactical bi-static and multi-static capability. L3Harris also offers the Model 980 ALOFTS (Advanced Low-Frequency Towed Sonar), which combines a high-powered active source in a variable depth towed body with a directional towed array in order to receive active and passive signals. The system is in service with the Republic of Singapore Navy's FORMIDABLE class multi-mission

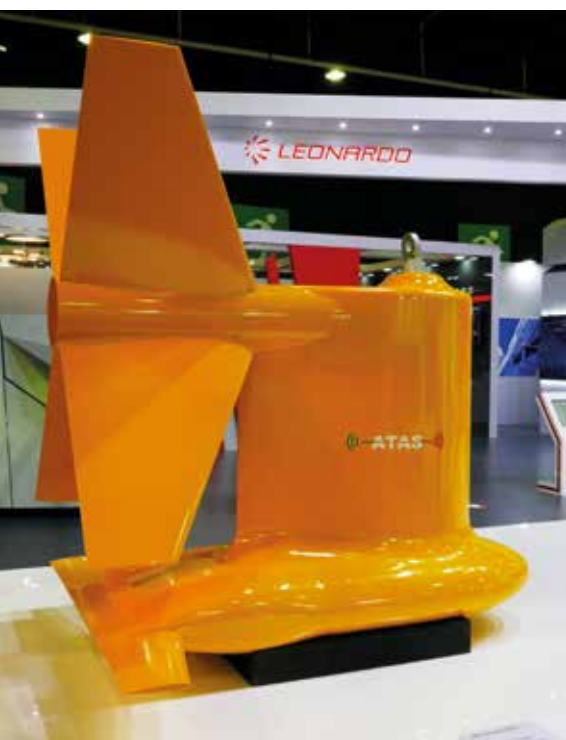


Photo: Luca Peruzzi

Leonardo is proposing its Active Towed Array System (ATAS) low/medium frequency active/passive VDS, characterised by reduced size, weight, and footprint. The system was developed for the Italian Navy's new THAON DI REVEL-class PPA combatant patrol vessels.

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Photo: SEA



The SEA company, part of the Cohort Group, has developed the KRAITARRAY family of low profile miniaturised acoustic arrays for low speed towed or static applications, which was successfully deployed from small manned and unmanned surface and underwater platforms.

frigates and the Israeli Navy on undisclosed platforms, reported to be the SA'AR 5 class corvettes.

Leonardo

Based on the Italian Navy's requirements for an ASW suite to be installed on the THAON DI REVEL class PPA combatant patrol vessels, which cannot accommodate a hull mounted sonar, Leonardo developed the Active Towed Array System (ATAS). The latter is a low/medium-frequency active/passive VDS, characterised

by reduced size, weight, and footprint. The ATAS can simultaneously perform panoramic surveillance and tracking in active and passive modes, manual/automatic classification of threats and interception of sonar pulse and torpedo acoustic head emissions, torpedo alarm, and training. With a maximum operating depth greater than 250 m at typical ASW patrolling speeds, according to Leonardo, the ATAS has a detection range, on "modern submarines" without specifying, beyond the first oceanic convergence zone (60 km in the Atlantic Ocean).

The ATAS is subdivided into modules of less than three tonnes for it to be easily transferable from one ship to another, although procured initially to equip the PPA 'Full combatant' platforms, the first of which is to be delivered in 2024. It has an overall weight of less than 9 tonnes, being composed of a launch and recovery system (LARS) less than 2 m high, towed body and array, power and processing electronics cabinets, local console. Equipped with a single tow line for both transmitting element and receiving array, the towed body presents a main rear cruciform stabiliser allowing for enhanced stability. It weighs less than 600 kg and is less than 2 m long. It incorporates a vertical array transmitter consisting of free flooded rings, which provides, according to the Italian group, omnidirectional transmission with good vertical directivity and high source level. The connected receiving linear array consists of multiple hydrophone triplets allowing left-right ambiguity resolution. The towed body cable has a maximum length of 400 m, while the connected smaller diameter cable adds less than 150 m and features the trailing passive array which is 20 m long.

Patria

In January 2020, Patria was awarded a contract by Saab, the Squadron 2020 combat system contractor, for the design and delivery of a new ASW suite to equip the Finnish Navy's new POHJANMAA class corvettes. Patria is developing a containerised solution called SONAC DTS, offering both active and passive modes of operation with two separate wet-end sub-systems: a VDS and a long TAS. The detection of targets can be performed through passive, monostatic and bistatic operations with these wet-ends set separately to desired depth levels. This enables optimal target detection, location and tracking capabilities in the prevalent environmental conditions and operative situations. In this setup, the system also includes torpedo detection capabilities. The wet-ends are both accommodated in and launched from a Launch and Recovery System (LARS) that has dimensions of a 20-foot standard container. SONAC DTS and its frequency range (including the 7-11 kHz range in the active mode) are optimised for littoral ASW and designed for open water conditions. The lightweight system design is optimised for detection ranges up to 20 km. This dual-tow sonar system also includes real-time processing for the purpose of underwater situational pictures. The graphical user interface (GUI) for the operators

Photo: Ultra Electronics



Ultra Electronics group promotes the SEA LANCER (2nd generation) low frequency active & passive sonar in a single tow together that is ideal for smaller platforms and multi-role ships, according to the manufacturer.

is optimised for combined passive/active operation.

SEA

The Systems Engineering & Assessment (SEA) UK company, part of the Cohort Group, has developed the KraitArray family of low profile miniaturised acoustic arrays for low speed towed or static applications, which was deployed successfully from small manned and unmanned surface and underwater platforms. According to SEA, the latest array iteration extends the range and increases the bearing accuracy, thereby enabling a full ASW capability on small platforms and OPVs. In addition to the ability to link modules together with a length up to 150 m (5-to-20 kHz receive bandwidth), SEA has increased the acoustics sensors' number up to 192, as well as the non-acoustic to 24, improved hydrophone performance, increased the strength to support tow speed of 30 knots and added smart power management. In October 2021, SEA conducted new at-sea trials on a further improved array which will support the next stage in product development.



Photo: S.Deschamps MARINE NATIONALE

The US Navy has chosen the CAPTAS-4 VDS provided by the Advanced Acoustics Concepts (AAC), a joint-venture company between DRS and Thales, to equip the new CONSTELLATION-class (FFG 62) frigates under design and construction contract with Fincantieri Marinette Marine (FMM).

Thales

The European group continues to enlarge the customers' portfolio of its well-established

and successful family of Combined Active Passive Towed Array Sonar (CAPTAS) low-frequency VDSs. During the Sea Air Space 2022 exhibition, The US Naval

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Sea System Command (NAVSEA) confirmed that the CAPTAS-4 VDS provided by the Advanced Acoustics Concepts (AAC), a joint-venture company between DRS and Thales, was chosen by the US Navy to equip the new CONSTELLATION class (FFG 62) frigates under a design and construction contract with Fincantieri Marinette Marine (FMM). Based on the free-flooded ring (FFR) transducers and triplet receiver array technology (to resolve left/right bearing ambiguity), the CAPTAS family was initially based on two products both including independent transmit and receiving arrays: the four-ring CAPTAS-4, specifically designed for ASW frigates of 3,500 tonnes and above and characterised by extended range surveillance capabilities, and the smaller CAPTAS-2 for installation on board ships down to 1,800 tonnes.

With the technological developments and an expanded smaller ASW platform market, Thales offers a CAPTAS-4 Compact version having already registered international success with its lower-end CAPTAS 1 model. With 900-2100 Hz active frequency coverage and wide bandwidth against reverberation effect, the CAPTAS-4 offers extended range simultaneous active and passive 360° surveillance with typical detection range up to 150 km (second oceanic convergence zone in the Atlantic Ocean) and permanent all-round torpedo alert, according to Thales. Already operational in two variants on board UK and Chilean TYPE 23 frigates (Sonar 2087), and on French and Italian FREMMs (CAPTAS-4), including foreign customers (Royal Moroccan and Egyptian Navies),

Photo: Thales - Michel Ricard



Thales offers the smaller CAPTAS-1 with a typical detection range up to 30 km, for installation on Offshore Patrol Vessels (OPVs) down to about 800 tonnes, using a single dependent tow for both the active sonar source and a triplet receiver array.

thanks to its recognised capabilities and technological upkeep, the CAPTAS-4 has been procured for the Royal Navy's new TYPE 26 frigates, as well as its Australian HUNTER class counterparts. It is also being considered or/and is in the pipeline for new Italian (two new platforms) and the Indonesian Navy's FREMM platforms. As anticipated, the latest CAPTAS-4 customer is the US Navy, but no further details have been released on the system procurement.

Thanks to the reusing and rationalisation of CAPTAS family components and hardware, Thales developed the CAPTAS

Compact version, achieving a 20 per cent weight reduction and a 50 per cent reduction in footprint compared to CAPTAS-4 (weighing 34 tonnes and featuring an 84 m² footprint), while maintaining about 90 per cent of the latter's performance characteristics. The CAPTAS-4 compact version comes in two configurations: the independent tow model, which retains a separate towed body and receiver array (25 tonnes in weight and circa 45 m² footprint), and the dependent tow model with the receiver array attached to the towed body (20 tonnes and circa 43 m² footprint), the latter being the same configuration used by smaller CAPTAS 2 and CAPTAS 1 systems.

The launch platform for the CAPTAS-4 Compact version in the independent tow configuration was the French Navy's Frégates de Défense et d'Intervention (FDI), which was recently followed by the Hellenic Navy with the procurement of the same platform from Naval Group, while the Spanish Navy acquired the Compact version in the dependent tow configuration for its new F110 frigates being built by Navantia. Designed for both deep and shallow water operations, the smaller CAPTAS-2 offers long range simultaneous active and passive 360° surveillance (typically up to 60 km – first oceanic convergence zone in the Atlantic Ocean) and torpedo alert, with a <16 tonnes in weight (on the quarterdeck) and <39 m² footprint (including maintenance area).

The CAPTAS 2 was procured for the Royal Norwegian Navy's NANSEN class and Royal Saudi Navy's F4000 frigates, UAE Navy's ABU DHABI class corvette and the



Photo: Thales

Designed for both deep and shallow water operations, the smaller CAPTAS-2 offers long range simultaneous active and passive 360° surveillance (typically up to 60 km – first oceanic convergence zone in the Atlantic Ocean) and torpedo alert. The club of CAPTAS 2 customers growing.

Mexican Navy's POLA platform, while being provided for the Malaysian, Egyptian Navies and with undisclosed GOWIND corvette customers. The Thales CAPTAS VDS family and hull-mounted sonar have been indicated for the Polish Navy's new MIECZNIK class frigates, without specifying the models. Working with the Thales BLUESCAN integrated multi-sensors acoustic system, CAPTAS VDS systems allow bi-static and multi-static operations with the Thales family of hull-mounted sonar, including the BLUEHUNTER, BLUEMASTER and BLUEWATCHER helicopter dipping sonar and sonobuoys. The systems also feature new user-friendly Human-Machine Interface (HMI), introducing 3D analysis and chart underlay to increase situation understanding. Thales also offers the CAPTAS-1 with a typical detection range up to 30 km, for installation on offshore patrol vessels (OPVs) weighing about 800 tonnes, using a single dependent tow for both the active sonar source and a triplet receiver array with a <16 m² deck footprint and weighing 7.3 tonnes.

Ultra Electronics

A key milestone in the development of new ASW capabilities by the Ultra Electronics group was reached in February 2021 when the company was contracted to commence work on the key Variable Depth Sonar (VDS) system for the Canadian Surface Combatant (CSC) – named the Towed Low-Frequency Active Sonar (TLFAS), marking the beginning of the full manufacture and delivery of the sonar suite to equip the new frigates for the Royal Canadian Navy (RCN). 'Optimized for the detection and tracking of stealthy submarines in challenging ocean environments', according to Ultra Electronics, 'when delivered it [the TLFAS] will represent a step-change in Canada's ASW assets and will provide a level of sonar capability never before enjoyed by the RCN'.

Fully designed and manufactured by Ultra in Nova Scotia, Canada, it is expected to leverage on the ongoing research and development activities funded by the Canadian Department of National Defence, as well as on the SEA SABRE VDS currently promoted worldwide by the company. The latter VDS consists of a tow body providing a high power acoustic source (1 to 2 kHz), combined with a QUAD directional passive receive array and its tow cable. With an installation mass (typical configuration) of 12,107 (active) and 8,815 kg (passive) respectively, and a deployment



Photo: Ultra Electronics

Ultra Electronics is working on the Towed Low Frequency Active Sonar (TLFAS) which, together with the same company's S2150 hull mounted sonar and a towed torpedo countermeasure system, will equip the new frigates for the Royal Canadian Navy (RCN), under the Canadian Surface Combatant (CSC) programme.

and recovery speed of 4-to-12 knots, the control of the towed receiver array is independent through use of separate winch and handling systems allowing the receiver array to be located further astern to minimise own-ship acoustic interference. According to Ultra Electronics, its LFA sonar source is ideal where search speed is a critical factor. With the company's Free Flooded Ring (FFR) effectors at its core, the SEA SABRE tow body emits acoustic energy in a toroidal pattern that is uniform in azimuth, each ping providing full 360° azimuth coverage. The SEA SABRE is available in a dedicated configuration for bistatic operation with the hull mount sonar, alongside optional sensors for mammal detection and active interception of torpedo sonars. Within the CSC programme, Ultra will also provide its next-generation all-digital SONAR 2150 hull-mounted sonar, already procured by the UK and Australia, and will lead the integration with sonobuoys and other capabilities for wide-area underwater battlespace surveillance to meet Canada's future strategic needs.

The company also promotes the SEA LANCER (2nd generation) high performance, low-frequency active and passive sonar in a single tow together that is ideal for smaller platforms and multi-role ships according to the manufacturer. Available also in a containerised configuration, with an overall installation mass of 8,690 kg and a 1.5 to 3.5 kHz operating fre-

quency (configuration dependent), the SEA LANCER (2nd generation) consists of a Horizontal Projector Array (HPA), which is a line array of independently driven projector arrays, combined with a receive array of QUAD sensors to provide an LFA sonar with instantaneous port-starboard ambiguity resolution.

As part of the UWSU (Underwater Warfare Suite Upgrade) programme for the RCN's HALIFAX-class frigate, managed by General Dynamics Mission Systems - Canada, Ultra Electronics provides a 3rd generation SEA LANCER LFA VDS where a co-funded (Canadian DoD/Ultra) new thin-line HPA is introduced. In January 2022, Ultra announced that in partnership with Indian company Mahindra Defence Systems, it was awarded a contract for the Integrated Anti-Submarine Warfare Defence Suite (IADS) programme for selected frontline warships of the Indian Navy. According to Ultra, IADS provides a powerful multi-sensor ASW capability using in-line active and passive towed LFA VDS, as well as Torpedo Defence with embedded detection, classification and localisation to defeat detected torpedo threats. Ultra (Australia) also provided the ASW suite for the Australian HOBART class guided-missile destroyers, based on a hull mounted sonar and an in-line active and passive towed LFA VDS, together with torpedo defence system capabilities, for which the company continues to provide in-service support. ■

Controversial but Effective – Dual-Use Military/Police Tech

From guns and ammunition, to body armour, drones, vehicles, anti-terror crash barriers and much more, the list of off-the-shelf equipment, made for either military or policing purposes, but which can equally and effectively be adopted and used by the other, is a long one.

Tim Guest

The operational worlds of military and policing can sometimes mirror one another in tactical approach, technological requirements, as well as other factors, depending on the situation. So, when it comes to equipment procurement there are increasing opportunities for tried, tested and already-available solutions to be adopted quickly, off the shelf, by one or other of these security segments.

This article takes a look at some of the challenges and controversies in the Police off-the-shelf (POTS) and Military off-the-shelf (MOTS) dual-use technology world and, in the run-up to the GPEC General Police Equipment Exhibition and Conference at the end of May in Frankfurt, at a handful of the kinds of systems that fall under this umbrella terminology from just a few of the exhibitors who will be at the event.

Dual-Use Can Be Controversial

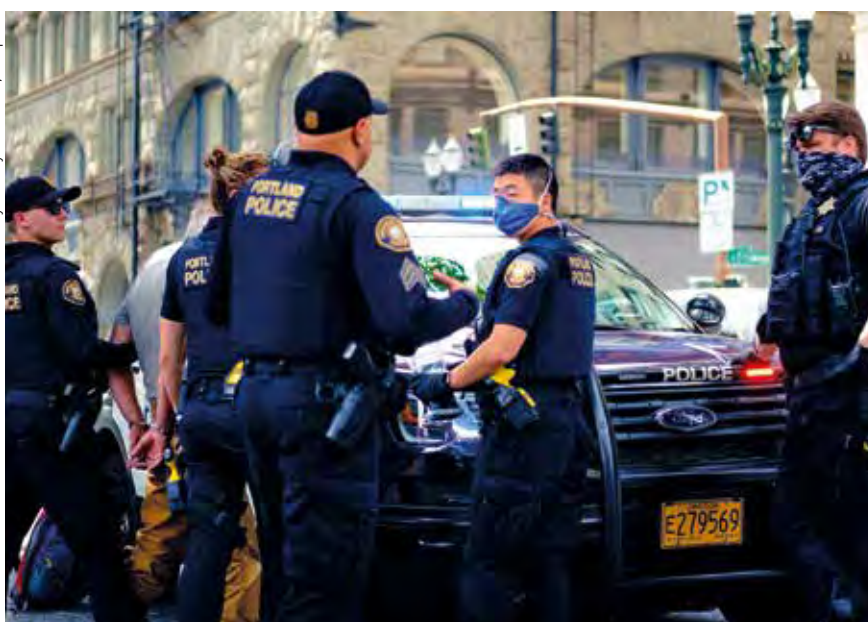
POTS and MOTS dual-use technologies are those systems that increasingly find their ways into the hands of one of these entities from the inventory, or intended inventory, of the other. When it comes to military equipment and 'surplus' being adopted by police forces, this can be a more controversial direction of travel for product on this two-way street, and has raised questions in recent years about the militarisation of police forces in several nations around the globe. In the US, for example, during the Trump Presidency, there was a roll-back on limitations introduced during the Obama years for the uptake of military gear by local municipal and state police forces, with at least

Photo: Koshu Kuniti, Unsplash



Protective gear such as helmets and body armour are typical examples of dual-tech solutions suited to both military and police force operations.

Photo: Portland Police by Wesley McIachlan, Unsplash



The 1033 Programme has been a key enabler in facilitating the transfer of surplus military equipment to civil law enforcement in the US.

Author

Tim Guest is a freelance journalist, UK Correspondent for ESD and former officer in the UK Royal Artillery.



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Overlapping items of dual-use military kit appropriately deployed by the police can be effective in many civil scenarios.

one executive order removing federal accountability as to how such military-style equipment was to be used at local level. The Department of Defense (DoD) so-called 1033 Programme, and similar initiatives, have been key enablers in encouraging and facilitating the transfer of surplus military equipment to civil law enforcement around the country. Since the 1033 inception in 1996, some 10,000 civil policing jurisdictions had received more than US\$7Bn of military-grade equipment by late 2021. Indeed, militarisation of US police goes back to the Reagan-era war on drugs when one programme informally began giving surplus military equipment from the Pentagon to police departments across the US and this initiative became known as the 1033 programme, which was formalised in Congress in 1996.

However, from body armour to armoured vehicles, together with the training to use them, altered perceptions of the police as quasi-military units has, in some cases, had a deleterious impact on police/community relations. Certainly, with the

The GAL VPS from Israel Weapon Industries is designed to protect users during public-order/riot-control missions and other scenarios.

right training, there are many overlapping items of dual-use military kit that can and have been appropriately deployed by the police, such as drones, body armour, optical day/night vision systems, and search and rescue equipment. However, more offensive military systems together with military training regimes, have sometimes resulted in heavy-handed military tactics being inappropriately employed by local law enforcement when dealing with age-old civil/domestic scenarios, once handled satisfactorily by the likes of Officer Krupke and Car 54.

The policing of protests and execution of standard domestic search warrants, for example, have seen some of the most high-profile uses of military-style equipment and tactics, and Special Weapons and Tactics (SWAT) teams also now appear more militarised than ever. During the Obama era, however, there had been efforts to improve oversight and accountability of those agencies responsible for the transfer of military equipment to the police, to ensure what was transferred was needed and used appropriately. A

Body armour specifications and standards deliver product suited to both military and law enforcement use and able to withstand typical threats experienced by both.

working group set up at that time taking input from across the law enforcement spectrum listed a number of prohibited items that should not find their way into the hands of the police. Such items included bayonets, grenade launchers, weaponized aircraft. An additional list of controlled items that could still be procured by the police, though under strict circumstances and only after the provision of justification as to why such items were needed, was also drawn up. The use of controlled items required full and proper training and ongoing reporting as to how the items were being used, although most law enforcement agencies involved already had in place stringent training policies for such equipment; and while these new accountability reforms did ensure improved oversight, no requests from US law-enforcement for controlled items have, as far as is known at time of writing, been prevented in recent years.

But this trend of police militarisation and the transfer of dual-use tech, is not just

the preserve of the US. In other countries, too, police have adopted military-style tactics and equipment, from Colombia, to Nigeria, Hong Kong, to Indonesia, and back to several European nations, including Germany. Indonesia's Mobile Brigade Corps and Special Detachment 88, for example, are heavily-armed paramilitary-style units, which form part of the Indonesian Police. Then there is the GSG-9, an elite German Special Forces, counter-terrorism, policing unit created as a police unit, rather than a military unit to overcome the German federal law prohibiting use of military forces against the civilian population. And while it is controversial that policing has become increasingly militarised around the world, it has created many opportunities for the transfer of dual-use off-the-shelf technologies, though accountability and correct, controlled use of systems is surely prudent.

English Countryside – More Dual-Tech than Pastoral

In the UK, an example of a major police unit adopting increasingly military-style equipment and tactics is the Civil Nuclear Constabulary (CNC), a branch of the Department for Business, Energy and Industrial Strategy, which is well resourced with some 1,100 armed officers tasked with guarding the UK's nuclear energy facilities. Equipped with such tech and equipment as body armour, high-powered assault weapons, drones and other surveillance systems, the CNC is one of the most critical specialist policing units in the UK – for which the adoption and use of military-grade OTS equipment is most suited and justified.



Photo: via author

Pitagone's mobile anti-vehicle barriers will be on show at GPEC.

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A GPEC Snapshot

Conference sessions and presentations at GPEC will cover wide range of subjects, from the use of drones to protective gear in riot-control scenarios covered by a specialist conference session on weapons and protective equipment by the Police Technology Institute of the German Police Academy, to such subjects as the use of vehicles in terrorist attacks against crowds or civil and military buildings and facilities covered by the event's Symposium on Access Protection & Vehicle Barriers. With more than 500 exhibitors expected to attend this year's GPEC event, however, limited space precludes mentioning all but a very few systems relevant in the context of this article.

In the area of body armour and protective suits that will be seen at GPEC will be the GAL Versatile Protective Suit (VPS) from Israel Weapon Industries (IWI), an SK Group member, which is designed to protect users during public-order/riot-control missions and is adaptable to various other scenarios such as search and arrest, dispersal of demonstrators, and more. Its use is not restricted to law enforcement agencies and also includes any security and military forces designated to maintain public order and protect civilians. The GAL VPS (GAL means 'wave' in Hebrew), was launched in Q4 2021 by IWI; since then it has undergone several modifications, enabling the suit to withstand even more significant trauma while maintaining it, according to the company, as the most lightweight protective suit available in the market. The GAL has 4.4 kg and 5.9 kg versions and its design enables it to absorb considerable kinetic trauma by diverting and reducing blows away from the user's body. Following a stringent testing process and crash tests, the system was shown to reduce the effects of potential trauma by 95%. The GAL can be used in conjunction with the company's bulletproof and anti-stab ultralight vest and ultralight ballistic helmet. All IWI systems comply with stringent military and ISO 9000 standards, applied by the IDF.

One of the anti-terror barrier specialists at GPEC will be Belgium company Pitagone whose mobile barriers offer civil and military users versatile solutions for installation in a wide range of scenarios. Its systems are used by military and policing customers across Europe and as far away as Australia and Japan and are designed to withstand head-on impact from vehicles of various sizes and weights, from just a few tons up to around 18 tons, and moving at a wide range of speeds up to and beyond 40 mph.

With SWAT and military users relying heavily on advanced optical solutions for observation and night vision, several optronics players will be at GPEC including Dutch company, Photonis, a leader in the design and manufacture of latest-generation II tubes for military, policing, space and commercial applications. At the GPEC 2022, the company's day/night binocular, TacFusion and its long-range camera system, SR750, will be on display, combining high performance, advanced connectivity and robust housing to support any critical policing or military missions.



The Photonis day/night TacFusion binocular and the company's long-range SR750 camera system will be on display at GPEC.

policing, military or civil orders. Its in-house R&D is one of its core competencies and its reliable system technology means the company is capable not only of fulfilling stringent civil law enforcement needs, but also demanding and specialist military projects. Its thermal imaging cameras can be used, for example, as weapon sights, clip-on (in-line) devices, or for observation tasks in either civil or military scenarios.

Optical Footnote

Vision enhancement technologies are an area of overlap between military and civil/policing where dual-use OTS makes a great deal of sense and in which a number of leading companies offer cross-user solutions. Much like Photonis, German optronics specialist, Vected, for example, specialises in a range of optoelectronic, thermal and II systems and technologies that it can adapt in-house to customer-specific requirements, even for very specialist and small

Photo: Elbit



The UK Home Office has unveiled plans for the National Police Air Service to adopt Elbit's HERMES 900 drone to replace helicopters and fixed-wing aircraft in certain scenarios.

That said, other challenges face UK police forces, including that of rural, organised crime, which targets high-net-worth individuals and their country cribs, as well as stately homes. In addition, the theft of farm and construction machinery is on the rise with organised gangs stealing items such as tractors, diggers, generators and other machinery, often to order, and sometimes for export to eastern Europe. In 2019 alone, rural crime cost the UK £54M, of which nearly £10M was due to farm vehicle theft. So, in the summer of 2021, a new specialist police unit was created to combat the situation -- the Agricultural and Construction Equipment (ACE) unit -- with the aim to monitor and prevent such crimes. Helping them to do this, equipment such as commercial and military-grade drones together with optical solutions such as latest-generation night vision goggles (NVGs) and other image intensification (II) systems are being employed; such equipment is already actively in use with other rural police units, such as the Avon and Somerset Police Rural and Wildlife Crime Unit, which uses drones and NV/II devices in the course of its often-nocturnal efforts to stamp out widespread wildlife

crime, poaching and machinery theft. There are currently around 300 drones in use across the UK with different police forces. In late 2020, the UK Home Office actually unveiled plans for the National Police Air Service (NPAS) to adopt Elbit's Hermes 900 military-grade drone to replace helicopters for missions in which unmanned systems would be suitable. The Israeli system trialled by the NPAS and the Maritime and Coastguard Agency, has a 15-metre wingspan, weighs 970 kg, and can fly for up to 36 hours at altitudes of 30,000 feet. The trial included a series of simulated police aviation scenarios currently conducted by 19 helicopters and four fixed-wing aircraft in support of the 43 police forces of England and Wales and British Transport Police. Procurement status is unclear at this time.

But once again, the militarisation issue raises its head, for while the UK's Home Office initially looked at the system in the context of replacing police fixed-wing aircraft and helicopters in the pursuit of suspects, looking for missing persons, or observing major incidents on the ground, such as road traffic accidents, government officials suggested



Photo: Impact Defender, Rosehill Security

One of GPEC's key symposia will be on Access Protection & Vehicle Barriers.

that surveillance of protests and other peaceful, legitimate events might also be scenarios for which the Hermes 900 could be used and Home Office studies

are currently in play looking at drones with facial recognition capabilities, which may become controversial if and when more details emerge. ■



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Acquisition Programmes in South-Eastern Europe

Manuela Tudosia

Since the Balkan Wars, or even the collapse of the Soviet Union, never has attention been so high on South-Eastern European countries.

This region is highly diverse and even defining its geographical boundaries is subject to endless debates, a topic not addressed in this article. Except for Greece – an old NATO member – what many of these countries have in common today is their NATO membership acquired at various stages in the last 20 years. Some today are older members, like Romania, which can also be seen as located in the south-eastern part of Central Europe...Others are new members, like North Macedonia.

Another common feature of these countries is the steady increase of their defence spending over the last decade, in response to the 2 per cent of GDP defence investment guideline defined in 2006 and reaffirmed at the Wales NATO Summit in 2014.

Based on the latest NATO estimates, in 2021, Croatia ranked in the top three, contributing 2.79 per cent of its GDP. Romania was expected to reach 2.02 per cent. Nearing 1.5 per cent or beyond – but still under 2 per cent – were Albania, Bulgaria, Montenegro and North Macedonia.

For the same year, these nations also stand out regarding the target of 20 per cent expenditure on equipment as a share of defence expenditure. Albania was expected to reach 21.3 per cent, Bulgaria 24.8 per cent, Croatia 43.5 per cent, Montenegro 20.8 per cent, and North Macedonia 25.6 per cent. These figures

Photo: GDELS



A PIRANHA 5 with an Elbit turret qualified for Romania

were probably also influenced by major acquisitions contracted in 2021, such as the purchase of 12 RAFALE fighter jets by Croatia or the 54 STRYKER-type light armoured vehicles by North Macedonia. Depending on the sources and the method of calculation, data on defence spending can vary but the upward trend in South-Eastern Europe remains a constant.

What Impact of the War in Ukraine?

One may ask if the conflict in Ukraine will trigger needs that are specific to the return of high-intensity conventional warfare in these countries' immediate vicinity. This will probably depend on each country's pre-existing capabilities as well as on their respective infrastructure, their civil resilience plans, but also on the level of exposure to the risk of actual conventional conflict on their territory. An additional layer, somewhat specific to the current conflict, is their existing preparedness to defend against CBRN threats

– both in military and in civil protection scenarios.

However, the major defence acquisition programmes result from multiannual and annual programming underpinned by risk analysis where high-intensity conflict scenarios were probably considered, among others. The situation in Ukraine is unlikely to change these priorities but it is likely to accelerate the pace of acquisitions already planned and to render more salient specific requirements. In some cases, it is also likely to trigger an increase of current defence budgets and purchases in larger quantities.

Romania – Increase in Defence Budget

The Romanian president announced in March the intention to increase the country's defence budget from 2.02 per cent to 2.5 per cent of GDP. A plan will be proposed by the end of 2022 detailing how this additional budget will be spent. Romania's high-level strategic priorities are formulated in the National Defence

Author

Manuela Tudosia is government affairs expert in defence, and contributor to the NATO Industrial Advisory Group and NIAG Industry Interface Group. She is also founder of the Pole CM [Civil-Military Innovation Network], initiative that provides strategic advice to Small- and Medium-Sized Enterprises in defence.

Strategy for 2020-2024. An additional Defence Strategic Analysis and a White Paper provide details on directions for capacity development in the 2040 horizon. The first stage is to complete the Armed Forces Modernisation Programme 2026, started in 2017 and estimated at more than €9.8Bn. The country has already several ongoing acquisition programmes, some considered a priority:

- 227 PIRANHA V 8x8 armoured vehicles acquired from General Dynamics European Land Systems;
- The PATRIOT surface-to-air missiles acquired through US Foreign Military Sales (FMS);
- The High Mobility Artillery Rocket System (HIMRAS) and Guided Multiple-Launch Rocket Systems (GMLRS), also procured through FMS;
- An existing F-16 squadron (17 fighter jets) purchased from Portugal, and an intention announced at the end of 2021 to acquire two more squadrons (32 fighter jets) from Norway.

The situation in Ukraine has rekindled an older debate on the need to procure amphibious armoured vehicles, since this feature was not included in the original contract for the PIRANHA V acquisition. Modernisation of the Navy was supposed to be addressed notably through the competition won in 2019 by Naval Group in partnership with Santierul Naval Constanta to build four GOWIND naval



Photo: Damen

Damen is proposing its GOWIND design for Romania's frigate programme.

corvettes and to renovate two existing T22R frigates. However, the signature of the contract worth €1.2Bn was delayed, first by a legal challenge from the competitor Damen, and currently by ongoing negotiations of contractual clauses. Another recent high-visibility acquisition is that of UAS class II tactical-operational drone systems. The signing of the contract with Elbit Systems, which cooperates with Romania's Avioane Craiova and Romaero, is expected in the first half of 2022.

Next in line for the start of a competition process is most likely Phase 1 of Stage 1 for the acquisition of C4I systems with ISTAR integration capabilities. A Command Point - Brigade Type will be procured during Stage 1 according to the government decision published at the end of March 2022.

Bulgaria – Acceleration of Modernisation Procedures

In February, President Radev announced upcoming government measures to accelerate procedures for the modernisation of the armed forces and for maintenance of existing equipment. Proposed measures are to be submitted to Parliament for consideration this year.

Until 2020, capability development was guided by the Plan for Development of the Armed Forces 2020, based on the 2010 Defence White Paper. However, some intended programmes have been marked by delays, such as the acquisition of Multipurpose Offshore Patrol Vessels (OPVs), finally awarded to German shipyard Lürssen in November 2020 for an estimated €503.1M. In 2019, the government agreed to invest US\$1.2Bn in the acquisition of eight new F-16 Block 70 fighter jets via FMS. Expected delivery delays of two years were announced recently, explained by supply chain disruptions caused by the COVID pandemic. In the meantime, Spanish EU-ROFIGHTERS and Dutch F-35s will be used to protect the country's airspace.

Bulgarian special forces were recently equipped with armoured vehicles delivered by SAMARM, a joint venture between the UAE International Armoured Group and the Bulgarian Samel-90.



Photo: Lockheed Martin

Bulgaria wants to buy eight new F-16 Block 70 fighter jets via FMS.

Photo: US Army



Croatia is about to receive 76 BRADLEY IFVs.

Photo: Dassault Aviation



Croatia just bought 12 French multipurpose RAFALE F3-R fighter jets.

Photo: US Army



In 2021, North Macedonia acquired 54 STRYKER light armoured vehicles.

A Programme for the Development of Defence Capabilities 2032 was endorsed by the National Assembly in February 2021. The new programme prioritises 38 minimum capability requirements. Among the priorities implied in the programme are new 3D radars, remote-controlled systems and drones (and protection against such systems), situational awareness and electronic warfare capabilities, or high-precision strike systems.

A Programme for Development of Defence Capabilities 2032 was endorsed by the National Assembly in February 2021 and is planned for implementation in two stages: 2021 to 2026 and 2027 to 2032. Bulgarian Minister of Defense Zakov's declarations at a press conference held on 29 March, confirmed several modernisation projects that were envisaged in the medium-term Plan 2021 – 2026, focused on artillery support capabilities; three-coordinate radars; building air defence systems for site and zone coverage; unmanned aerial vehicles (for all forces); multi-purpose diesel electric submarines; and basic combat equipment for the construction of battalion battle groups of the mechanized brigade. The acquisition of ammunition for the Navy, of coastal antimissile complexes and of field communication equipment were also announced in the same context. Although these could be considered as sub-sets of the 2026 planning period, the Ukrainian experience has probably heightened their urgency.

Croatia – A New Long-Term Development Plan?

President Milanović's declarations before the onset of the war in Ukraine - that Croatia would recall any troops from the country if the conflict escalated was followed by disagreements with the government, generated considerable political embarrassment, and which included an apology from the prime minister stating that no Croatian troops were deployed in Ukraine anyway. However, the recent crash of a Soviet-era drone on its territory, was a wake-up call regarding potential defence shortcomings. This may trigger, among others, more investment in the air defence system.

The Croatian Armed Forces Long-Term Development Plan 2015 – 2024 defines the acquisition priorities for the above-mentioned timeframe. In recent years, the highest visibility project was the acquisition of 12 French multipurpose RAFALE F3-R fighter jets for an estimat-

ed €999M. For the Army, the procurement of fighting vehicles was a priority, and it was recently confirmed that 89 second-hand BRADLEY M2A2 infantry fighting vehicles would be acquired for US\$145.3M. Man Portable Short Range Air Defence Systems (MANPADS) and engineering equipment were also among the priorities contained in the 2015-2024 plan. Offshore Patrol Vessels, Coastal Patrol Boats and Anti-Ship Missile Systems were priorities for the Navy. Currently, a new long-term planning document is expected, covering most probably the timeframe 2022 - 2033.

North Macedonia – Vast Modernisation Potential

The country joined NATO in 2020. With much of its equipment inherited from the former Yugoslavia, the modernisation potential is vast. The 2018 Strategic Defence Review (SDR) and the Long-Term Defence Development Plan 2019-28 outline the priorities.

Precedence is to be given to those capabilities arising from the country's commitments to NATO membership, namely: one Light Infantry Battalion Group; two transport/utility helicopters Mi-8/17; one Ranger (light infantry) company; two Special Operations Force teams; one Engineer platoon; one demining team; one Military Police company; and one Role 2 Basic Land Medical Treatment Facility.

A recent high-visibility acquisition in 2021 was of 54 STRYKER light armoured vehicles and related equipment through FMS, worth about €176.3M. The principal contractor is General Dynamics Land Systems. Oshkosh Defense will also deliver Joint Light Tactical Vehicles (JLTV) as part of a wider contract to supply several FMS customers.

Other priorities highlighted by the SDR are tactical communications systems, engineer equipment, cyber-defence capabilities, indirect fire capability, individual and collective CBRN and ballistic protection equipment, ISTAR capabilities and equipment for the integration of communication core network and services.

Albania – Committed to Fulfil Defence Investment Targets

In the context of the crisis in Ukraine, the Albanian Minister of Defence reaffirmed the country's commitment to fulfil defence investment targets by 2024.



Photo: US Army

Montenegro bought 67 JLTVs from Oshkosh Defense.

The Albanian MOD plans in 2022 to revise its Long-Term Development Plan 2016-2025 in view of a new version covering the 2022-2031 horizon.

Modernisation will be focused on the development of capabilities for the Light Infantry Battalion Group, the establishment of deployable and static communications, and for cyber defence.

For the Air Force, the most important infrastructure project is the construction of the Kuçova Air Base, as a NATO tactical base.

For the Navy, the modernisation of the integrated Maritime Space surveillance system is taking priority.

The Support Command is also likely to be equipped for a range of operational needs, with maintenance and repair, as well as with CBRN monitoring capabilities.

Montenegro – Small but Key

Montenegro has one of the smallest armed forces in Europe, having joined NATO in 2017. Its Long-term defence development plan covers the 2019-2028 timeframe. According to the local media, around €215M is envisaged for the procurement of equipment by 2028. A contract worth about €3.26M was signed in 2020 with the Canadian Commercial Corporation for the acquisition of two Bell 505 JET RANGER X helicopters, manufactured by Bell Textron Canada. The country is also set to receive 67 JLTVs from Oshkosh Defense, 20 of which having already been delivered in 2020.

Although a small country, Montenegro is key for stability in the Western Bal-

kans. The government has initially delayed imposing sanctions on Russia due to internal political divisions.

Conclusion: Interoperability more Important than Ever

In addition to the high-visibility acquisition programmes, it must be stressed that many countries in the region are hosting multinational troops and/or infrastructure. This can involve investments either through multinational funding or directly by the host nation.

For example, Romania hosts the NATO Multinational Division South-East HQs, Croatia hosts a Multinational Special Air Force Training Centre and North Macedonia, the South-Eastern European Brigade.

The US Special Operations Command Europe recently announced that its forward-based headquarters will be located in Albania. NATO Force Integration Units are already based in Bulgaria and Romania. Following the 24 March NATO extraordinary Summit, four new NATO battlegroups were announced, two each in Bulgaria and Romania.

As efforts to strengthen the Eastern flank of NATO continue, reinforcing interoperability across the spectrum of military domains will certainly become more important than ever and will probably have practical implications on most procurement decisions. Given that many South-Eastern European countries have joined NATO relatively recently, investment in interoperability – including for communications – will likely continue to be a top priority in the years to come. ■

Enhanced Urban Assault

Alex Horobets

Whatever high-tech weapons an army possesses, and whatever the conflict - local or large-scale – the armed forces one way or another will have to engage in urban warfare, where a peculiar set of rules apply.

At the current stage of military technological development, modern conflicts and military operations are unfolding amidst a new set of conditions. Over the past decades, wars have become fundamentally different, although, of course, some examples, including Afghanistan, Iraq, and Syria, prove that certain traditional elements are still being preserved, involving massive offensive operations and the use of infantry and aircraft over large territories.

The option of a nuclear deterrent has been in place since the Cold War. Accordingly, world powers are developing new and more effective methods of coercion. In this context, a wider range of economic, diplomatic, informational, and psychological means of influence are also being employed.

Due to the spread of non-military tools, warfare tends to be classified, either as traditional or non-traditional. Therefore, many goals can be achieved without actually deploying a regular army, but only by applying strategies on the margins of war and peace. Furthermore, regular troops, in the form of a limited contingent, can be involved over a shorter period – at critical moments, while the main functions of maintaining the combat effectiveness of territories are entrusted to puppet regimes, as done by Russia in the Donbas region of eastern Ukraine. Moreover, in those short periods when regular forces are deployed, their affiliation to a particular country remains concealed, as was the case during the Russian annexation of Crimea in 2014 when the troops operated without insignia and their military hardware carried no markings.

In modern realities therefore, a large-scale war is becoming increasingly less likely due to the enormous economic and human losses it implies. New forms of achieving strategic goals by unleashing local conflicts in combination with economic, political, and media influence on the enemy have turned out to be much more effective. However, this doesn't mean a large-scale war is off the table.

Photo: Pexels / Khaled Akacha



Idlib in Syria has been the scene of intense urban combat.

In late 2021, the world's attention was focused on the threat of China's military incursion into Taiwan during the massive militarisation of the South China Sea region by the Chinese military, coupled with the wider presence of China's warplanes in the region, as well as a spree of military exercises. Also, in the fall of 2021, a series of articles were published in the European and American media regarding the build-up of some 120,000 Russian troops on the borders with Ukraine, which threatened another Russian invasion. As Russia would suffer enormous losses in the event of such an offensive, including due to guerrilla resistance across the country, it remains more profitable for Moscow (and less risky for its international reputation) to exploit the very threat to achieve certain goals in negotiations with Western powers (including sanctions lifting, successful certification of the Nord Stream 2 gas pipe, etc.). However, as history shows, the line between war and peace amid the prolonged presence of a huge number of troops in the border areas can be quite thin.

Whatever high-tech weapons an army possesses, and whatever the conflict - local or large-scale – the armed forces one way or another will have to engage in urban warfare, where a peculiar set of rules apply. While the advantages of armoured vehicles are obvious in open terrain, their use in an urban landscape could become a liability. Moreover, in urban face-offs, the potential of developed armies is pretty much the same as that of the Taliban, since most clashes involve small arms used at close range.

Urban Warfare – the New Reality

For several decades, many armies were one way or another engaged in hostilities in urban settings. After all, it was the capture of key cities that was and remains the most important strategic element of any military operation. For example, in the summer of 2021, the Taliban rapidly seized the provincial capitals across Afghanistan and after the second and third most populous cities – Kandahar in the south and Herat in

the west – fell, Kabul didn't hold out for long. By taking such large cities, the Taliban proved its weight, resulting in a beneficial propaganda effect.

In 2014, two cities in eastern Ukraine, Donetsk and Luhansk, became centres of self-proclaimed "people's republics." The pro-Russian separatists, who have enjoyed Russia's covert support, focused on taking over local government buildings, which would allow them to proclaim "people's power" in the region. Thus, the ability of armed forces and special operations units to run effective urban missions will play a key role in modern and future military conflicts.

Urban Warfare

Urban combat is different from open field combat at both the operational and tactical levels. The situation is further aggravated by landscape and civilian presence, with civilian infrastructure sites turning into firing points. Typically, urban terrain is less advantageous for the attacking side, as local forces are able to set up complex defensive systems, set numerous traps, plant explosive devices, and engage the enemy from hard-to-spot



Photo: Vadim Savitskiy/ MoD Russia

Russian and Belarusian forces take part in ZAPAD-2021, a large-scale annual military exercise, at the Mulino training ground in the Nizhny Novgorod region of Russia, in September 2021.

locations. Moreover, the pace of convoy movement through city streets is usually hampered by barricades and debris, which create additional ambush risks. The likelihood of being hit by sniper fire naturally increases.

Combat in an urban environment minimises the advantages of any given side, especially as the effect of artillery and air support (excluding surveillance drones), as well as armoured vehicles, is minimised. For example, small groups of soldiers using

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Photo: U.S. Army / Sgt. Jeremiah Johnson



Mosul, Iraq -- Stryker brigade combat team search for insurgents.

man-portable anti-tank missile systems, are able to effectively ambush and also destroy convoys of modern armoured vehicles. ISIS fighters would set up their headquarters and hospitals in densely populated civilian neighbourhoods, thus making themselves almost invincible to aviation and artillery.

There are also plenty of peculiarities related to the urban landscape. Battles in such terrain can be fought in one building on several floors at the same time, including basements and roofs. Furthermore, many cities host an extensive network of sewers and tunnels, including subways. The defender is usually much more aware of these features, being able to move stealthily across city districts. For example, in Mosul and Raqqa, a network of underground tun-

nels was eventually discovered, which had been used by militants to move between the zones of hostilities, supply weapons, as well as capture and destroy positions held by government forces. These tunnels were equipped with a video surveillance system, communications equipment, and proper lighting. This all creates huge issues for the attacking force.

For the effective use of units in urban operations, they must be trained in close combat tactics, namely, the use of particular weapons and ammunition, night vision devices, and equipment aimed at ramming doors or destroying walls, removing the enemy from confined spaces, etc. For such purposes, many governments set up massive training grounds replicating an urban environment. However, Baghdad in 2003

had a more complex environment than can be recreated in the most advanced training centres.

Armoured Vehicles in Urban Warfare Conditions

At the macro level, in the context of military development and procurement of military hardware, the issues of adapting certain armoured vehicles to urban combat or developing combat control systems in such conditions are now being addressed. Urban warfare requires close interaction between infantry and armoured vehicles, since tanks and armoured vehicles deployed in city streets without infantry leads to large losses of military hardware. Infantry operating without the support of heavy military hardware is also of little to no effect. Modern realities are such that most armies remain more equipped and combat-ready for war on rough terrain than for urban warfare.

Improving the survivability of vehicles for urban combat has certain criteria, but making a balanced vehicle is difficult, meaning that some elements have to be sacrificed. Armour protection of existing combat vehicles in urban combat cannot provide all-round protection from above and below, making them easy targets even for RPGs and improvised explosive devices (IEDs). There is no obvious solution regarding the preference of wheeled/tracked vehicles in urban combat. On the one hand, wheeled combat vehicles are more mobile, while on the other hand, tracked combat vehicles are capable of turning 360 degrees on the spot and are more manoeuvrable in rubble and among debris.

Other requirements for military equipment in urban conditions include a large angle of gun elevation for firing at the upper floors of buildings; an additional remote-controlled machine gun; high manoeuvrability; comprehensive armour protection not only in front, but also on the sides, rear, as well as IED protection at the bottom; improved all-round visibility, and additional orientation sensors.

Equally important is specialised engineering equipment to ensure stable operation amid the ruins, blockages, and enemy barricades. Therefore, the deployment of armoured bulldozers, as well as engineering means of demining, contribute to mission success.

Robotics and UAVs

In many aspects of future urban battles, the share of the use of robotics and drones

Image: Rheinmetall



The LYNX infantry fighting vehicle

will further increase – by all sides. The use of such robotic technology is required to gather situational intelligence data, engaging designated targets, demining, and fire spotting. Light tracked or wheeled robotic systems, being several times smaller than standard hardware, have a higher cross-country manoeuvrability, as well as a significant level of protection. They are able to overcome obstacles and operate in the dark. Entrusting such tasks to robots will lead to a significant drop in casualties.

While ground-based robotic equipment is now used mainly for reconnaissance and demining, tactical UAVs are already of a wide use across the armies. The drones are small in size, able to fly along streets and between houses, as well as peep into the windows, which raises awareness of concealed enemy positions. The situation will change dramatically when drone swarms become common. DARPA is currently developing small UAVs able to operate in a swarm, while collecting data or interrupting enemy operations.

In 2016, DARPA launched the OFFSET programme to develop software that allows combining up to 250 different robots and UAVs into a single group, which will be set to address issues as one, with over 100 options for tactical action available. In 2019, the US military tested a group of various kinds of robots. They simultaneously conducted reconnaissance, made a map of the location of all buildings in the designated area and ensured the safety of QR tags, designated by operators as priority.

In November 2021, DARPA launched tests under the OFFSET programme with the participation of Northrop Grumman and Raytheon. The military tested the operator's ability to control a swarm of 200 unmanned systems. In the summer of 2021, Israeli defence officials reported that they conducted more than 30 operations using drone swarms. According to the report, this was the first combat use of drone swarms. Drones would collect data, as well as locate and engage Hamas militants. At the same time, all drones were controlled by a single operator.

To adapt combat vehicles to the modern combat realities (including taking into account urban warfare conditions), the US Army launched the Next Generation Combat Vehicles (NGCV) programme. One of the projects within the NGCV is Optionally Manned Fighting Vehicle (OMFV), aimed at developing a vehicle to replace the M2 BRADLEY. Although the BRADLEY remains a fairly powerful vehicle, the US Department of Defence believes that the vehicle cannot accommodate additional technol-



Photo: Textron

A team made up of Textron Systems, Howe & Howe and FLIR Systems debuted, Inc. debuted the RIPSAM M5 unmanned vehicle at the 2019 Association of the United States Army's annual meeting.

ogy that will prove crucial for survival and victory in the future battles. In July 2021, the US Army announced it was selecting five competing firms to participate in OMFV – American Rheinmetall Vehicle, BAE Systems, General Dynamics Land Systems (GDLS), Oshkosh Defence, and Point Blank Enterprises.

In August 2021, American Rheinmetall Vehicles showcased the concept of a combat vehicle it is developing as part of OMFV. For the project, Rheinmetall took the LYNX KF41 infantry fighting vehicle, designed specifically for Australia. Rheinmetall's project boasts of high survivability, mobility, and agility, high firepower, a large payload, and the ability to adapt to various combat operations thanks to modular survival systems. Also, thanks to its modularity, it is capable of being continuously upgraded with the latest technology throughout its service life, which is one of the programme's requirements.

Another programme is the Mobile Protected Firepower (MPF) to create a new generation of light tanks to provide support for infantry and penetrate enemy defences, including in urban environments. After considering the proposals available, two prototypes remained – by General Dynamics Land Systems and BAE Systems. After determining the winner, the production of the first 26 vehicles is set to kick off in 2022.

Also, the US Army Command intends to supply light, medium, and heavy robots to the troops as early as 2028. Prototypes will be developed by the consortia of Textron and Howe & Howe, as well as QinetiQ North America and Pratt & Miller. Also, HDT Global and Oshkosh will be involved. The use of such robots will become a priority in urban environments.

In 2019, the consortium of Textron and Howe & Howe presented their RCV RIPSAM M5 medium tracked combat robot project. The robot weighs 10 tonnes, with a payload of 2.7 tonnes and is armed with a 30 mm gun. The robot's systems are capable of detecting and classifying targets, as well as engaging them at the operator's command.

Lighter robotic platforms such as WOLFG by HDT Global Hunter or RCV-Light vehicle prototypes by QinetiQ North America – Pratt Miller are capable of carrying up to 500 kg in payload, being able to have 7.62 mm or 12.7 mm machine guns installed, along with a variety of detection and surveillance systems. Also, these robotic platforms are equipped with armour protection against shells and boast a range of about 100 km.

Conclusion

The experience of hostilities over the past decades in different regions of the world has shown that future wars will definitely take place in urban areas, therefore, with a varying degree of success, governments are adapting and training their infantry units to conduct operations in urban settings. There is also an ongoing effort to renew the fleet of armoured vehicles, for which increased survivability in urban battles, increased firepower, and modern sensor systems are already mandated. Meanwhile, the introduction of different variants of robotic platforms for reconnaissance and offensive operations will soon change the rules of urban warfare, as it once was with drones. As for the unmanned systems, the next step in their development is swarms and operations in urban environments, alongside ground robots. ■

Light Tactical and Utility Vehicles

Sidney E. Dean

Many 4x4 light military vehicle types are designed as multitaskers. Depending on configuration, they can deploy as reconnaissance or liaison vehicles, conduct light strike missions, support dismounted infantry with a variety of weapons, act as tactical troop transports, or carry out logistics missions including battlefield resupply.

While some rely solely on speed and manoeuvrability for survival, others can be fitted with removable modular armour. Depending on total weight as well as mission profile, some permanently protected vehicles can also be classified as light tactical vehicles.

North America

JLTV

An eight-year production contract for the Joint Light Tactical Vehicle (JLTV) was awarded to Oshkosh Defense in 2015, with the understanding that a competition for a follow-up contract award would be conducted for continued procurement after completion of the initial award period. More than 15,000 of the 16,901 vehicles called for under the initial contract have been delivered to date, primarily to the US Army and US Marine Corps (USMC). Deliveries under this contract will continue through 2024. International sales of the JLTV continue to intensify. Export permits have been awarded to seven nations, including several NATO-frontline nations in Eastern Europe. The largest potential acquisitions have been approved for the UK (up to 2,447 vehicles) and Lithuania (up to 500 units, although to date only 200 have been ordered for delivery through 2024). The JLTV Family of Vehicles (FoV) is a classic example of multitasking. There are two basic variants: the four-seat Combat Tactical Vehicle (CTV) with a 1,600 kg payload, and the two-seat Combat Support Vehicle (CSV) with a 2,300 kg payload. Both variants can tow a cargo trailer specifically configured for the JLTV. The CTV can be configured for three mission types: General Purpose (including transport of a four-person fire team), Heavy Gun Carrier, and Close Combat Weapon Carrier. Weapons options include turret-mounted guns up to 30mm, anti-tank missiles (ATMs), short-range air-

Photo: US Marine Corps



An MATV beside a Humvee in Iraq

Photo: USAF



The MATV climbs a 60% gradient and crosses a 50 cm trench.



Road testing the Arquus SCARABEE

defence missiles, and a 120mm mortar. The heavier weapon options make the JLTV a viable combatant even in peer-level conflicts, providing fast-moving light infantry units a powerful offensive capability.

The CSV is designed for the Utility and Shelter Carrier mission. Depending on the mission, the open-bed cargo space can be directly loaded with equipment and supplies, or it can be outfitted with a specialised utility shelter or shell. The latter permits deployment of the vehicle in various specialised roles, including as a field ambulance, repair/maintenance vehicle, or communications/command vehicle.

The JLTV's versatility has been further proven by the development of additional operational concepts, primarily for the CSV. These include equipping the CSV with a Boeing SHORAD Air Defense (SHORAD) turret; mounting a 105mm howitzer on the cargo bed to create a mobile artillery capability for light infantry units; and deploying Kongsberg Light Strike Missiles on a modified unmanned JLTV chassis to create a mobile shore-based anti-ship missile capability.

Payloads only account for a portion of the JLTV capabilities package. Its manoeuvre profile is essential for maximising offensive and defensive capabilities and the ability to access terrain which would



The SCARABEE compact armoured vehicle with remote weapons turret

stymie heavier vehicle types. Oshkosh's proprietary TAK-4i intelligent independent suspension system uses compressed nitrogen to automatically adjust to driving conditions, enhancing the ability to master broken terrain while easing occupant discomfort.

The JLTV programme office released the solicitation for the follow-on procurement contract in February 2022 (with a closing date of 12 April 2022 for bids). In addition to Oshkosh, competitors are expected to include AM General, GM Defense and Navistar Defense. The single-award contract for delivery of 16,600 vehicles will have a five-year duration.

Product Feature: Dencrypt A/S

Defining Dynamic Encryption

Dynamic Encryption is a "moving-target" defence strategy applied to cryptography to ensure any potential breach only reveals a single data transmission's contents. Subsequent transmissions are encrypted differently. Adding an encryption layer on top of an existing fixed encryption algorithm provides extra protection. As Dynamic Encryption is constantly mutating, cryptanalysis – code breaking – is rendered practically impossible. While special devices or channels are often necessary for highly secure communication, it is not a practical solution for daily communication of any form.

A few tech leaders like Dencrypt integrate Dynamic Encryption into their smartphone apps, meaning special equipment is not necessary for voice or video calls and messaging. This makes any Smartphone a confidential communication tool. Be-

cause Dynamic Encryption data is useless to a hacker, encrypted communication smartphone apps inexpensively combine convenience and security when using exposed mobile phone networks.

According to Dencrypt, Dynamic Encryption can protect other communication channels and applications. Soon, a new enhancement will avail Dynamic Encryption for communication systems with both fixed-line and mobile devices in one coherent and secure network. Requiring only a small computational overhead it can be used in applications where bandwidth is expensive or scarce.

With the 5G roll-out, there is a vast increase in Internet of Things (IoT) devices. Many "IoT" devices transmit sensitive data, so require the advanced security that Dynamic Encryption affords. Dencrypt confirmed it is actively engaged in the



development of quantum-safe encryption and will offer solutions that are resistant to hacks or attacks by both "normal" and quantum computers. Such is the pathway for current and future data and communications security.

Photo: GD-ELS



The Danish Army has acquired 36 EAGLE V vehicles, primarily for the reconnaissance mission.

A selection is expected during the fourth quarter of fiscal year 2022 (July-September 2022).

The JLTV produced under the follow-on contract will be designated the A2 variant. The programme office is planning some performance upgrades for the A2. The current Banks Power-modified GM Duramax engine will be replaced by the next-generation engine by the same manufacturer. Modifications to the alternator, drive gears and vehicle insulation will reduce the acoustic profile, both externally and within the passenger compartment. Improved fuel efficiency is another goal. One solution here is the planned utilisation of lithium-ion batteries to power on-board electrical systems while the vehicle is stationary, reducing the need to idle the engine. Externally

mounted cameras will provide vehicle occupants with a 360-degree situational awareness. Delivery of the first A2 production units is expected in 2025.

ISV

One drawback of the JLTV is the limitation to only four soldiers per vehicle. The US Army is acquiring the Infantry Squad Vehicle (ISV) as a light tactical vehicle capable of transporting an entire nine-member infantry unit including heavy crew served weapons (machine guns, ATMs) and 72 hours worth of supplies (payload capacity 1,450 kg). In 2020, the Army selected General Motors to develop the ISV on the basis of the commercial Chevrolet COLORADO ZR2 pickup truck. The militarised design features a com-

pletely new hull, but otherwise retains 70 percent commonality with the civilian truck, including the multimatic DSSV dampers that enhance off-road performance. Being smaller and lighter than the JLTV, the ISV can be transported internally via CH-47 or sling-loaded beneath a UH-60 helicopter. The 2020 contract calls for procurement of 649 vehicles out of a long-term goal of 2,065 vehicles.

A report issued in February 2022 by the Pentagon's Director of Operational Test and Evaluation (DOTE) criticised the ISV's performance during Initial Operational Test and Evaluation (IOT&E) in August 2021. Negative design aspects included insufficient space for the required 72 hours worth of supplies; the lack of side panels or a top, which exposed soldiers to injury while traversing forest terrain; the lack of an integrated communications system which hampered situational awareness; and difficulty accessing and deploying weapons while the vehicle is moving. Structural faults were also noted. These manifested primarily during the IOT&E's desert scenario, and resulted in intermittent loss of steering capability, and engine cracks and failures.

Overall, the IOT&E report found that the design was "not operationally effective" for combat or engagement and security cooperation missions in a peer-level conflict. On the positive side, it praised the vehicle's agility, cross-country capability, and low acoustic signature. "The ISV allows an infantry unit to move over extended distances rapidly, reducing fatigue," the report noted. The Army took issue with some conclusions, stressing that the operating concept did not call for the ISV to engage in combat; rather, it is conceived as a personnel transport, with infantry dismounting upon reaching an engagement zone. The ISV program office acknowledged the structural issues, emphasizing that a corrective action plan was in place to address these problems

Photo: Practika



Rear hatch of the KOZAK 5 armoured vehicle



Photo: Practika

The KOZAK 5 APC achieves a road speed of 150 kph.

BARAK MX – No Escape Zone

Modern air defence systems are required to quickly adapt to meet a constantly evolving operational environment, facing a changing threat map that now includes manned and unmanned aircraft, helicopters, and a variety of guided weapons, including anti-ship, ballistic, and cruise missiles. At the heart of Israel Aerospace Industries' (IAI), the BARAK MX air and missile defence system is based on a 'modular' plug and play concept, which allows end-customers unmatched flexibility for building their supreme capabilities.

Major System Elements and Integration Capability

BARAK MX is based on the ability to fuse together a range of interceptors and a variety of sensors, and to link them together to any Battle Management Center (BMC). The system can also integrate with existing ground-based air defences, thus enhance and upgrade the capabilities of legacy systems facing evolving threats. BARAK MX is compounded out of three central elements: The BMC's command and control (the mission 'brain'), the sensor system, and the interceptor (killing effector). The same building blocks are used in both land and sea configurations, including an identical missile, giving BARAK MX a significant advantage for end users in terms of maintenance, acquisition, and technical support. As such, the system can be available both in land-based or naval configuration.

The combat proven system is fully operational, following dozens of live-firing successful trials in the past six years with existing Barak end-customers. Most recently, together with the Indian Navy, the system was successfully tested in India in March 2022. This unique Cooperative Engagement Capability (CEC), available today only with the most advanced navies in the world, was denominated by IAI as Joint Taskforce Coordination (JTC), which is applicable not only in the naval arena but for Ground Based Air Defence (GBAD) as well.

IAI Family of Interceptors

IAI offers its customers a variety of interceptors to choose from, based on their existing air defence solution, defence doctrine, and budgetary policy. BARAK MRAD (Medium-Range Air Defence) provides a range of 35 kilometres, Barak LRAD (Long-Range Air

Defence) extends to 70 kilometres, and Barak ER (Extended Range) carries an additional booster for a range of 150 kilometres. All of BARAK's interceptors come with vertical launch capabilities, and support 360-degree coverage. The interceptors are highly energetic, providing a large 'no escape zone.'

The flexible configuration and capabilities of Barak MX enable its implementation in several modes that are derived from the user's capabilities, existing air defence systems and sensors in order to optimise the use of all available means achieving the best operational solution at the minimal cost. The ability to fuse sensors and interceptors into a single system lies at the heart of BARAK MX architecture, and is a major element in its attractiveness to customers. As the

Indian Navy demonstrated, this capability can integrate multiple platforms, making it one of the most advanced air defence solutions currently available worldwide. BARAK MX was designed to intercept any range of aerial threat – from fighter jets, UAVs, helicopters, cruise missiles, and surface-to-surface short range ballistic missiles.

Future-Proofness

The system's modular nature allows customers to start with the basic configuration and scale up gradually or quickly, according to the operational need and budgetary considerations. These advanced features make BARAK MX an 'evergreen' system that is designed to remain valid and capable for decades to come.



Photo: IAI



The MATV Assault variant seats 11 including the vehicle crew.



MATV of Marine Special Operations Command



The MATV Utility variant seats 5 and has a 3,181 kg payload capacity. The flatbed has ISO-lock corner fixings.

before the Full Rate of Production decision is made in May 2022. System level reliability testing is planned for later in 2022 to assess the corrective measures.

NATO Europe

URO VAMTAC

The VAMTAC LTV (Light Tactical Vehicle) introduced in 2021 is the latest iteration of the UROVESA VAMTAC (Vehículo de Alta Movilidad Tàctico – High Mobility Tactical Vehicle) FoV. The aluminium chassis of the base model restricts gross vehicle weight to 3,500 kg. The LTV is optimised for high off-road mobility and easy air transport. The cab accommodates five, while the open rear bed remains free for cargo. Alternately, a shell or tarp can be placed over the cargo bed. Total payload capacity is 1,000 kg. The multi-purpose LTV can accept a weapons mount and modular armour to meet specific mission requirements.

The LTV is preceded by the VAMTAC ST5, which was introduced in 2013; an armoured version – designated ST5 BN3 – was added in 2015. The ST5 is offered in numerous variants including an eight-seat troop carrier, a weapons carrier (heavy machine gun or a multi-mission missile launcher deploying MILAN or SPIKE ATMs), mortar carrier, reconnaissance and surveillance vehicle, command/control/communications vehicle, field ambulance or pickup truck/logistics vehicle. A 2018 order covering 139 ST5s for the Portuguese Army included four different configurations: troop carrier (107 units), command vehicle (7), ambulance (13), and special operations (12). In addition to ballistic and mine protection, these vehicles featured the Rheinmetall ROSY L rapid obscuring system, the Critical Software EyeCommand battle management system, and the EID PRC 525 combat net radio. The command vehicles and a portion of the SOF variant were also configured with a satellite communications suite.

Iveco LMV

The first generation of the IVECO Light Multirole Vehicle (LMV) was introduced in 2006. The second generation LMV2 was presented in 2016. The newer variant features an upgraded 220 hp engine; an upgraded driveline capable of managing more power; a new air filtration system; enhanced suspension; a new automatic eight-speed gearbox and a new electronic stability control system. These upgrades optimize offroad performance. An enhanced digitized electronic architecture and power supply support additional vectronics and an electronic countermeasures (ECM) suite.

The redesigned crew cell accommodates five soldiers in body armour plus weapons and supplies. Payload capacity has been increased by 40 percent to 1,500 kg.

The LMV2 is available in several variants with different combinations of short or long cab and short or long wheelbase. Configurations include the standard troop carrier, a special forces variant with an open rear cargo bay, a field ambulance, and a short-cab truck tractor. The LMV2 entered service with the Italian Army in 2021. Fulfilment of a 2019 procurement contract for the Royal Netherlands Army and Marine Corps is slated for the 2022-2027 timeframe. The contract covers 1,275 vehicles in five configurations.

SupaCat LRV

The SupaCat Light Role Vehicle (LRV) was introduced in 2019 at the DSEi expo. The 4x4 vehicle can be converted to a 6x6 configuration within a few hours by installing a third axle, which boosts the payload capacity from 1,700 kg to 2,350 kg. The highly modular open-cab vehicle can be configured with a canvas roof and side screens and a detachable polycarbonate wind screen, or with ballistic ar-

mour; seating and cargo layout can also be customised, including installation of ballistic-protected crew seats. An optional weapons mount can support machine guns up to 12.7mm or the Fletcher 70mm rocket launcher system. The vehicle supports various mission modules and can be optimised for long-range patrol and strike missions. Optional features for long-range missions in austere environments include a pinnacle compass and an on-board water boiler. The LRV can be internally transported by CH-47 and roll-off ready for action.

Jankel

Jankel's Light Tactical Transport Vehicle (LTTV) entered full-rate production in November 2021 after passing the Belgian Ministry of Defence's Preliminary Technical Acceptance milestone. The Belgian Army is procuring 199 of the highly modular vehicles, which are based on the Mercedes UNIMOG chassis. The LTTV is designed to provide maximum flexibility through easy re-configuration by the user, with a variety of removable mission modules or "rear hampers" to be mounted on the utility section. The mission-specific modules are

optimised for troop transport, special operations, medical support/field ambulance, and load carrying, respectively. Additional military subsystem options available, regardless of the installed mission hamper, include a ballistic armour kit, multiple machine gun and communications mounts, and a roll-over protection system. Further optimization is possible through application of cold-weather (-32 degrees Celsius) of hot-weather (+50 degrees Celsius) kits. Depending on configuration, the LTTV has a payload capacity of more than 3,000 kg and an enhanced towing capacity of 14 tons.

The LTTV augments Jankel's multi-member FOX Family of light tactical/utility vehicles, which are based on the Toyota LAND CRUISER and Toyota HILUX chassis. The heavier members of this FoV are the Rapid Reaction Vehicle (RRV) and the Long-Range Patrol Vehicle (LRPV). These air-transportable all-terrain vehicles feature up to ten days mission endurance in austere environments and the ability to mount a variety of heavy firepower. Mission profiles include direct action strike missions, fire support, force protection and convoy escort, and reconnaissance and surveillance, in terrain or urban settings.

Marketing Report: EVPÚ

EVPÚ Defence's Strategic Area Protection Solutions

As one of Europe's leading electro-optical system producers, EVPÚ Defence a.s. supplies both civil law-enforcement and military forces with the top quality surveillance equipment they need to protect border zones, coastal areas, airports, power plants, warehouses, transport hubs, military bases and many other objects of strategic importance.

EVPÚ Defence's systems for civil applications include practical and cost-effective SMV surveillance vans fitted with monitoring systems with detection ranges from 9 to 28 km. These custom-designed vehicles can be equipped with day cameras, thermal imagers, radios, independent power sources, generators and, optionally, radars. The vans can cover several hundred square miles with just two operators, giving significant cost savings. A sought-after solution for police units and border patrols, SMV vehicles are in service in several European countries and regions including Greece, Latvia and Central Europe. In maritime

areas and border zones, EVPÚ Defence's surveillance systems can be installed on patrol boats or search and rescue vessels. Stationary versions suitable for installation on surveillance towers, rooftops, masts and similar platforms are also available.

For military applications, EVPÚ Defence produces a number of electro-optical systems designed to enhance the effectiveness and increase the safety of light armoured vehicle crews. While the LAWAREC laser and radar illumination detection system alerts the vehicle crew to detection by laser rangefinders and laser aimed and guided weapon systems, the GATRIA awareness system provides a 360° view of the battlefield. MANTIS and the ultralight MANTIS MINI remote-controlled weapon stations carry up to 12.7mm and up to 7.62mm machine guns respectively, and can be installed on various combat vehicles or vessels. EVPÚ Defence also supplies a range of Gunner's and Commander's sights equipped with high-quality, full HD sensors.

Photo: : EVPÚ



All EVPÚ Defence systems are tailored to the specific needs of each individual customer: find out more at www.evpudefence.com

Photo: US Africa Command (AFRICOM)



US military forces delivering BASTION 4x4 APCs to the Ugandan military in 2017.

Photo: Otokar



The MRAP variant of the COBRA II armoured vehicle carries up to nine infantry plus a two-person crew.

Photo: Otokar



The Otokar COBRA II standard configuration variant

The FOX Light Utility Vehicle (LUV) seats two in a doorless cab. The open cargo bed can be configured for troop or cargo transport, as a water or fuel carrier, or as a mobile maintenance shop. Alternately, it can serve as a mortar platform. The highly modular Tactical Utility Vehicle (TUV) was added to the FOX lineup in 2021. The closed cab accommodates four. The cargo bed can serve as a gun platform (utilizing the removable “tactical pod”), or be enclosed with a neutral shell for covert and surveillance missions.

WIRUS-4

The first WIRUS-4 light high-mobility vehicles entered service with the Polish Army in December 2021. Designated as the Zmija LPU-1, the light armoured vehicles – which are domestically produced by manufacturer Team Concept – are configured as light strike and armoured reconnaissance vehicles. They are suitable for operations in difficult terrain including dense forests as well as rapid on-road movement.

The vehicle features front and rear double wishbone suspension, with independent front suspension and a rigid rear axle. The body is composed of high-strength chrome-molybdenum steel tubular construction incorporating composite laminate components. The floor incorporates ceramic-aramide composite laminate, which provides 1 armour protection. But the driver and commander seats have no doors, trading fast egress for protection. The four-metre long, two-metre wide WIRUS-4 has a gross vehicle weight of 2,600 kg and a 900 kg payload capacity. It accommodates three including the driver, and has an additional rear cargo space. Machine guns are emplaced at the roof-

top ring mount and the commander-side pintle mount; the ring mount can alternately accept a 40mm grenade launcher. Optronics systems to support the reconnaissance and surveillance mission can optionally be installed. The vehicle's small footprint facilitates transport by sling beneath medium-lift helicopters. The Polish Army is acquiring a total of 118 units.

Team Concept has also designed a Special Operations Forces variant which seats four and can be equipped with driver and passenger side doors. It can be equipped with machine guns including 5.56mm Minimi, UKM 7.62mm, and 12.7mm.

YORUK NMS

The Nurol Makina YORUK NMS 4x4 light armoured vehicle was introduced in 2019 at the IDEF expo, preparatory to entering serial production. To date 250 units have been produced for the Turkish and Qatari armed forces.

The main configurations are the armoured combat vehicle, reconnaissance/surveillance, air defence, anti-tank, and the utility/cargo pickup truck variants. The standard armoured combat vehicle configuration holds seven plus the commander and the driver. Payload capacity is circa 4,000 kg. The vehicle's low centre of gravity provides excellent stability and handling in urban and terrain settings. The 300 hp engine and six-speed automatic transmission permit road speeds of 140 km/h, while the front and rear independent suspension optimize off-road performance.

The base vehicle's v-shaped monocoque body has STANAG level 1 protection, which can be increased to level 4 through various modular armour suites. The ballistic-protected glass can be strengthened in tandem with the body armour by adding applique laminate layers. Armour kit application can be conducted in the field without specialized equipment. The NMS can accommodate various Aselsan weapon mounts including: the remote-control Saro-Zafer stabilised turret for 7.62 or 12.7mm machine guns; the KORNET ATM-turret; and the IGLA anti-aircraft turret.

Middle East

Plasan SANDCAT

In November 2021, Plasan unveiled the STORMRIDER as the fifth and newest member of the SANDCAT light armoured vehicle family. At 11,500 kg gross vehicle weight, the STORMRIDER is the largest



Photo: Arquus

The Patrol SAS or PATSAS variant of the BASTION is optimised for special operations forces.



Photo: Voice of America (VoA)

A soldier of the Burkino Faso national guard stands beside a BASTION 4x4 APC



Photo: German MoD

The field ambulance configuration of the EAGLE IV

and heaviest member of the SANDCAT FoV. The newly designed Monocoque hull features the strongest protection suite of any SANDCAT vehicle, up to STANAG 4569 Level 3, plus 2a/2b mine protection. Despite the added weight, the STORMRIDER displays the high mobility and versatility of earlier models. Like the SANDCAT IV introduced in 2018, the new variant accommodates up to ten combat-equipped soldiers (including the driver) in the Troop Carrier configuration. Other base configurations include the Utility vehicle (with a cab for five soldiers plus a cargo space) and the Single Cab variant (cab for three soldiers, plus a larger cargo bay).

The SANDCAT FoV is designed for tactical strike, special operations, and border security operations as well as for police SWAT units. The all-terrain vehicle performs well in urban settings and in the field. For the SANDCAT IV, Plasan reports top speeds of 120 km/h, acceleration to 96 km/h within 23 seconds and a turning radius of 12.3 metres. Six different integrated system modules are optional: Driver Assistant module (includes ther-

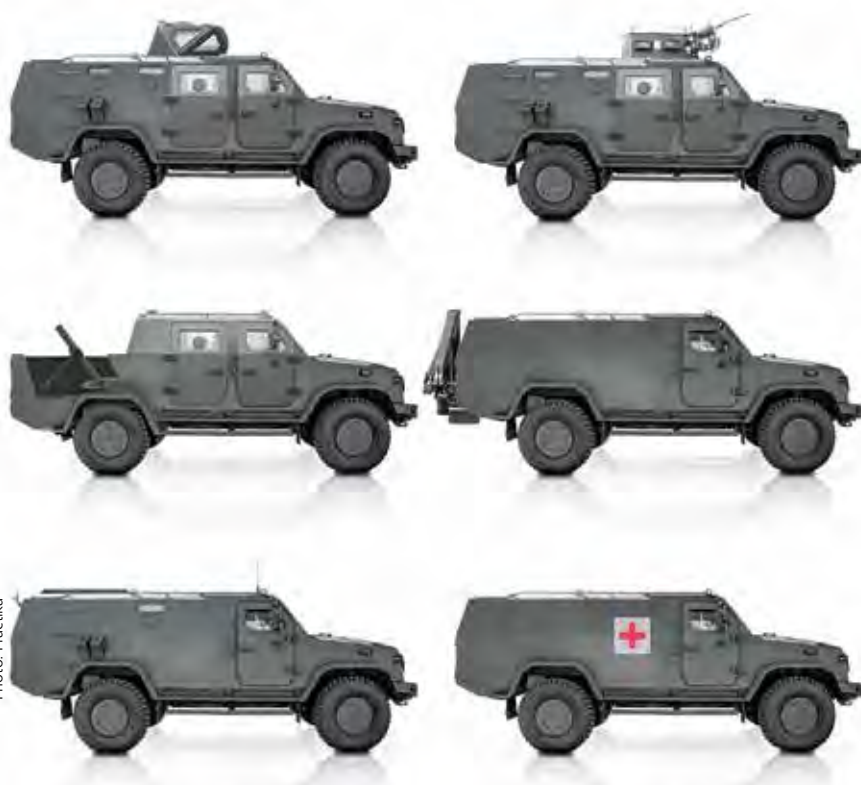


Photo: Practika

The KOZAK 2M2 is available in six configurations.

mal cameras and a dashboard display, enabling driving and navigation under limited visibility conditions); Situational Awareness module (includes six external cameras and analytical software to provide a 360 degree situational picture of the vehicle's immediate vicinity); Mission Management module (centralized command and control over on-board sensors, navigation systems, weapons, and electronic warfare systems); Vehicle Analytics module (collects and analyses data from vehicle components and systems to monitor vehicle health); Vehicle to Vehicle module (broadband data exchange between vehicles); Autonomous Vehicle Operations module (allows unmanned vehicle operation including

remote operations and leader-follower scenarios). Manual and remote weapon stations for machine guns and grenade launchers can be mounted. Heavier weapons such as Rafael SPIKE missiles or 120mm mortars can be installed on the utility variants.

NIMR AJBAN

NIMR's AJBAN FoV includes eight 4x4 vehicle models optimized for various mission profiles. These include the second-generation AJBAN 4x4 Mk 2 introduced in early 2021. The Mk 2's v-hull structure features enhanced ballistic protection and blast mitigation. Optimized as a protected light tactical patrol vehicle



Photo: Practika

The KOZAK 2M2 with the rocket launcher turret



Photo: Practika

The KOZAK 2M1 has four side doors and a rear hatch for easy egress.



Photo: Practika

The KOZAK 2M2 variant is designed for the export market. Unlike earlier variants, it has automatic transmission.

with optional roof-mounted armament, the Mk 2 has a 700 km on-road cruising range at 100 km/h. Off road, the ruggedised suspension master dynamic loads up to five times gravitational force, according to NIMR's data sheet. A central tire inflation system allows tire pressure to be adjusted according to terrain conditions.

The AJBAN Mk 2 seats five soldiers. Total payload capacity is 2,900 kg. A ballistic protected cargo compartment is situated behind the crew cab. Mission readiness has been enhanced by streamlining replacement of the vehicle's modular powerpack – including cooling, engine, transmission and transfer case – from previously ten hours to only 20 minutes.

Other AJBAN variants include the 440 and the armoured 440A, with a four-person capacity plus a large cargo bay, suitable for troop transport or logistic support missions; the two-seat 420 pickup truck; the soft-skin 450 SUV with an eight-person capacity; the open-top Long Range Special Operations Vehicle (LRSOV) which can accommodate gun mounts for all five occupants, as well as a centrally-mounted rocket launcher; and the 447A Multi-Role Armoured Vehicle which seats seven and can accommodate a turret-mounted Gatling gun. Overall, the AJBAN FoV represents a broad spectrum of applications including long-range patrol and reconnaissance, counterinsurgency and special operations, border security, tactical response, and logistic support. Scalable modular armour for ballistic and blast protection is available on most models.

Mobile and Versatile

Mobility and versatility are the great strengths of light tactical/utility vehicles. Most can be airlifted internally and externally by medium- or heavy lift helicopters, or be parachute-deployed by transport airplanes. On the ground, they can traverse most terrain, and can operate freely in urban areas that could prove challenging to larger, heavier vehicles. Manoeuvrability and a low profile enhance survivability, compensating for a lack of heavy armour. The ability to mount a wide variety of sensors and weapons confers the ability to act as force enablers and to effectively engage much heavier opponents, up to and including tanks or helicopters. This versatility will ensure the continued need for light tactical and utility vehicles for the indefinite future. ■



Photo: German MoD

The EAGLE 4x4 light armoured vehicle is suitable for all climate zones.



Photo: German MoD

German Army EAGLE 4x4 armoured vehicles participating in the United Nations MINUSMA mission in Mali.



Photo: Iveco

Iveco MVP of the Italian Army



Photo: Otakar

The latest variant of the AKREP II family of vehicles, the Diesel-fueled AKREP IId, was introduced in 2021. Like the other variants, it can mount a 90mm gun turret.



Viewpoint from New Delhi



Photo: Suman Sharma

India Becomes Focus of World's Geopolitical Chessboard

Suman Sharma

India, as the world's largest democracy, has unwittingly become the focal point of a geopolitical tug-of-war between Russia and the West, amidst a narrative largely dominated by the ongoing Russia-Ukraine conflict, sanctions, and the relevance of multilaterals. As David Frost once said, "Diplomacy is the art of letting somebody else have your way."

This is evident from the flurry of world leaders and envoys visiting New Delhi in order to either issue a veiled threat, coerce, persuade, to learn circumvention, or simply enhance cooperation and business. With India displaying its neutrality by abstaining eight times from UN votes (in different UN agencies) pertaining to the Russia-Ukraine conflict, each camp seems to be aiming at pulling New Delhi to its side.

Kicking off these high-level visits was Japan, which will host the Quad Summit later this year. On his maiden India visit, Japanese Prime Minister Fumio Kishida, besides announcing investments, also reinforced the Indo-Japan special strategic and global partnership. Japan's territorial issues with Russia over the Kuril Islands, coupled with Tokyo's UN vote in favour of Ukraine and in support of sanctions, all resonated in the Kishida-Modi meeting.

Australia, the other important Quad member, has a turbulent relationship with China. PM Scott Morrison, who enjoys a special friendship with PM Narendra Modi, discussed Quad dynamics in a virtual meeting, besides signing the India-Australia Economic Cooperation and Trade Agreement.

However, all visits were not about business. As part of the broader diplomatic push by the West, during her day-long India visit, UK Foreign Secretary Liz Truss took a swipe at India for accepting the Russian discounted crude oil offer, "I think it is very important that we respect other countries' decisions about the issues they face. I have outlined the UK's approach to sanctions and the fact that we are ending our dependence on Russian oil by the end of this year. India is a sovereign nation. I'm not going to tell India what to do." India's External Affairs Minister Dr. S Jaishankar retorted, "It is interesting because we have seen for some time what looks almost like a campaign on this issue. When the oil prices go up, I think it is natural for the countries to go out into the market and look for what are good deals for their people." It may be noted that India buys just two per cent of its oil and gas from Russia, while the EU's gas imports from Russia overall are around 45 per cent.

Veiled threats from America triggered a backlash from India's diplomatic community. US Deputy National Security Advisor (NSA) Daleep Singh, on his maiden India visit, said, "There will be consequences. What we would not like to see is a rapid acceleration of India's imports from Russia as it relates to energy. The more leverage that China gains over Russia, the less favorable that is for India, I don't think anyone would believe that if China once again breached the Line of Actual Control, that Russia will come running to India's defence."

The Deputy NSA's coercion-laced threat evoked a strong reaction from former Indian Ambassador to the UN, Syed Akbaruddin, "Remarks made by the US diplomat were not in keeping with diplomatic traditions. This is the language of coercion. Punitive unilateral economic measures are a breach of customary international law." Chinese Foreign Minister Wang Yi's visit dealt largely with the India-China boundary issue, and BRICS to be chaired by Beijing later this year, as New Delhi's central importance in this multilateral grouping comprising Brazil, Russia, China and South Africa, appears inevitable.

German Foreign and Security Policy Advisor Jens Plotner reacted to India's abstaining at the UN vote, by calling New Delhi's approach in accordance with international law of the UN Charter which respects territorial integrity, adding that Berlin would have liked India to be on their side.

Plotner emphasised that geography defines India's motivation, reiterating the conflict was likely to have consequences for the Indo-Pacific region at large. Out of the five visiting foreign ministers from Greece, China, Austria, the UK and Russia, only Russian Foreign Minister Sergei Lavrov was granted an audience with PM Modi. Lavrov's visit was aimed at improving the tanking Russian economy. Lavrov plainly told India that Moscow was ready to sell India anything it wanted. For the first time, the EU has a dedicated Indo-Pacific Ambassador, evident by the recent visit of EU Special Envoy for Indo Pacific Gabriele Visentin, who subtly warned of a Ukraine-Russia style misadventure not being far from the Indo-Pacific.

Representing smaller and neutral countries, trading with Russia, Mexican Foreign Minister Marcelo Ebrard, Austrian Foreign Minister Alexander Schallenberg and Oman's Foreign Minister Sayyid Badr bin Hamad bin Hamoud Al Busaidi all came calling to understand how to circumvent sanctions.

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Lessons Learned from the MMF Programme

A Reference for Future Cooperative Defence Acquisition Initiatives

Angel Saiz Padilla, Dion Polman, Joachim Weidmann

Europe's Multinational MRTT Fleet (MMF) programme is the most successful example of international cooperation in armament procurement. What are the main success factors that may have applicability in future similar initiatives?

European nations today face an uncertain and unpredictable strategic situation. New scenarios require new capabilities in increasing numbers, whilst the cost of individual weapons systems is increasing exponentially, stretching to the maximum the funds allocated for defence investments.

The multinational organisations devoted to European defence and security reacted in support of their Member States launching concepts and initiatives such as "Pooling & Sharing" by the European Union (EU) in 2010, or NATO's "Smart Defence" solutions in 2011 with the intent to optimise available resources.

At the same time, new efforts have focused on the identification of the most critical capability shortfalls and on new and creative ways to procure them. Following operations in Libya, Afghanistan or Syria, and after extensive analyses by the European Defence Agency (EDA), NATO, at the 2012 Summit, welcomed that the EDA was taking the lead in an initiative to address the shortfall in Air-to-Air Refuelling (AAR) capacity in Europe.

The MMF Programme

This later crystallised in a specific Letter of Intent (LoI) signed by ten European nations, which became the genesis of today's Multinational MRTT Fleet. In December 2013, the European Council iden-

tified once again in its conclusions the AAR capacity, together with strategic transport, as one of the critical shortcomings in military capabilities in EU Member States. These conclusions endorsed the same capability gaps identified in 2012 by the EDA and NATO.

The MMF represents the best example of a successful answer to those urgent calls to join efforts addressed to cover military capability gaps. This multinational fleet arrangement is a cost-effective and flexible solution that mitigates the European shortage in AAR and strategic transport capabilities.

The project demonstrates that close cooperation between NATO and the European Union can deliver critical capabilities, on time, on budget and exceeding customer expectations. This was possible thanks to the excellent cooperation between the NATO Support and Procurement Agency (NSPA), EDA and the Organisation for Joint Armament Cooperation (OCCAR) since the very beginning of the project.

Since the EDA started the initiative, the project has grown into a mature programme managed by the NSPA, on behalf of the nations involved, and supported by the OCCAR on the acquisition phase and the first two years of Initial In-Service-Support.

Being close to the delivery of the seventh MMF aircraft, it is of special interest to analyse the main success factors of the MMF Programme that may have applicability in future initiatives of a similar nature, some of them today following feasibility studies or in an early conceptual phase. During different sessions, the EDA, OCCAR and NSPA were able to identify a number of these success factors, both in the tactical and strategic level for future applicability.

Find a Lead Nation and Dare to Launch the Programme

The Netherlands decided to step forward in 2016 and assumed the role of lead nation of the Strategic MRTT Initiative. With Luxembourg, both nations combined their requirements for AAR and Strategic Transport in a Pooling & Sharing initiative to jointly procure a fleet of MRTT aircraft. The Netherlands identified the political appetite and decided to move forward and launch the initiative, despite all the uncertainties linked with the management of a new cooperative multi-agency programme. The challenges were many but they were progressively managed over the following two years.

After starting small in 2016, Germany and Norway joined in 2017, followed by Belgium in 2018 and the Czech Republic in 2019. The six European Allies signed the Memorandum of Understanding (MRTT-C MoU) and became members of the MMF Support Partnership with equal membership rights, regardless of their level of participation and funding contribution. The MMF nations will share the use of a fleet of Airbus A330 MRTTs, as well as their sustainment and operation. The MMF comprises nine aircraft with scheduled deliveries between 2020 and 2024, although the fleet is expected to grow in the coming years both in members and in the number of aircraft.

Probably the first and most important lesson learned from the early stages is to acknowledge the fact that a multinational pooling and sharing initiative comes full of uncertainties that cannot be identified and planned in detail from the very beginning. Difficulties will progressively arise as the programme develops; more nations might join or more agencies might be involved; and all the challenges must be tackled as

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they appear. Despite all those concerns, it is necessary to dare to launch the programme, with a clear vision of the desired outcome and a committed group of stakeholders to make it a success. On too many occasions, very interesting initiatives do not move beyond the conceptual phase due to lack of commitment, difficult negotiations or the logical doubts of the early stages.

In this complex scenario, a second lesson learned from the MMF is that a strong lead nation is essential to the success of a multinational cooperative programme. The Netherlands has played a crucial role as the driving force for the MMF programme. As lead nation, they provided key personnel to steer several working groups, chaired the programme's management bodies (Steering Group and Support Partnership Committee) and the MMF Executive Board, provided essential host nation support and have played the role of registering nation to the MMF. They were also instrumental in the growth of the programme, negotiating the MoU conditions for new partners, in close cooperation with EDA.

One of the creative solutions that made the MMF a success is linked to a fair and transparent cost share arrangement em-



Photo: Norwegian Air Force

A new MMF A330 MRTT air-to-air refueling an F35

bedded in the MoU, making this another important lesson learned.

The MRTT-C MoU established a clear and equitable funding agreement by calculating the financial contribution per nation based on an annual Flight Hour (FH) factor that defines the national participation in the programme. This enables nations with a limited need of FH to join the MMF and still getting assured access to an entire fleet of aircraft that otherwise they might not be able to afford. Also, bigger nations benefit from economies of scale of this multinational cost share arrangement, beyond the obvious operational benefit of owning a larger fleet than they could otherwise afford. This provides an incredible surge capability to cover urgent AAR and strategic transport needs.

Another lesson learned linked to the framework of the MMF initiative is that the legal construct of the MRTT MoU allows for broader participation across institutional limits. The MRTT MoU is open to any interested party; it is not limited to NATO or EU Member States and is thus purely multinational. Furthermore, the governance through a multinational Executive Board and that the fleet is manned by a multinational unit highlights the purely multinational character of the programme.

Establish an Effective Multi-Agency Cooperation

The following lessons learned emanate from the unique management structure of the programme, which involves three



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Photo: MMU

An MMF A330 MRTT air-to-air refueling two EUROFIGHTERS

international organisations: The European Defence Agency (EDA), the NATO Support and Procurement Agency (NSPA) and the Organisation for Joint Armament Co-operation, (OCCAR as per its name in French). The embryo of the initiative flourished in the framework of the EDA, as a result of its mission to support the development of military capabilities and cooperation among its Member States. The use of EDA was instrumental in triggering political involvement, ensuring high level top-down support from the very beginning. The shortfall in AAR was addressed first and foremost by EDA at the ministerial level in 2014, through a Joint Declaration and the Letter of Intent on a European Strategic MRTT initiative. The political acknowledgement of the shortfall was crucial for the successful launch of the project. As the project developed under the umbrella of an EDA project team, it ensured immediate awareness amongst the 27 EDA nations. The continuous support from EDA to interested Member States to harmonise the operational requirements and agree on the baseline financial (including cost sharing) and legal conditions, has resulted in several additional partners signing the MMF MoU.

MMF nations entrusted NSPA with the ownership responsibility, together with its future operation and in-service support. NATO ownership of the MMF aircraft (through NSPA) leads to a greater delegation from nations to the agencies (NSPA and OCCAR), preventing diverging national agendas or micromanagement, common in other cooperative programmes.

Mainly due to the tight timeline imposed to launch the MMF initiative, NSPA delegated in OCCAR the responsibility for managing (on behalf of NSPA) the complex contract processes associated with the acquisition of the fleet, its acceptance and the initial logistics support. The close relationship between both organisations is governed through a specific Cooperation Agreement for the MMF Programme. This arrangement allows the use of OCCAR and NSPA within their strengths: OCCAR for its specific skills in managing complex cooperative acquisition contracts, where NSPA used its own experience in managing in-service fleet support. In this way, the strengths and wide expertise of both agencies are combined in the same

initiative, maximising synergies and allowing for a mutual learning experience. However, this innovative multi-agency management arrangement required some adaptation on both sides. OCCAR and NSPA established the Cooperation Agreement under time pressure and succeeded only in partially being able to provide a clear and detailed description of roles and responsibilities, leaving room for interpretation in certain areas. The ambiguities created some duplicities and mutual interferences that led to unnecessary tensions. These circumstances triggered the need for further planning and a revision of the management structure that was recently finalised. A key lesson identified here was that multi-agency cooperation requires an upfront clear and detailed description of roles and responsibilities, including duration of the joint venture. It is imperative to the success of a programme with more than one agency involved, that these rules are clear from the beginning of the cooperation and fine-tuned over the first few months of operations.

An adverse consequence of cooperative acquisition through the specialised agencies such as OCCAR or NSPA is that nations with limited experience in multinational cooperative programmes might perceive the agencies' procedures intricate and

inflexible. One of the early challenges that the Netherlands and Luxembourg had to face was precisely the fact that procedures for non-NATO/non-OCCAR interested nations should have been clear upfront. More clarity would have saved cost and time.

Interconnected with the above, another aspect to consider in future initiatives is the fact that programme management structures should be clear, unique and established at the beginning of the partnership. When OCCAR and NSPA included MMF in their portfolios, both agencies tried to apply their standing structures and processes over those of the other organisation, not recognising MMF's distinct nature and the need for flexibility to ensure fruitful cooperation. One consequence of this misinterpretation was the lack of unity of command and duplication of effort for a period of time. As an example, very soon, OCCAR established a full Programme Division in Bonn (Germany) led by an A-5, later followed by a System Manager at NSPA (also A-5) in Capellen (Luxembourg) and a reinforced management team there. The management structure was finally rationalised in 2018 by establishing a virtual System Management Office (SMO), tying all elements needed for the success of the programme under the single direction of the NSPA System Manager. The SMO solution worked, in large part due to the people involved in the MMF programme, all committed and true believers in the success of the MMF.

In retrospect, it would have been more effective if both agencies had clearly identified a lead agency, created one

Photo: MMU



MMF aircraft on the ground




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programme office, appointed one programme manager, and created a single integrated programme team from the beginning, even using personnel from both organisations if necessary. When it comes to locating the management teams, proximity to the prime industry partner (OEM) during production phase, and to the Main Operating Base of the fleet during in-service phase provides for improved efficiency.

Choose the Right System and Industry Partner

The platform selected to satisfy the AAR and strategic airlift capability was the Airbus Defence & Space (Airbus DS) A330-200 MRTT aircraft. This is an Off-The-Shelf solution with a mature design, already in service with several users around the globe. Final assembly of the A330-200 basic airliner platform is performed by Airbus in Toulouse. The civilian aircraft then converts into an MRTT in the Airbus DS' factory in Getafe, Madrid. This military conversion adds the ability to perform AAR, strategic transport of personnel and cargo, as well as medical evacuation (MEDEVAC) operations and limited VIP transport. All roles can be performed simultaneously if necessary.

The first lesson learned and linked with the weapons system itself, is the clear benefit of using a single lead industry (prime), which allows for effective programme management. For the MMF programme, Airbus DS acts as the industrial prime, taking responsibility for the production and a large majority entry into service of the aircraft. This way, most risks and responsibilities are assumed by a single organisation, making for a simpler supervision from the SMO. Exceptions are the DIRCM system, the MEDEVAC equipment and some of the military components (radios, crypto etc.) that are provided by the MMF nations (through NSPA) to Airbus DS as GFX.

Another distinct aspect of the MMF initiative is that no industrial compensation (just return) was expected by the MMF nations. This might seem an unprecedented example of generosity but it is a mandatory characteristic of any programme managed by OCCAR. Most large cooperative acquisition contracts embrace the opposite direction, later proving to be the source of big inefficiencies, complex (unnatural) industrial consortia that increase the final unit price and promote the dilution of responsibilities. MMF lacks these negative effects or else they are handled by the prime, compelled to aim for the

most efficient and lean production chain. Another lesson learned linked with the system itself is the commonality in configuration throughout the entire fleet. The MMF requirements were harmonised upfront, during the initiation of the project, with EDA facilitating the harmonisation of the operational requirements of the interested partner nations. This allowed for a smooth take-over by NSPA and OCCAR to further develop the programme and engage with industry with stable contractual requirements.

One of the strong principles of the MMF proved to be that any nation joining the programme has to accept the single configuration, based on the harmonised re-

Photo: Airbus



MMF aircraft landing

quirements. In the rare cases that changes to the configuration were deemed appropriate, they were accepted for the whole fleet (examples are the DIRCM and MEDEVAC improved configurations). This takes a disciplined support partnership but sticking to one single configuration enables the programme to be on time, within budget and within scope.

The last highlight linked with the system and the industrial partner, is that the inclusion of the Initial In-Service Support (I-ISS) in the acquisition contract assures smooth entry into service. On behalf of NSPA, OCCAR manages not only the acquisition of the fleet, but also the ISS set-up and the first two years of initial in-service support, all to be provided by a single contractor, Airbus DS. This allows for a sole interface from the customer towards industry, combined with an individual contractor taking on the burden of delivering the aircraft, as well as ensuring a smooth and easy entry into service. Subsequently, NSPA enjoys more time to refine the know-how about the weapons system and to contract for the best follow-on ISS solution.

Don't Reinvent the Wheel

The current restrictive economic conditions will most likely remain in the near future, causing pressure on defence budgets allocated to procure new equipment. Allied nations will surely be compelled to look for alternative options and smart acquisition solutions such as MMF, to provide for the military capabilities required today.

For most nations, the modern complex and expensive weapons systems cannot be developed and procured nationally in the right numbers; they will slowly become unaffordable unless the acquisition strategy evolves from individually

procured material to cooperative or joint procurement solutions, sharing acquisition or sustainment costs. The cooperative approach will most likely become the norm in the immediate future, rather than the exception. There is no better way for most European and Allied nations to satisfy operational needs applying best value for money practices.

The success of the MMF initiative is a unique example of effective procurement of military capabilities through a multinational cooperation, in a pooling & sharing arrangement. Conscious of the uniqueness of the MMF, all the MMF stakeholders jointly developed this article to present the reasons behind the success of the initiative; a cooperative programme that will surely be a reference for future initiatives.

Industrial partners, nations and agencies are now encouraged to not reinvent the wheel and make the most out of the lessons learned by the MMF, when shaping the new multinational, cooperative, multi-agency, pooling & sharing initiatives that will surely be the preferred approach in the coming years. ■

CBRN Naval Collective Protection

Dan Kaszeta

CBRN agents can suppress a naval vessel's ability to operate efficiently.

Because of the threat to the crew much more than the actual physical infrastructure of a ship, collective protective is often the primary component of naval CBRN defence.

Land warfare gets most of the attention in military CBRN defence, and for several good reasons. Within defence budgets, protecting land forces leads to the largest outlays of expenditure on protection, detection, decontamination, and other necessary elements of CBRN defence. Armies have CBRN defence troops and most of them have devoted force structure and professional schooling to CBRN defence. Navies tend to have lesser emphasis on CBRN defence. Historically, CBRN defence in naval environments was strongest in the Cold War, particularly in the navies of the traditional nuclear powers like the USA, USSR, France, and Britain. Even then, the emphasis was very much on the R/N part of CBRN. However, the end of the cold war has not seen the end of concern for protection against CBRN hazards. Navies ignore CBRN threats at their peril.

Chemical warfare agents, biological agents, and radiological particles (such as fallout from a nuclear weapon explosion) will not fundamentally damage a naval vessel. However, they can suppress a naval vessel's ability to operate efficiently. Non-persistent chemical agents such as Sarin could cause immediate casualties on a ship, and a ship's ventilation systems might even carry the hazard throughout. Persistent chemical agents and radiological particles could cause contamination of exposed surfaces for days or even weeks. This could have the effect of interdicting flight operations on an aircraft carrier and forcing crew to work in cumbersome protective clothing. All of the CBRN threats pose the prospect of illness and injury to crew over a protracted period of time from persistent threat materials, as many of the CBRN threats provide chronic cumulative effects. The evolution of smaller but more specialised crews means that some critical roles may have only one or two people trained to do them on some ships.

Author

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Photo: U.S. Navy / Mass Communication Specialist Seaman Dallas A. Snider

Sailors are fitted for chemical, biological, and radiological (CBR) protective masks on the mess decks of the US Navy's aircraft carrier USS RONALD REAGAN. The carrier conducts annual mask fit tests to ensure all sailors have the correct personnel protective equipment in the event of CBR exposure.

A Higher Vulnerability

In particular, naval vessels have some degree of higher vulnerability to biological attack than their land-based comrades in armies and air forces. Crews live in confined proximity. Air handling systems act to concentrate biological agents, unless the whole ship is heavily filtered. Recirculation of air can spread pathogens around a ship. Ships at sea cannot quickly replace dead or sick crew members, and a ship's medical staff and facilities can be easily overcome by casualties in some CBRN scenarios.

Because of these varied threats to the crew, much more than the actual physical infrastructure of a ship, collective protective is often the primary component of naval CBRN defence. (This author discussed other aspects of naval CBRN defence, such as detection and decontamination in the October 2020 issue of this magazine's sister publication Maritime Security and Defence.) Collective protection is the provision of protection in a large space, as opposed to "individual

protection" which is generally composed of protective clothing and masks/respirators. Individual protection also plays a role in naval CBRN defence, but it tends to not vary greatly from individual protection for land forces and firefighting.

Components of Collective Protection

Collective protection in ships (or in building or land vehicles for that matter) is simple in principle. It should be noted that NATO has played a valuable role in standards in this area as well. NATO Allied Engineering Publication 54 lays out standards for collective protection that industry can follow. Collective protection ('colpro' in industry jargon) for spaces and volumes, such as ships and buildings consists of several components. These components include air handling equipment designed to provide a high volume of clean filtered air at a pressure higher than outside, large filters, and all of the ancillary modifications and fittings needed to



US sailors assigned to the destroyer USS ROSS simulates checking another sailor for signs of biological attack during a biological hazard drill aboard the ship.

ensure the airtight integrity of spaces. All three components will be addressed below.

Air-Handling

The first component is air-handling. All but the smallest and most basic vessels have some kind of ventilation system in crew and operational spaces. Naval vessels are generally required to operate in a variety of climates and have need of humidity reduction, so some form air conditioning is fairly standard. As a result, ship designs incorporate air intakes, air handling, recirculation, and exhaust requirements. The key issue is that collective protection imposes a requirement to operate at an overpressure, so that air flow out instead of in through leaks and openings. It also has air flowing through filters, which give resistance. Therefore, a vessel with collective protection needs to have fair more extensive airflow than a non-protected vessel might have or require. This, in turn, drives space and power requirements.

Filtration

The next component is filtration. While modern non-Collpro ventilation systems will have some degree of filtration, the sorts of filters necessary for CBRN protection are far more extensive and expensive than commercial filtration. High-grade commercial filtration can provide a reasonable degree of protection against biological aerosols and radiological particulates. However, chemical warfare agents necessitate elaborate filtration in order to absorb gases and vapours. Collective protection generally stacks several degrees of filtration together so that the more expensive chemical filters are not fouled by particles that can be screened out by cheaper and more easily replaced particle filters. For CBRN filtration, the state of the art remains deep-bed charcoal filtration, a time-honoured technology dating back a century. These are, in most respects, a large

version of the filter that you might find on a soldier's protective mask. The most recent technical advances involve "regenerative filters" – filters that, as the name suggests, effectively renew themselves and therefore have a longer service lifetime between replacements than simple charcoal filters.

Airtight Integrity

The third component is the least glamorous one. Higher volumes of air and filtration are of only limited value if the spaces on a vessel to be protected are reasonably air-tight. Overpressure cannot be maintained if too much air leaks out. Filtration is pointless if a stiff breeze carries vapour or particles into compartments on a ship. Therefore, it is important to ensure airtight integrity of compartments in the same way that naval vessels handle watertight integrity. This means reviewing every way in which air can enter or leave a space or compartment. It adds up to a lot of gaskets around a lot of hatches and lots of plugging of small holes. This effort also means a burden on maintenance and inspections because damage, erosion, or other wear-and-tear over time to gaskets and hatch hardware can greatly reduce the protective value of a system. It should also be noted that instrumentation is needed on a vessel as well. Air flow and air pressure, in particular the pressure differentials between inside and outside air pressures, need to be monitored to ensure that collective protection is effectively maintained.

Two Approaches

There are two main approaches to designing CBRN collective protection into a vessel. One is to go for an all-vessel approach and attempt to provide filtered overpressure throughout the vessel. This can be prohibitively expensive. It can prove impossible in retrofits and is much easier to design from the beginning with a new vessel. But naval

vessels tend to have long service lifetimes and often undergo numerous retrofits during their lifespan. In addition, larger vessels with large volumes on them, such as aircraft carriers, will prove to be too difficult to protect in totality.

A far more commonplace approach, both in new designs and in retrofits, proves to be more manageable from an engineering approach. One can identify specific areas within a ship to protect and form a protected "Citadel" that is hardened against CBRN hazards with collective protection. As a practical matter, this is cheaper and easier to undertake. This citadel approach has become the industry standard. A ship's combat information centre, fire control spaces, and medical areas are commonly fortified as such citadels. With a larger ship, setting up a number of citadels within a ship is still cheaper and easier than protecting the entire ship.

Operational Cost

One serious issue with collective protection is operational cost. Maintenance for such systems can be both time-consuming and expensive. Replacement of filters can be costly. Even running the system with clean air will gradually reduce the operational effectiveness of the filters. Because of this, many navies have instituted operating procedures that only use the systems part of the time. However, this begs the question of when to turn on the system. Detection systems have a place on naval vessels to help make such a decision.

The Collective Protection Market

Several companies do a lot of work in the CBRN filtration and collective protection market space. Some of them specialise in naval work, while others are more general-purpose military collective protection providers. At the lowest level, individual compartments on small vessels, the hardware is not radically different than that installed in, say, a tank or military ambulance. This is not an area of major specific programmes and expenditures. Rather, this sort of equipment is buried well within the construction and/or retrofit of major naval vessels and done by subcontractors. However, this is a space worth surveying and there are several important manufacturers in this area.

It is difficult to define a clear world market leader in this segment, in part due to the fact that ship construction and retrofits are complex projects and collective protection is buried several layers down in overall project. However, some industrial players are worthy

of mention. HDT Global (USA) is a market leader in this military collective protection overall and has not neglected the naval market. They have had sold numerous systems to the US Navy. In addition, they are an industry leader in the instrumentation, tools, and components needed to install or retrofit naval collective protection. HDT easily does tens of millions USD worth of contracting in this area.

Within continental Europe, several manufacturers work in this space. ENGIE-AXIMA Marine Offshore (France) is a time-honoured contractor in naval collective protection. Their CBRNflex 3600 is a well-regarded naval protection product. They also produce some modular systems for smaller vessels and a variety of accessory equipment. Heinen & Hopman (Netherlands) is a major player in maritime ventilation and air conditioning. They make CBRN filtration systems for a variety of naval craft. Van Halteren Specialty Products (Netherlands) sells a full range of filter systems ranging from small to large. Their filters range from 900 cubic metres per hour all the way up to 3600. Even the largest naval requirements could be met by Van Halteren's product line.

Another name of note in this sector is Beth-El Industries (Israel). They are an

established player in the military CBRN collective protection market. Israel, for domestic protection reasons, takes collective protection seriously and Beth-El have applied their considerable land-based expertise to ships. A number of firms in the UK serve the collective protection market. EMCEL (UK) is a well-established name in the production of CBRN filters of various sizes and configurations for collective protection, and makes NATO-standard filter elements that are often integrated into maritime systems. MDH (UK) focuses on the land-based market, but advertises that they can provide solutions in the naval space as well. An arm of BAE had been involved in Royal Navy collective protection systems as well.

The Future?

As with any part of the CBRN defence market space, the future depends on technical investments. In turn, these investments are driven by perceptions of the threat and reaction to actual incidents. Overall, collective protection in navies remains a relatively modest area for market expansion because of relatively low priorities afforded to such threats. The big-

Photo: US Navy



A US sailor sanitises inside a decontamination station during a CBRN drill aboard littoral combat ship USS TULSA.

gest area for improvements in this field is in regenerative filtration. Filter elements that can purge and clean themselves will have significantly longer lifespan, both in standby and in active modes than the century-old charcoal filter systems that are still the mainstay of collective protection both on land and sea. This author's prediction is that regenerative filters will eventually become the industry standard. ■



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Bridging and Gap-Crossing Options

Christopher F Foss

In recent years, most armies have introduced heavier tracked and wheeled armoured fighting vehicles (AFV) into service. This has meant that existing bridges have had to be upgraded, or sometimes replaced, to take into account these heavier vehicles.

A previous article in ESD 4/2020 covered armoured combat bridging, but this is just one part of the total bridging capability deployed by combat engineers of the major powers to enable their units to rapidly cross wet and dry gaps. These include lightweight bridging systems that are typically deployed by the infantry, mobile bridges to enable wider gaps to be crossed, amphibious bridging and ferry systems, pontoon bridges and line of communication bridges which are deployed to the rear once the initial advance has been completed. While these bridges have been originally developed and deployed for military use they are also used by an increasing number of countries in emergency disaster relief operations such as the urgent replacement of bridges lost during floods and landslides.

Prior to bridges being deployed, it can be required to lay a trackway on marginal terrain so that the ground is not turned into a total quagmire due to constant use. Faun Trackway of the UK are the market leader with sales having been made to some 40 countries with their Heavy Ground Mobility System (HGMS) and Medium Ground Mobility Systems (MGMS). These are rapidly laid over the rear of the vehicle as it moves backwards and with the HGMS having a MLC 70 and MGMS MLC 30. These are also used during amphibious operations on beaches.

Crossing Dry Gaps

One of the major growth areas in combat bridging is the development and fielding of smaller bridges which are typically used by

Photo: Faun Trackway



A Faun TRACKWAY Heavy Ground Mobility System (HGMS) being laid over rear of Rheinmetall MAN Military Vehicles (8x8) truck with a protected cab at a bridge crossing point

infantry units. A good example of this is the General Dynamics European Land Systems (GDELS) Bridging MAMBA, previously called the Infantry Assault Bridge (IAB) which is known to have been sold to Austria, Germany, Ireland, Netherlands and the UK. The complete MAMBA set weighs only 460 kg, with the heaviest element weighing only 55 kg. According to GDELS-Bridging, a bridge 30 m in length can be constructed in about 6 minutes. Although the MAMBA is normally deployed to cross dry gaps, with the aid of lightweight pontoons it can also be used to cross wet gaps with the pontoons being anchored in position.

The company has also developed and is marketing the VIPER (previously called the Medium Trackway Bridge) which is also of aluminium construction and has been designed for use by vehicles up to Military Load Class 40 (MLC 40) and is typically transported on a 4x4/6x6/8x8 or a tracked platform. According to GDELS-Bridging, the launching and retrieving time for a four metre VIPER is less than five minutes with four soldiers. Additional units can be added to the VIPER to extend dry gap crossing

capability to six or eight m, with the actual bridge length being seven and nine metres respectively.

The PYTHON REBS

GDELS-Bridging has also developed the PYTHON Rapidly Emplaced Bridge System (REBS) for which the launch customer was the US Army who ordered 20 systems. The US Army transports and launches the PYTHON REBS over the rear of an Oshkosh Heavy Expanded Mobility Tactical Truck (HEMTT) (8x8) Palletised Load System (PLS) chassis fitted with Bridge Adapter Pallet (BAP) and when deployed this two part bridge is 13.80 m long and can be used to bridge a gap of up to 13 m and take vehicles up to MLC 50 with launch time of 10 minutes.

The actual bridges are the same as those used in the German Army BEAVER (BIBER) based on the LEOPARD 1 tank hull still used by the German and other armies.

A batch of PYTHON REBS was purchased by the British Army to meet an Urgent Operational Requirement (UOR) and these are

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transported and launched from a Rheinmetall MAN Military Vehicles HX series (8x8) truck and one of these was loaned to the New Zealand Army. As well as being deployed by a dedicated launch platform it can also be integrated onto a Palletised Load System (PLS) so on the system is deployed the truck can be utilised for other missions.

The Dry Support Bridge

Following a competition, WFEL was awarded a US Army contract for the Heavy Dry Support Bridge (HDSB) was first fielded by the US Army under the designation of the M18 DSB with over 100 systems now supplied. In US Army service, the M18 DSB is transported and launched from an M1077 Oshkosh (10x10) HEMTT/PLS with one set consisting of one launcher vehicle, six M1077 flat track of bridge components and one M1077 flat track load of launch beams. This is sufficient to complete one 42 m long bridge, which would span a gap of 40 m and take only 90 minutes to assemble. This was originally to MLC 80 (tracked) and MLC 100 (wheeled) but development has enabled bridges with a length of 46 m to be constructed.

While the US Army uses the Oshkosh chassis the design of the DSB is that it can be integrated onto other platforms with Australia, for example, using the German Rheinmetall MAN Military Vehicles HX (10x10) platform while Switzerland uses an Iveco Defence Vehicles TRAKKER (10x8) chassis. Other customers include the Philippines (Reinmetall MAN) and Turkey (HEMTT).

Amphibious Bridging and Ferry Systems

One of the most recent wet crossing systems is the Turkish FNSS Savunma Sistemleri OTTER (4x4) Rapid Deployable Amphibious Wet Gap Crossing System (RDAWGCS), which has been developed by the local company of FNSS Savunma Sistemleri to meet the requirements of the Turkish Army who have taken delivery of 32 units and is now being offered on the export market. When being used in the ferry mode, a single OTTER can transport tracked vehicles with a MLC of up to 21 which can be increased to tracked vehicles with a MLC 85 with two units and wheeled vehicles up to MLC 120 with three units. When 12 OTTER units are coupled together, a bridge 150 m in length can be quickly deployed which can take tracked vehicles up to MLC 85 and wheeled vehicles up to MLC 120. The OTTER crew are seated in a protected cab at the front and it also features all wheel



Photo: GDELS-Bridging

A GDELS-Bridging MAMBA in position and being used to transport an injured person



Photo: GDELS-Bridging

The VIPER in travelling configuration with bridge elements in a trailer being towed by an EAGLE (4x4) vehicle



Photo: WFEL

An Australian Army WFEL Dry Support Bridge launcher-based on a Rheinmetall MAN Military Vehicles (10x10) cross-country chassis with fully protected cab

Photo: WFEL



A WFEL Dry Support Bridge being launched over a landslide in Switzerland to allow the road to be rapidly reopened to civilian traffic

Photo: GDELS



A US Army GDELS-Bridging PYTHON Rapidly Emplaced Bridge System (REBS) being launched over the rear of the Oshkosh (8x8) truck chassis with two bridge elements almost aligned and stabilisers lowered

Photo: FNSS



Two units of the Turkish OTTER rapid deployable amphibious wet gap crossing system being used as a ferry with ramps raised and transporting an upgraded M60T MBT

steering, independent air suspension and when afloat is powered by two pump jets at a maximum speed of up to 10 km/h.

The GDELS M3

The market leader for amphibious bridging and ferry systems is the General Dynamics European Land Systems – Bridging (GDELS) M3 Amphibious Bridge and Ferry System (ABFS) which is a further development of the older M2. The first customers for the M3 were Germany and the United Kingdom but since then sales have been made to other countries including Indonesia, Latvia, Singapore, South Korea and Taiwan. Late in 2021, the Republic of Korea selected the M3 to meet its requirement for a Korean Amphibious Bridging Vehicle (KABV), with GDELS-Bridging teamed with the local company of Hanwha Defense will produce 110 of these systems under the local designation of the M3K which will make the ROK the largest user.

According to the company, when used as a bridge, eight M3 units are coupled together to form a bridge 100 m long in less than 10 minutes. Once in position, this bridge can be crossed by tracked vehicles up to MLC 85 and wheeled vehicles up to MLC 132. In addition, the M3 can be used as a ferry with two units coupled together in about three minutes and having a similar carrying capability to the 100 m M3 APFS. Each M3 unit is MLC 30 and is powered by a 298 kW diesel engine, which gives a maximum road speed of up to 80 km/h. It also features powered steering on all four wheels and when afloat is powered by two 360 degree turntable mounted water pumps as a maximum water speed of up to 14 km/h.

The CEFA

The standard wet gross system of the French Army is the CEFA Engin de Franchissement de l'Avant (EFA), or also Forward Crossing Vehicle (FCV) as it is also called, with 39 units being delivered to the French Army and ten to an undisclosed export customer. The EFA can be used as a bridge, ferry or raft with a 100 m bridge being deployed by four units in ten minutes according to CEFA.

The LEGUAN

The most widely used vehicle launched bridging system is the Krauss-Maffei Wegmann LEGUAN, with the LEOPARD 2 being the most recent tracked vehicle launcher. A key feature of the LEGUAN is that it can also be used as a ferry with

Norway being a known customer. This consists of a modified LEGUAN bridge opened out which is laid on two unsinkable aluminium pontoons with associated loading ramps. The MLC depends on the number of pontoons but a MLC 30 ferry, for example requires six pontoons of which two are powered.

Pontoon Bridges

Following the fielding of the Russian PMP pontoon bridge which is carried and launched over the rear of a 6x6 cross-country truck, similar bridges have been built elsewhere. The original German now GDELS-Bridging Ribbon Bridge (RB) was of aluminium with steel components and normally referred to as the FSB and was sold to at least 11 countries. This was followed by the Improved Ribbon Bridge (IRB) deployed by the US Army for 2002 and transported and launched from an Oshkosh HEMTT followed by the German Army in 2007 (as the PVFSB or FSB2 2) and since then sales have been made to Australia and Sweden.

The IRB consists of two key parts, an Interior Bay and a Ramp Bay and trials have shown that a bridge 100 m in length can be deployed in about 30 minutes and this has a maximum single load of MLC 80 for tracked vehicles and MLC 96 for wheeled vehicles. When positioned in a river the IRB is normally held in position by a Bridge Erection Boat (BEB) which is based on the German Army M-Boat 3.

The IRB can also be assembled as a ferry in conjunction with a BEB and a typical five bay ferry would require 3 interior



Photo: FNSS

The Single Turkish OTTER rapid deployable amphibious wet gap crossing system in travelling configuration and showing armoured cab at the front

bays and two ramp bays which would take about 30 minutes to assemble and take the same maximum loads as the IRB. A key feature of the IRB is that it is fully interoperable with the US standard RB and the Folding Float Bridge and with a coupling device can be used with the IRB, SRB (V) and FSB and can also be connected to the M3.

Medium Girder Bridge

The WFEL (now owned by Krauss-Maffei Wegmann) Medium Girder Bridge (MGB) was originally developed to meet the

requirements of the British Army and by early 2022, over 500 had been supplied for the home and some 40 export markets. In October 2020, the UK Defence Equipment & Support Organisation placed a further order with WFEL for an additional 17 sets of MGB and the first of these was delivered in July 2021, ahead of schedule. The first bridge set will allow the Royal Engineers to build a 31 m Double Story and a five bay Single Story MGB which can also be used to cross wet and dry gaps.

The MGB is a complete bridging system can be rapidly assembled to meet different user requirements with load capacities of up to MLC 70 (tracked) and MLC 100 (wheeled). While originally developed to enable dry gaps to be crossed, wet gaps can be crossed by using pontoons. Using a Reinforcement Set, a single span MGB can be deployed to MLC 60 with a length of 49.4 m or MLC 70 with a length of 45.7 m. Using a Span Junction Set, bridges with a length of up to 76 m can be deployed to MLC 70.

WFEL have also developed the Mechanically Aided Construction by Hand (MACH) MGB which reduces the size of construction crews from 25 to 9 personnel without needing additional build time. This is achieved by pre-fabricating MGB components into modules in a separate assembly area. The bridge is then constructed using a suitable crane or HIAB vehicle. MACH MGB uses standard MGB components supplemented by special components designed to assist mechanical handling.



Photo: GDELS-Bridging

German and British Army M3 Amphibious Bridge and Ferry System units coupled together to form a bridge

“We need a strong domestic defence industry.”



Photo: MoD HU

Prior to the parliamentary elections in Hungary on 3 April 2022, ESD had the opportunity to interview Hungary's Chief of Defence, Lieutenant-General Dr. Romulusz Ruszin-Szendi. Since the General answered our questions in great detail, we have split the extensive interview. The second, more strategic/political part of the interview will appear in the June issue.

ESD: What security challenges do you see for the Hungarian Defence Forces?

Ruszin-Szendi: Hungary's security continues to be directly threatened primarily by mass illegal migration. Pressure has temporarily eased on our southern borders, but the main economic and social problems causing mass migration remain in the MENA region [Middle East and North Africa] and beyond (Central Asia, Sahel). Based on existing trends, we must, in the medium and long-term as well, face the challenge of mass illegal migration and the terrorism associated with it.

The Hungarian Defence Forces (HDF) are continuously contributing to securing the closure of the southern border, as well as participating in NATO and EU operations that seek to strengthen the stability of the source countries, helping to address the root causes of the threats. In addition, we encourage the implementation of our partners' capacity building within international organisations or bilateral frameworks, promoting the resilience and self-defence capabilities of our partners.

Hungary lies at the crossroads of threats from the eastern and southern strategic directions. Due to its geographical proximity, the stability of the southern direction and within that of the Western Balkans is key to Hungary's security. Our commitment to the region is demonstrated by the fact that most of our operational role is focused on this region. Our presence in KFOR is particularly significant, with a Hungarian commander running this operation for a year from November 2021, which is currently NATO's largest operation.

In the current rapidly changing, extremely complex and unpredictable security environment, the possibility of an unexpected armed attack against our allies or even Hungary cannot be ruled out. In the course of the comprehensive modernisation of the Hungarian Defence Forces, in line with NATO's defence planning process, we aim to acquire and develop capabilities aimed, inter alia, at deterring and, if necessary, preventing such an attack. During this modernisation process, we also place great emphasis on developments in a multinational framework. An outstanding example of this is the creation of the Central European Multinational Division Headquarters (HQ MND-C), which was set up with the strong support of Germany and the framework national involvement of Croatia and Slovakia. In the first half

of this year, the organisation will be activated in NATO, thus strengthening the Alliance's capability for regional command and control, and thereby indirectly strengthening its reaction and response capability in the eastern and southern direction alike.

ESD: You have launched a modernisation programme for your Defence Forces. What are the priorities of this programme?

Ruszin-Szendi: The main objective of our development programme is to make the Hungarian Defence Forces the primary pillar of guaranteeing the sovereignty and territorial integrity of our country. I believe that in today's environment fraught with security challenges, this can only be done by a force with state-of-the-art equipment. Such a force will need to incorporate light, medium and heavy capabilities, prepared for modern application principles, and having high mobility, responsiveness and appropriate reserve forces. These are the factors with which we can ensure that the Hungarian Defence Forces are able to act as a credible regional deterrent and to prevent possible military aggression, both nationally and internationally.

With these in mind, the top priorities of our developments are:

- developing ground and air combat capabilities;
- further development of the voluntary reserve force in line with the development of the Hungarian Defence Forces;
- developing our command and control and cyber capabilities;
- developing light, medium and heavy capabilities;
- developing our air defence and airspace control capabilities;
- developing a logistics system that meets the new requirements, developing the division support capacity;
- completion of the development of HQ MND-C and R-SOCC capabilities in the framework of multinational cooperation;
- further development of tactical aviation capability.

I can say that in these years we have developed and are developing the Hungarian Defence Forces' ground and air forces, cyber and command-control capabilities and the logistics and volunteer reserve system that can support all this along these priorities.

This goal is also strengthened and supported by our efforts to establish a domestic defence industry. In order to meet the challenges of rapidly evolving new technologies and to be able to adapt them, we need a strong domestic defence industry. Our goal is for our defence industry to be able to meet the needs of both Hungarian and international forces by the end of the decade. I think that by fulfilling the above, we will achieve that the Hungarian Armed Forces will be one of the dominant forces in the region in the near future.

ESD: To what extent do the goals of NATO and the EU influence the modernisation goals of the Hungarian Defence Forces?

Ruszin-Szendi: As a result of the commitment made within the framework of NATO in 2014, the increased Hungarian defence

budget and priority government subsidies provided an opportunity for the Hungarian Defence Forces to be renewed after many years of underfunding and to undergo force transformation and development unprecedented since the regime change. The Government is firmly committed to achieving and maintaining a 2 per cent share of the defence budget in the GDP by 2024, providing a solid basis for the long-term modernisation and transformation of the armed forces. The aim of the transformation is to develop a modern army capable of meeting the challenges of the age and further strengthening the security of Hungary, Europe and the transatlantic region. The aim of the transformation is to make the Hungarian Defence Forces a dominant force at the regional level and applicable to the standards of this day and age. The direction of development is largely determined by the requirements of the EU and NATO. In the case of NATO, these requirements are easier to translate into the language of force development as specific development directions, we pledge to achieve the so-called capability goals with specified content and timeframes, which will be derived from the Allies' force



Photo: NATO

30,000 professional soldiers serve in the Hungarian armed forces, 18,000 of them in the Army and 5,000 in the Air Force.



Photo: NATO

Since April 2017, Hungary has taken over the tasks of the reserve tactical battalion of KFOR.



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Hungarian soldiers are deployed across three continents (Europe, Asia, Africa) in 15 countries (Kosovo, Bosnia and Herzegovina, Serbia, Great Britain, Germany, Spain, Italy, Cyprus, Georgia, Afghanistan, Iraq, Kuwait, Mali, Lebanon, Western Sahara).

package to achieve NATO's level of ambition. In the case of the EU, there is a wide-ranging, more complex process that also sets the direction for development, but in a much more flexible framework. The EU places particular emphasis on ensuring that capability development directions are implemented in a multinational format where possible, with the European Defence Agency (EDA) and even within the framework of the so-called Permanent Structured Cooperation (PESCO), using resources from the European Defence Fund (EDF).

In addition, Hungary is pleased to participate in regional collaborative initiatives that coincide with its capacity building efforts, especially within the framework of the Framework National Groups (FNCs) and the V4. Both NATO and the EU have recognised that fierce competition has begun among

world politicians for new types of challenges (artificial intelligence, space, nanotechnology, hypersonic equipment, etc.). Although the HDF's short- and medium-term developments focus more on rebuilding and developing capabilities previously lost due to a lack of resources, in the longer term we will also monitor technologies designed to address new types of challenges.

ESD: With which countries do you cooperate particularly closely?

Ruszin-Szendi: It is clear from what has been said before that we are making significant efforts to replace the old weapons and weapon systems, which are basically from Russian sources but can be used at the end of their life cycle, in which we rely heavily on our allies and partners.

I would like to emphasise that Germany is our key ally in this regard. We work together to procure several land weapon systems. In order to develop the heavy capability, Krauss-Maffei Wegmann GmbH & Co. KG LEOPARD 2 A7HU tanks, and PzH 2000HU self-propelled guns, are being procured. Rheinmetall Landsysteme plays a significant role in the procurement of LYNX infantry combat vehicles and Elbit Systems Deutschland GmbH & Co. KG in our radio procurement. Elbit Systems Deutschland GmbH & Co. KG, together with KMW, will be involved in the development of system integration tasks for the GIDRAN 4x4 armoured, multi-purpose, modular combat vehicles, tactical radio integration, and the C4I capability of the main battle tank, cannon, and LYNX combat vehicle as well. Germany, together with France, is an important partner in the development of Hungarian helicopter capabilities. The H145M light multi-role and the H225M medium multi-role transport helicopters are sourced from these countries.

We are working with Sweden as our old partner to procure an air-to-air missile for our JAS-39 GRIPEN tactical aircraft. With the purchase of the MS-20 development package to improve the combat capabilities of the aircraft, this collaboration has been further expanded. The CARL GUSTAF M4, one of the world's most advanced recoilless armour-piercing systems, is also being procured from Sweden (SAAB BOFORS) under an existing contract.

We also work closely with Norway on the development of ground-to-air anti-aircraft missile systems and their associated command and control capabilities.

Among our partners, I would like to mention the role of Brazil, from whom we purchase 2 KC-390 transport aircraft with full logistic support in accordance with our already concluded contracts. This partnership also includes Israel and Canada, with whom we work in the procurement of radars and 3D active radars, as well as in the implementation of related programme management.

Last but not least, as a key partner, I should also mention Turkey, which supplies us with 4x4 GIDRAN combat vehicles as part of the armoured multi-purpose modular combat vehicle procurement programme. The Turkish partner, Nurol Makina, is also involved in the full system integration of these pieces of combat equipment, together with Hungarian companies.

ESD: Hungary has significantly expanded its partnership with the Bundeswehr at the military level in recent years. What are the

Photo: NATO



Major General Kajári (right) is the first Hungarian officer to take command of the NATO peacekeeping mission in Kosovo for a year as KFOR's 26th commander.

most important projects for you in this context? Will there be more to come?

Ruszin-Szendi: The Hungarian Defence Forces maintain intensive relations with the Bundeswehr at the leadership and expert level. This is partly justified by our three major contracts with Germany for the supply of tank and artillery equipment (KMW), infantry fighting vehicles (RHEINMETALL) and tactical radios (ELBIT). Within this, training and instruction is a key area of cooperation, as the new technical equipment procured and to be procured is not worth much without well-trained soldiers. Within the framework of the German-Hungarian co-operation, our soldiers, who will instruct and train their Hungarian colleagues in Hungary in the future, have received and will receive training. Cooperation with the Bundeswehr also provides an opportunity for our soldiers to conduct joint exercises with soldiers not only in Germany but also in the United States and other NATO countries in an international environment. These opportunities and exercises greatly promote the deepening of our interoperability, the acquisition of practical experience, and the knowledge and application of each other's digital systems. For our part, we will do our utmost to make this relationship stable, unbureaucratic and smooth. To this end, we have set up a liaison group of Hungarian experts in Germany who are in constant, day-to-day contact with the experts and relevant leaders of the Bundeswehr.

ESD: The Hungarian Defence Forces procured numerous pieces of military equipment from German companies. At the same time, Hungary is building up defence production at home - also in cooperation with German companies. What is the current status and are you planning to build up further competencies?

Ruszin-Szendi: The general aim of the Government of Hungary is to create joint ventures in connection with the modernisation of its armed forces, which, in addition to meeting the needs of the Hungarian Defence Forces, will strengthen the Hungarian economy on a market basis, thus reducing the economic exposure of the programme. Thanks to this, we have the opportunity to realise development beyond the performance of the Hungarian economy and the current world economic situation. The co-operation with, among others, German partners is an important part of the strategic development of the defence industry: the goal is for the Hungarian Defence Forces to become a world-class force as soon as possible and thus contribute to addressing the security challenges in the region. Examples of the cooperation so far include the Kiskunfélegyháza small arms factory, the Zalaegerszeg combat vehicle factory, the Kaposvár plant specialising in wheeled vehicles, the Nyírtelek facility dealing with air defence equipment, and a plant for the production of medium- and large-

Photo: MoD HU



Up to 700 Hungarians were deployed in Afghanistan. The last Hungarian soldier returned home on 8 June 2021.

calibre ammunition and explosives is also being established in Várpalota.

The interview was conducted by Rolf Clement.



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Spain in NATO's Missile Defence Architecture

Debalina Ghoshal

Spain was always a crucial partner in the US effort to field missile defence capabilities in Europe to counter short, medium and intermediate range ballistic missile threats from Iran and North Korea.

In May 2020, the ARLEIGH BURKE class destroyer USS ROOSEVELT (DDG 80) arrived at Rota, Spain, replacing USS CARNEY (DDG 64) as part of the US Navy's "forward rotation" while enhancing their "top-of-the line capabilities" to NATO's missile defence. USS CARNEY was one of the four ships that Spain hosted along with USS ROOSEVELT - USS DONALD COOK (DDG 75), USS ROSS (DDG 71) and USS PORTER (DDG 78).

The new destroyer is equipped with new missiles and the Cooperative Engagement Capability datalink, able to "vastly increase the sea-based BMD force structure" in the European region. As noted by Robert Bell, Secretary of Defense Representative, Europe and Defense Advisor at the US Mission to NATO in 2014, "[w]ith these ships stationed in Rota, we (the United States and also NATO) can project a missile defence capability much more immediately and responsively in this region."

It must be noted that Spain was always a crucial partner in the US effort to field missile defence capabilities in Europe to counter short, medium and intermediate range ballistic missile threats from Iran and North Korea. During the Obama Administration, it was planned under the European Phased Adaptive Approach announced in 2009, that the Aegis missile defence system would be deployed in Europe under three phases that would start in 2011 and extend until 2022.

Author

Debalina Ghoshal, is a Non Resident Fellow, Council on International Policy and Asia Pacific Fellow, East-West Institute. Her areas of specialization is on issues pertaining to nuclear, missiles, missile defense, space and artillery issues. She is the author of the monograph 'Missile Development in the Middle East' with the Middle East Institute.

Photo: US Navy



The Spanish ÁLVARO DE BAZÁN class frigate ESPS CRISTÓBAL COLÓN was the flag ship for the execution of Exercise FORMIDABLE SHIELD in 2021. The exercise was to improve allied interoperability in a joint live-fire, Integrated Air and Missile Defense (IAMD) environment, using NATO command and control reporting structures.

By 2014, Spain was hosting four of the BMD capable Aegis ships that were equipped with SPY-7 radar at Rota to show their support for both NATO and the EPAA that it confirmed in 2011. The ships are equipped with SM-3 interceptors thereby making these destroyers a key component in NATO's missile defence shield.

Spain thus became an integral element in the US and NATO's layered missile defence capability. Spain's participation in the EPAA programme "enabled the maximisation of BMD operational flexibility throughout the Mediterranean by utilising the only truly mobile interceptor platforms." Hosting them in Rota, on Spain's south-western Atlantic coast results in lesser ships being required to protect the US and NATO assets in the Mediterranean region.

One of the advantages of these BMD assets is that they can be placed under

NATO operational control too in times of crisis, providing greater flexibility and operational capability.

In 2020, under Foreign Military Sales (FMS) to Spain, the US Navy awarded a contract worth US\$519.1M to support the AEGIS and SPY-7 systems for Spain's F-110 frigates - a Spanish programme to modernise their Navy. These included AEGIS fire control loop development, solid state S-band Radar Processing Group, tools and test equipment, and spares for new multi-mission frigates operating the AEGIS combat system. The F-110 class multi-mission frigates are being developed by Navantia for the Spanish Navy, also referred to as the BONIFAZ class.

The Spanish Ministry of Defence signed the contract with Navantia for the construction of five F110 frigates for the Spanish Navy in April 2019. Construction of new vessels to replace the old SANTA

MARIA class frigates has now begun in 2022 and the first vessel is expected to be delivered to the Spanish Navy by 2027. Lockheed Martin is working with Spain's Indra on the integration of new a solid state S-band radar system developed for the F-100 frigates.

There is little doubt that Spain's indigenous frigates would possess a credible BMD capability. This is well reflected in a Spanish Admiral's observations in 2014, "[t]he emergence of a hybrid threat where irregular warfare and cyber warfare may co-exist with the use of advanced stand-off weapons —including the potential employment of weapons of mass destruction — is shaping the battle space within which navies are required to operate. The transatlantic link enables allies to face these demanding threats, and Spain contributes to the allied ballistic-missile-defence capability (BMD) by hosting the US Navy Aegis destroyer deployment at the Rota naval base, while the possibility of fitting the ÁLVARO DE BAZÁN class frigates with BMD capability in the future is not ruled out." It must be noted that ÁLVARO DE BAZÁN frigates are Spain's indigenously developed frigates and possessed credible air defence capabilities with Standard SM-2 MR and Evolved SEA SPARROW.

This, along with the AEGIS system would provide better 'defence by denial' capability to Spain and also enable Spain to play a credible role in NATO's mission for a credible missile defence capability by making its systems interoperable. Conducting missile defence related exercises would be easier with common systems deployed in both the AEGIS and Spain's indigenous destroyers.

New Challenges

With the ongoing crisis in Ukraine, there is a threat to Spain's naval assets from Russia's military too. This means that Spain and NATO's naval assets could face threats from hypersonic missiles. The SM-6 interceptors may provide the Spanish Navy with a greater defence capability against hypersonic missiles. However, the recent limitation caused by a US funding snag, experienced in its glide phase interceptor programme, is not good news for Spain either. Glide phase interceptors are capable of intercepting missiles at glide phase itself, rather than waiting for the missile to achieve its terminal phase for the interceptor to intercept. Glide phase interceptors, if successfully developed, would

Photo: US Navy



Sailors man the rails aboard the ARLEIGH BURKE class guided-missile destroyer USS PORTER (DDG 78) while departing Naval Station Rota, Spain, in March 2019.

Photo: US Navy



The ARLEIGH BURKE class destroyer USS CARNEY (DDG 64) arriving at its new homeport, Naval Station Maypor. The ship completed its five-year forward deployment to Rota, Spain as part of Destroyer Squadron 60.

provide NATO assets a more credible 'defence by denial' option by reducing the scope of intercepting missiles close to the destroyers.

However, as Spanish local companies are joining initiatives to develop missile systems, they could develop missile defence components, including interceptors in the near future. Again, with NATO's Integrated Air and Missile Defence

(IAMD) only developing slowly, Spain's credible missile defence capability surely would provide a boost to NATO's IAMD capability, but for Spain to feel secure, NATO's IAMD would need to be fully capable of providing credible defence against incoming missile threats. Moreover, Spain still needs a credible defence against cruise missile threats considering their usage in conflicts. ■

The Rise and Fall of the Russian Battalion Tactical Group Concept

David Saw

The central element of Russian ground forces operations is the Battalion Tactical Group (BTG). In the ongoing war in Ukraine, BTGs have displayed a disastrous performance. What went wrong?

The Russian invasion of Ukraine in February this year was supposed to be a military operation leading to a rapid conclusion. Ukrainian command and control capabilities were expected to be disrupted and/or destroyed. Consequently, Ukrainian defensive responses were likely to be uncoordinated. Russian airmobile operations into the strategic depth of Ukraine and, where appropriate, amphibious operations would further diminish Ukrainian capabilities for resistance. Ground forces operations would then rapidly penetrate into strategic depth, utilising their firepower and mobility to sweep aside opposing forces. This all, however, failed to materialise. What went wrong?

Photo: Ukrainian Land Forces



Ukrainian soldiers investigate a knocked out Russian T-72B3 tank, Russian tank losses have been extremely high in Ukraine. As of early April, 66 T-72B3 and 83 T-72B3 obr.2016 (the latest T-72 variant) tanks have been destroyed or captured in Ukraine, according to the credible Oryx blog.

What is the BGT?

The central element of Russian ground forces operations is the Battalion Tactical Group (BTG), which is the product of a process of reform in the Russian Army. To understand what the BTG is and what it is supposed to do, we need to look at the emergence of the modern Russian Army and the challenges it faced, which eventually led to military reform.

It all starts with the collapse of the Soviet Union at the end of 1991, although to be fair the institutional collapse of this once great superpower had seemingly become inevitable in the late 1980s. There were attempts to keep the Soviet military together under the auspices of the Commonwealth of Independent States (CIS), but this was not acceptable to successor states that were emerging from the Soviet Union. As a result, the Russian government established a Ministry of Defence in May 1992, creating Russian ground, air and naval forces.

A Difficult Birth

Russia's military capabilities were born out of the wreckage of the Soviet military. In the early 1990s, Soviet troops and equipment were being pulled out from the for-

mer East Germany and Czechoslovakia, Poland, the Baltic States and Hungary. Those destined for Russia were spread out across military districts all over the country. When these troops returned to the crumbling Soviet Union, there were not enough barracks and other facilities to accommodate all of them. In the midst of all this, corruption became a major problem. Equipment of all types just disappeared, as did stores such as fuel and food. Beyond that, there was another major problem to confront and that was money. The Russian economy was in a shambolic state and the government just did not have the funds to support its military.

Obviously, something needed to be done. This led to the first military reform effort in Russia, which failed to achieve much in the way of reform. The problem was that many senior officers were products of the

Soviet system and could not cope with the fact that the world had changed. They tried to preserve Soviet structures, something that was impossible in the Russia of the 1990s, and they also failed to recognise that their own forces were suffering from bad morale and poor motivation, as well as being deficient in terms of training and equipment. It became plain that the Russian Army was not the instrument its commanders believed it do be when military operations commenced in Chechnya in December 1994.

Disaster in Chechnya

It was supposed to be a rapid operation to restore 'order' in Chechnya. It was expected to be over in a matter of hours with the capture of the Chechen capital, Grozny. Instead, it turned into a disaster



Photo: Ukrainian Land Forces

Russian MSTA 152 mm self-propelled gun abandoned by the side of the road in Ukraine, either out of fuel or a combat loss. As of early April, confirmed Russian losses were 37 2S19 MSTA-S and three 2S33 MSTA-SM2 artillery systems.

that exposed the weaknesses of the Russian Army, including the loss of a Motor Rifle Brigade sent into Grozny. Fighting in Chechnya ended in August 1996 with a ceasefire. Then in 1999, what became known as the Second Chechen war broke out, subsequently spreading across the North Caucasus, with the conflict continuing until 2009. Combat performance did improve in the second Chechen conflict, but plainly, there had to be further reforms to modernise the Russian Army.

Military Reform

In reality, for all of the talk about military reform and the need to develop a new generation of advanced weapons, the crux of the matter was that the Russian economy could not afford to support the superpower pretensions of the Russian leadership. First and foremost, there was the requirement to sustain the strategic nuclear forces, which demanded tremendous investments. It was necessary to consider the army, the air force and the navy, all of whom required major modernisation funding. On top of that, one had to take into account that defence had been significantly underfunded from the foundation of the new Russian state in 1992 through to the mid-2000s. Effectively that amounted to some 15 years of underfunding that had to be repaired before modernisation programmes could commence. There were even worse issues to resolve, and one critical task was to put a halt to corruption and other criminal activity in the military, which had been a serious and constant problem.

When the Putin era commenced in 1999, the imperatives were to restore the power of the state, while being intolerant of dissent, and to regularise the economy to start raising living standards. These objectives were achieved. Initially the dynamic of the regime was power, but then an ideology emerged that was based on Russian nationalism and the desire to have the position of a world power formerly occupied by the Soviet Union. This justifies funding military modernisation and in turn allows Russia to dispute existing borders as it works

towards becoming the dominant power within the borders of the former Soviet Union or perhaps even beyond. As such, this nationalist ideology is not conducive to strategic stability.

Military Structures

Historically Russia has always had large ground forces, whether it was Imperial Russia or the Soviet Union; the only way to achieve the desired force strength was through conscription. For the new Russia, conscription was and still continues to be problematic for a number of reasons. The first was demographic; birth rates in Russia declined dramatically and in consequence the number of military-age males also declined, thus reducing the number of available conscripts. For political reasons, the term of conscription was reduced to 12 months. How much training can be achieved in just 12 months and how useful will these soldiers be?

The solution to the conscription issue was the 'contract soldier,' who was a paid professional soldier and operated under much better conditions than conscripts. Another important effort was to create a proper NCO system in the military, something that had been lacking in the Soviet era. These were positive measures, but the fundamental issue was that the Russian ground force were 'hollow,' since you might have a division, but its personnel numbers were far below the required number.



Photo: Ukrainian Land Forces

Russian Battalion Tactical Groups (BTG) have three mechanised infantry companies, but their light armoured vehicles have suffered heavy losses. As of early April, 104 BTR-82A and 46 BTR-80 had been confirmed as destroyed, abandoned or captured.

Photo: Ukrainian Land Forces



A destroyed BM-27 URAGAN 9P140 16-tube 220 mm calibre MRL system. Each BTG has an attached MRL battery.

The 2008 conflict with Georgia where Russia supported the establishment of two separatist enclaves in South Ossetia and Abkhazia, provided further evidence that Russian ground forces needed to be both modernised and reorganised. The objective was to build new generation formations with high levels of readiness, where the personnel were professional soldiers, and the new formations would have high levels of firepower and mobility, allowing them to have a decisive impact on the battlefield. Initially the idea was to opt for a brigade-sized formation, but this solution proved impossible to implement, as the personnel were simply not available for a full-strength brigade solution. Instead, the idea was to keep the brigade as a parent formation and have manoeuvre units based on a mechanised infantry battalion with attachments to form a combined arms unit. In many respects, this is a battlegroup, something that had been used by both the Soviet and Russian Army as an expedient solution. Here though it is a formalised solution and is classified as the Battalion Tactical Group (BTG). During the first Russia-Ukraine conflict, from 2014 onwards, the BTG played a key role in Russian operations in eastern Ukraine. In the main, BTG-based operations were successful, although weaknesses with the overall concept did become apparent and there were occasions when Ukrainian forces took advantage of these weaknesses to inflict defeats on the BTG.

If one recalls this first conflict in eastern Ukraine, it is significant how little attention it received, despite the fact that it was very unexpected. As regards the conflict itself, first there was the seizure of the Crimea

and then the establishment of separatist zones, with the intensity of ground combat increasing to the point when one US observer described it as the largest scale battles in Europe since the Second World War! Central to this intense conflict was the BTG. The baseline organisation of the BTG is three mechanised infantry companies, one tank company, one anti-tank company, two, sometimes three, tube artillery batteries, one MRL battery and two air defence batteries. There is no consistency in terms of equipment between different BTGs, as the current conflict has demonstrated, for example, the tank company could be equipped with the following vehicle types; T-72B, T-72B3, T-72B3 Obr.2016, T-80U, T-80UK, T-80UM2, T-80BVM or T-90A. It would appear that BTG equipment depends on what is available in the military district where it was raised, and this also accounts for differences observed in armour protection across tank types.

Artillery and Technology

In the first conflict, it became clear that Russian forces held an advantage in terms of tanks, as the T-72B3 and T-90 tanks had superior fire control, day/night optics and a higher performance gun compared to Ukrainian types. Perhaps more significant was the fact that the BTG had a firepower overmatch due to its organic tube artillery and MRL batteries. The BTG could also call on higher-level artillery assets as well, for instance the BM-30 SMERCH, a long-range (90 km) 300 mm calibre system with HE-F, submunition, top-attack, mine and ther-

mobaric warhead options. According to post-conflict analysis, some 85 per cent of casualties in the first Russo-Ukraine conflict were caused by artillery.

These artillery assets could neutralise hostile positions on the battlefield, allowing the BTG to move through the enemy position and maintain a high tempo advance. An indication of the destructive level of Russian artillery can be seen from July 2014 when Ukrainian forces at Zelenopillya in the Donbas were hit with an MRL barrage from positions across the Russian border, when two Ukrainian mechanised battalions were destroyed in less than three minutes!

Maximising the ability of artillery to have a decisive operational impact requires a full picture of the battle area, rapid target detection and classification, the ability to quickly organise and perform a fire mission against the desired target, and then conduct a Battle Damage Assessment (BDA). In the first Russo-Ukraine conflict, the Russian forces were able to give their artillery the ability to provide this decisive operational impact through the extensive use of UAV systems.

The Russians also had a strategic UAV surveillance capability. This consisted of a high-altitude UAV covering the depth of Ukrainian dispositions from the front line through to rear areas, in addition to a medium-altitude UAV to provide target acquisition and fire correction in association with MRL batteries. This capability extended to a shorter-range UAV providing similar services for BM-21 MRL targeting and a small tactical-level quad-copter for BDA and close-in reconnaissance. In addition, counter-battery and ground surveillance radars were also widely deployed. All of this amounts to a very credible Intelligence, surveillance, target acquisition and reconnaissance (ISTAR) capability. In parallel, this demands a robust communications infrastructure for all of the component parts to work and it all did seem to work extremely well. Mention should also be made of the extensive use of electronic warfare systems by Russian forces, covering communications and radar jamming, as well as jamming of Ukrainian UAV control links. Electronic combat was a significant part of the Russian ground combat strategy.

What Went Wrong?

To summarise, in the first Russo-Ukrainian conflict from 2014 onwards, BTGs and supporting ISTAR and electronic combat assets proved to be a very potent offensive tool. In the current conflict, the BTG and its supporting assets have not had the same success, and this is due to a range of hu-



Photo: Ukrainian Land Forces

Ukrainian Land Forces 152 mm 2A65 MSTA-B howitzers during a fire mission in March..

man, tactical and technical factors. Some of those issues could be resolved relatively easily, while others will require more time and significant investment to correct.

Maximising the potential of the BTG requires that the BTG commander, component company commanders and lower-level officers show initiative and react dynamically to the evolving battlefield situation. Instead, very little initiative has been shown, and command has reverted to the old-fashioned top-down structure. There also appears to have been a reversion to the more negative characteristics of the Soviet military system with rigid adherence to an operational plan, even when the reality of circumstances on the ground have made the plan invalid.

One problem for the BTG that became very clear during operations in 2014/2015 was a lack of infantry, though this was offset by the use of separatist forces in eastern Ukraine providing an extra infantry screen. However, nothing was done to correct the lack of infantry prior to the current conflict, with a contributing factor here being the lack of military personnel. The Russian Army has created large numbers of BTGs, as the lure of having large numbers of formations is difficult to resist, but it is plain that they should have focussed on fewer but better units instead. It is said that a BTG needs at least three more mechanised infantry companies, but it really needs more! Also required is an effective reconnaissance element; there have been so many images of Russian units blundering into ambushes, indicating a total lack of reconnaissance.

Even if more infantry and a real reconnaissance capability were to be added, that might not make much of a difference in the face of so many instances of inept tactical handling. Another weakness is that it is clear that little was done to prepare Russian troops for combat operations, explaining why they were going into Ukraine and what they were expected to do once they got there. It appears that many units did not anticipate combat, with their expectation being a road march to their assigned

objectives in the face of zero resistance. When the reality proved different, the impact on morale is not difficult to gauge.

What is also clear is that the ISTAR, UAV and electronic warfare systems that had performed so well in the first conflict, failed to perform as expected in the current one. Indeed, significant numbers of high-end electronic warfare systems have been captured by Ukrainian forces. One of the biggest failure points in the Russian campaign has been in terms of communications, notably the total lack of security in their networks and communications breakdowns leading to Russian troops using cell phones to communicate in the clear. To resolve these problems some high value Russian units, such as VDV airborne forces, have been equipped with the AURIGA secure voice and data satellite communications systems. The vast majority of Russian units continue with compromised communications systems though.

A Litany of Errors

It is very easy to point to the litany of errors by Russian commanders during the current conflict as the reason for them failing to reach their objectives. That is certainly true, but it is impossible to underestimate the contribution of the Ukrainian military and

population in resisting the invasion. The Ukrainian military appears to have learnt a lot of lessons from the first conflict which it has acted upon. Furthermore, its capabilities and its resilience were an immense surprise to the invading forces. In all of this, we should not forget the terrible cost of this conflict to Ukraine and its people.

The second phase of this conflict is now upon us and will be centred in the Donbas region of eastern Ukraine. The Russian objective will be to secure and expand the Donetsk and Luhansk separatist enclaves, and to create a land corridor from Russian-controlled territory through to the Crimea. The supply situation in this operational area should be far more favourable to Russia, and they can base offensive systems in Russian territory where they will be safe from harm, whilst capable of intervention in the battle area in Ukraine. Sadly, this conflict looks set to continue until the Russian Government can declare a victory.

As for the BTGs, so many of these have suffered such losses as to make them combat ineffective and if they are to play a part in the second phase of this conflict, they will need to be rebuilt and re-equipped. Clearly, the BTG has failed to have a decisive impact in the current conflict, but this does not mean that the concept has no value. If the issues with the command culture can be fixed, if more personnel can be found and if the organisation can be modified, then the BTG will have real value. As it currently stands, the BTG is perfectly adequate for less demanding operational environments, not for high intensity operations. If high intensity operations are envisaged then it would seem that a tactical group based on a brigade structure is more appropriate. This would have more infantry, more firepower, more support and more staying power in combat. The future of the BTG remains to be written. ■

Photo: Ukrainian Land Forces



The BM-21 GRAD 40-tube 122 mm calibre MRL system entered service in the 1960s and is in use with both Russia and Ukraine militaries. The BM-21 provides the MRL battery for many Russian BTGs, and consequently losses have been high, with 33 systems destroyed (as seen here) or captured.

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Photo: CADSI



CADSI President and CEO, Christyn Cianfarani

ESD’s Tim Guest spoke with CADSI’s President and CEO, Christyn Cianfarani, about the Association’s latest views on Canadian defence industry exports and partnerships.

ESD: How big is the Canadian defence industry and does its current size reflect any recent growth, or shrinkage, due to changing operational requirements, or politics?

Cianfarani: The Canadian defence industry contributes to the employment of more than 64,000 Canadians and generates CA\$10Bn in annual revenues, roughly 60% of which come from exports. It also contributes over CA\$7Bn to the country’s GDP each year. I will note that these statistics are pre-pandemic, dating from 2018. Every two years, CADSI conducts an in-depth survey of the industry in partnership with Innovation, Science and Economic Development Canada and Statistics Canada. The results of the newest survey are expected in May 2022 and will shed some light on how the industry has fared throughout the pandemic. Anecdotally, we are confident that the industry has grown over the past two years, especially when it comes to our homegrown cyber-defence sector. Canada is currently spending more on defence than it has in several decades, with an additional CA\$6Bn over five years announced in our most recent federal budget. We have seen – and will hopefully continue to see – domestic industry rise to meet that demand. The most recent government-led sector survey, which uses 2018 data, identified 640 defence firms and another 340 firms in cybersecurity. By comparison, CADSI’s membership in 2018 was over 900 firms, which suggested we were able to represent most of the industry, along with many additional firms seeking to do business within the defence arena, like law and accounting firms.

Photo: Author



Colonel Charles Davies (retd), Senior Fellow of the Conference of Defence Associations Institute, Canada

ESD: Please highlight some of Canada’s current leading defence companies and outline some of the most important, regular and sizeable defence-industry exports?

CADSI: Much like when you win an award and have to thank people, listing companies always makes us nervous that we will forget one that provides something outstanding. Canada’s largest defence companies and primes are often – though not always – subsidiaries of American or European

Photo: BAE Systems



Under Canada’s National Shipbuilding Strategy Canadian shipyards will work on a new fleet of surface combatants based on the UK’s Type 26 frigate.

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Cover: The Swedish company Aimpoint is among the leading global suppliers of red dot sights for small arms. Interview: page 98.
Photo: Aimpoint

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firms. What makes them Canadian is the degree to which they hold and generate intellectual property in Canada, export from Canada, and have Canadian-based employees. Notably headquartered in Canada are the shipyards of Irving Shipbuilding and Seaspan, and other firms like MDA, Calian, IMP Aerospace, CAE Inc., and Weatherhaven, to name a few. Some of our larger subsidiaries with significant IP resident in Canada are General Dynamics (more specifically General Dynamics Land Systems), Lockheed Martin Canada, Pratt and Whitney Canada, Textron, Rheinmetall and Thales Canada.

From our perspective, the entire sector is important, as it forms an integrated ecosystem that supports the Canadian economy at both a macro and micro level. For example, shipbuilding is a primary driver of Canadian defence work and investment on the east and west coasts, while in Ontario, Canada's most populous province, there is a complex and active supply chain attached to the production of light armoured vehicles made by General Dynamics Land Systems. But the majority of the Canadian sector is, in fact, comprised of highly innovative, specialised SMEs. They produce world-leading capabilities, not only in traditional defence domains, but also in cyber defence.

Our most export-intensive defence products and services are mission systems/sensors, other electronics, software and related systems, followed by platforms and platform systems. Ground vehicles and components represent CA\$1.3Bn of the CA\$1.9Bn overall value of military goods exported under permit. Next largest, at CA\$140M, is the category that includes aircraft, lighter-than-air vehicles, unmanned airborne vehicles, aero-engines and aircraft equipment, related equipment, and components, specially designed, or modified, for military use.

ESD: On the world stage, how competitive is the Canadian defence industry, how are its products, systems and equipment viewed and received, and what is the current size of Canadian defence exports with financial projections for coming years?

CADSI: Our largest and most important defence trading partner remains the US. Our two defence industrial bases are tightly woven together as we share responsibility for the defence of North America, and we expect to see that relationship deepen further with the modernisation of NORAD. Outside of the US, our industry primarily exports to European countries like the UK and Germany, and these remain very important markets for us. The Middle East is a growing and important region for us, as well. We often boast that Canada punches above its weight on the international stage, and our capabilities are some of the most sought after in the world. Given that we export more defence and cyber products and services than we buy domestically and that our American allies tend to be our largest export market, it goes without saying that Canada is very competitive on the world stage.

CADSI's members participate regularly in international defence shows with support from our partners in government, and we welcome dozens of international delegations to our own defence trade show, CANSEC, each spring. While Canada makes few weapons platforms, there are plenty of non-traditional and disruptive defence technologies where Canada has established expertise, like artificial intelligence, quantum, robotics, training, and simulation, cyber, and space capabilities.

All that said, the Canadian government rarely practices the kind of high-level defence trade diplomacy common in the UK, France, or the US. Our government does not, as a rule, procure defence materiel in an interventionist or protectionist way, which is why you see so many Canadian companies relying on exports to grow their businesses.

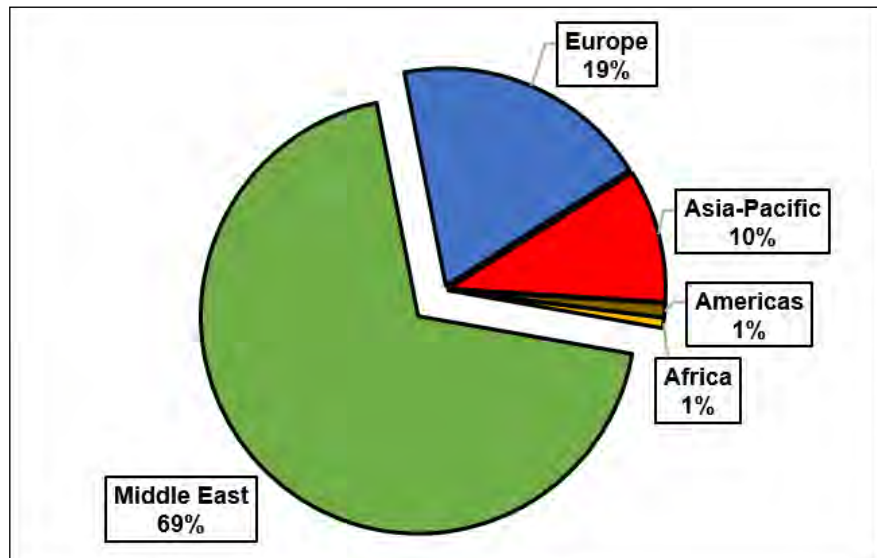
The most recent statistical overview of Canada's defence industry in 2018 shows that the overall export value of our products and services (both permitted and non-permitted) increased from CA\$5.5Bn in 2014 to CA\$5.7Bn in 2018.

The other source of reliable export data, the Report on the Export of Military Goods for 2020, saw "the value of Canadian exports of controlled military goods and technology amounted to approximately CA\$1.966Bn, compared to a value of CA\$3.757Bn in 2019." The report attributes this decrease to the lower value of military exports to Saudi Arabia in 2020, which diminished by CA\$1.553Bn compared to 2019.

In terms of projections, we do not have visibility into individual firms' business plans, making it difficult to project broad trends in Canadian defence exports. However, we expect that exports will continue to play a vital role in our industry's health and its ability to reinvest and prosper, domestically.

ESD: Are there important domestic defence industry partnerships currently ongoing with prime and sub-contractors working on specific programmes/projects, and can you mention any current, international partnerships between Canadian defence industry players and overseas partners?

CADSI: The most notable example of this kind of [domestic] partnership is Canada's National Shipbuilding Strategy, or



Export value of (non-US-destined) military goods and technology – percentage by region

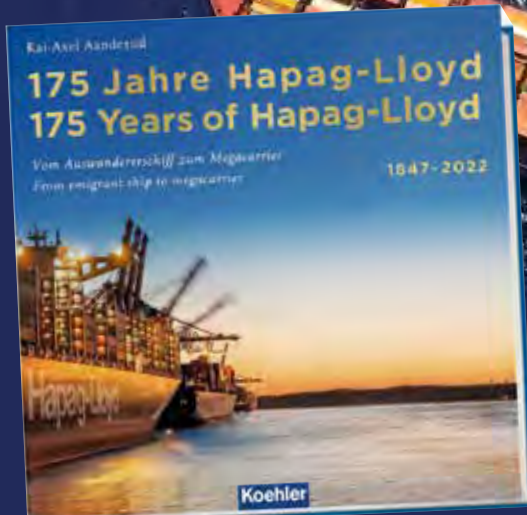
NSS. Launched a decade ago, the NSS represents a complete recapitalisation of the Royal Canadian Navy, with Canadian shipyards currently engaged in the construction of icebreakers, Coast Guard vessels and soon a new fleet of surface combatants based on the UK's Type 26 frigate. The domestic supply chains attached to these projects are complex, and prime contractors have specific, contractual obligations under Canada's Industrial and Technological Benefits (ITB)

Policy to undertake business activity in Canada equal to the value of the contract. This policy applies to all defence and Coast Guard procurements valued over CA\$100M.

We will soon see another example of this type of programme as Canada refreshes its pilot training under the Future Aircrew Training program (FACT). That project will involve similarly integrated domestic supply and service chains and significant investment into the Canadian economy,

Source: 2020 Report on Exports of Military Goods from Canada.

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Photo: Seaspan



A Mari Usque Ad Mare, Canada's motto meaning 'From Sea to Sea' is apt when it comes to shipbuilding as a primary driver of Canadian defence work and investment on the east and west coasts, with Canadian shipyards like Seaspan currently engaged in the construction of icebreakers and Coast Guard vessels under the NSS.

including socio-economic investment in indigenous peoples.

As an industry association, we don't have visibility into specific [international] joint ventures or business partnerships unless the companies involved decide to share that in-

formation. Again, a good proportion of Canadian primes are in fact subsidiaries of large international firms. We do know that a lot of the products and services produced by Canadian SMEs, particularly in cyber defence, are destined for international customers.

As to the war in Ukraine, at time of writing in the first half of April, ESD asked both Canada's Conference of Defence Associations Institute, (CDA) and CADSI about Canada's ongoing support for Ukraine.

Senior Fellow at the CDA, Colonel Charles Davies (retd), told ESD: "After an initial focus on non-lethal items, Canada has provided materiel aid in the form of both lethal and non-lethal military equipment to Ukraine and this is expected to continue. Further, it is providing intelligence services – in particular access to high-quality satellite imagery – and financial support in the form of loans and grants to the Government of Ukraine. Much of the equipment provided to date has come from Canadian Armed Forces inventories, including shoulder-fired anti-tank weapons, hand grenades, sniper rifles and other small arms, night vision and surveillance equipment, body armour, field rations and ammunition. Specialised high-resolution camera systems produced by the Canadian manufacturer Wescam for drone platforms are also being procured. All of these items are part of the aid packages the Canadian government has committed to provide at no cost to Ukraine. Canada's capacity to deliver further lethal equipment in particular is constrained by the limited inventories held by the Canadian Armed Forces, however the government may consider financially supporting other equipment contributions arranged by NATO, like-minded nations or groups of nations."

CADSI's Christyn Cianfarani, added: "We know that the Ukrainians have shared with Canada what they urgently need for their defence, and that Canada has committed that it will provide an additional CA\$500 million in military aid. Further details on this aid have yet to be specified by the Government of Canada. Canada's defence industry stands ready to support the Ukrainian people as they defend their country, and we are working with Canadian Government partners to determine what more we can do."

ESD: What are the prospects for Canadian defence exports looking forward to the end of the decade, and are successes more likely through partnerships?

CADSI: We continue to expect forward-looking growth in Canadian defence exports as we maintain historically high levels of domestic defence spending. In addition, Canada's highly educated population and investment in research, development, and innovation – including in leading-edge technologies such as artificial intelligence and quantum computing – make us an attractive global partner.

We believe that partnerships are critical to accessing the global marketplace. Not only is defence a tool of foreign policy, but it is also viewed by nations as an economic driver, so by nature, it requires in-country partnerships. When we view that through a national security lens, like in the case of cyber, and we see the threat growing, it is obvious to us that no one country will be able to 'go it alone' without allies and without pooling our collective resources.

ESD: Can the Canadian defence industry continue to compete on the global export stage against the leviathans of other western defence industries?

CADSI: Absolutely. We have the technologies, the expertise, and the will to thrive in international markets. But long-term success for our industry and, by extension, the Canadian economy at large will require increased support from the Canadian Government. As mentioned, other countries are far more protectionist and interventionist when it comes to their defence industrial bases, favouring home-grown industry and providing strong supports for firms wishing to grow their presence in international markets. That can mean everything from active trade missions to timely, predictable export-permitting processes.

Canada has a unique relationship with the United States in terms of our collective defence of North America (NORAD) and we remain an active member of NATO. This means that we know what it means to work in partnership with other nations. We understand that in the long-term working collectively, including bringing the best-in-class technology to the table, is the only way in which we will all have enough resources, both financially and in terms of human capital, to defend our values and interests.

ESD: Thank you.

The interview was conducted by Tim Guest.

Canada's Optical Powerhouse

David Saw

The fortunes of Canada's defence industry have fluctuated over the years, at one stage this industry was capable of designing and building advanced combat aircraft and their engines. It built tanks and self-propelled guns, over 800,000 military trucks and other support vehicles between 1940 and 1945. It has built air defence systems, transport aircraft, helicopters, light armour and naval com-

Canada for the manufacture and provision of life-cycle support for small arms fleets and HFI Pyrotechnics Inc. for search and rescue markers, training equipment and other pyrotechnic technology. The MSP has sustained the Canadian small arms sector to the present day and this has set the scene for the Canadian Armed Forces (CAF) to embark on a programme known as the 'Assault Rifle Pro-

and C8 carbine in 5.56x45 mm manufactured by Dimaco (later Colt Canada). They decided that they would need an optic for these new rifles and they wanted it to be a Canadian optic. To this end, the Canadian Government worked with, and helped fund, ELCAN to design, develop and produce an optic for their new C7/C8 weapons. The end result was the SPECTER OS, a 3.4x optic, which was given the C79 designation by the CAF.

The story of how Canada got a weapon optic industry, started in 1952 when German company Ernst Leitz set up a facility in Midland, Ontario, Canada, to build and repair Leica cameras for the North American market. Over the years the company would expand into optics for medical, cinema and space applications, as well as meeting diverse optical requirements across the aerospace and defence industry. The company became part of Raytheon in 1997.

As previously noted, ELCAN started with the C79/SPECTER OS optic at the end of the 1980s, since then they have built some 475,000 sights and they have customers in 40 different countries. Now the company is entering a new era, in November 2021, working with Leonardo Germany, ELCAN won the German military main combat sight (HKV) contract covering the supply of 107,929 SPECTER DR 1-4x optics. Germany has an option to increase the size of this contract by 50%. The importance of high performance optics for small arms is now acknowledged, bearing that in mind one would have thought that Canada would have looked to include ELCAN in the MSP as a key national capability. One would also hope that the CAF will recognise that the optic is far more than just an accessory that can be provided by the weapon manufacturer as an add-on for its future rifle, and treat it as a mission-critical system. As for the future, ELCAN have developed the SPECTER Digital Fire Control Sight (DFCS), to meet integrated optic/fire control system requirements. They are also looking to compete in some important European programmes such as an optic for French Army FN MAG machine guns, an optic for French Special Forces FN EVOLYS light machine gun and an optic for the British Army L85 assault rifle replacement.



Photo: MCpl Genevieve Lapointe, Canadian Forces Combat Camera, Canadian Armed Forces

Canadian soldier with the C9A2 light machine gun and ELCAN C79 optical sight on the Patrol Pathfinder course in Quebec. In the late 1980s ELCAN and the Canadian Government joined together to develop the C79 sight, since then the company has delivered some 475,000 optical sights to a global customer base.

batants. Today, inevitably, the industry is much smaller, even so Canada's industry manages to have some world class capabilities.

Back in the 1970s it was realised that Canada had to retain centres of excellence in key strategic areas, principally those of small arms, ammunition and related systems. To achieve this objective the Munitions Supply Programme (MSP) was created and eventually some five companies, were covered by the programme. These were: General Dynamics Ordnance and Tactical Systems - Canada (GD OTS-C) for the production of small, medium and large calibre ammunition, propellants and explosives. Magellan Aerospace for rockets, illumination flares and rocket propellant, IMT Defence for forged projectiles and specialised machining, Colt

ject.' The aim here is to replace the existing C7/C8 assault rifle, according to the official description: "The project could include a new or same calibre weapon with improved design and materials that improves performance, day and night optics, the ability to share power to devices through a powered rail, and the ability to integrate with soldier information and sensing devices." The Assault Rifle Programme is in the definition phase, programme implementation will commence in 2025/2026, with initial deliveries in 2026/2027.

Building a Capability

In the 1980s the CAF replaced their C1/C1A1 (license produced FN FAL) 7.62x51 mm battle rifles, with the C7 assault rifle

“Many of our customers must trust their equipment every single day as their lives depend on it.”



Photos: Aimpoint

Since its foundation in 1975, Aimpoint AB has produced red dot sights for hunting, police and military applications. At present, there are millions of Aimpoint sights in use globally. ESD had the opportunity to speak with Jonas Ardemalm, Aimpoint's Director for Professional Sales.

ESD: What are red dot sights? How have they changed over the years?

Ardemalm: A red dot sight (also called a reflex sight) is non-magnifying optical device that gives the user a point of aim in the form of an illuminated red dot. The red dot sight uses a LED (light emitting diode), which is completely eye-safe compared to a laser which produces an emission that can be harmful to eyes. Furthermore, unlike lasers, which project a red dot onto a target, red dot sights are all internal thereby allowing only the shooter to see the red dot on their target.

In 1975, Aimpoint AB marketed the first "electronic" red dot sight combining a reflecting curved mirror and a light-emitting diode. The sight was called the "Aimpoint Electronic" and had a closed tube design with a LED that could run for 1,500 to 3,000 hours on mercury batteries. Today, some of our sights run for 80,000 hours on one single AA battery.

Aimpoint's red dot sights today use much lower power consumption LEDs and power saving electronics, allowing them to run for years without being turned off.

Aimpoint red dot sights use an extremely efficient red light-emitting diode (LED) that allows the sight to run on one single battery (AAA or 2032) for five years or AA for eight years without being turned off. Gone are the days when you were worried about the dot when you needed it the most.

ESD: Recently, many red dot sellers have emerged, causing market confusion – some of them with an aggressive pricing strategy. What is Aimpoint's strategy and what differentiates Aimpoint from its competition?

Ardemalm: There are brands trying to take a share of the market today by lowering their prices. There are also a few low-price brands trying to get sales, but you get what you pay for. Using lower-cost components will automatically reflect on the quality and performance of the final product. Aimpoint does not want to compromise in any way. We are dedicated to our task of always delivering user-friendly products that our end-users can trust in any situation they might find themselves in – with simplicity, speed and accuracy.

The Aimpoint electronic red dot sight has revolutionised mid-range to short-range moving target shooting techniques. With

45 years of experience and millions of products in use worldwide, we know that every single detail counts; here are a few examples:

- The use of high-quality components in all our products;
- A very strict manufacturing executed in a highly controlled process and environment. Aimpoint AB is certified according to ISO 9001:2015, and each sight is hand-built at our state-of-the-art facilities in Sweden, assigned an individual identification number, and subjected to rigorous testing and numerous quality control checks during the manufacturing process;
- Skilled and experienced employees;
- User friendliness is extremely important in a stressful situation. On top of that, you have years of continuous use on one single battery and no matter the



Aimpoint's CompM4 and 3X-Mag magnifier is submersible in water to 45 m and 25 m.

weather or climate conditions, your sight will work – always;

- And it is also important to mention that for us, a sale is not the end of the deal, but it is the start of a commitment to our customers. During the product's whole life cycle, we are always there to support our customers.

That makes Aimpoint red dot sights the preferred choice for beginners and experts alike and that is what differentiates Aimpoint from its competition.

Many of our customers must trust their equipment every single day as their lives depend on it. Therefore, we are extremely serious and aware of the importance of developing and manufacturing products that live up to these challenges.

ESD: What are the main benefits of red dot sights compared to other aiming devices?

Ardemalm: There are various kinds of optics on the market. For accuracy and quick target acquisition, red dot sights are superior to iron sights and magnified scopes in several ways.

With iron sights, shooters must align the rear sight with the front sight, which can add time to target acquisition. And by focusing on the front sight, the target is blurry.

Magnified scopes require closing one eye to acquire a target, therefore losing situational awareness. Due to the magnification, scopes are not ideal for fast target acquisition.

The red dot sight technology allows a shooter to do what comes naturally — keep both eyes open while focusing on the target. The single red dot has been proven to be the fastest type of aiming reticle and provides the greatest hit probability on moving targets.

When the red dot is on target, so are you. With ease of use, there is a heightened level of confidence. This is the genesis of shooting with both eyes open – the concept behind all Aimpoint sights. Remaining focused on the target while being fully situationally aware enhances critical decision-making during rapidly developing tactical situations. Increased confidence leads to increased success in the field.

ESD: Why are red dot sights effective for increased accuracy? At what point are they ineffective / have reduced accuracy?

Ardemalm: Red dot sights are the most effective optics when aiming at moving targets. When the red dot is on the target, you are on target. If you are properly zeroed, there is no need to centre the dot in the sight. This allows for quick target acquisition. It is this combination of speed and accuracy that makes red dot sights the preferred choice for beginners and experts alike.

Red dot sights don't magnify and are used primarily for CQB (Close-Quarters Battle), but most shooters can use a red dot sight up to 150 metres. For longer distances, Aimpoint offers 3x and 6x magnifiers that can be mounted behind the red dot sights and allow mid-range moving target shooting. Mounted with a flip-mount, the magnifier can be flipped on the side when not needed or back behind the red dot sight when shooting at longer distances is required.

ESD: How durable are red dot sights? Is extra care required for handling, mounting, and zeroing them?

Ardemalm: Aimpoint sights have been soldier tested and combat proven under the most extreme environmental conditions since the early 90s.



The FCS13RE multi-weapon fire control system mounted here on a CARL GUSTAV M4

Aimpoint products are subjected to brutal testing, including exposure to extreme heat, cold, physical abuse, and submersion under water. From arctic temperatures to desert sand, the ruggedness of Aimpoint red dot sights are extremely rugged, standing up to any challenge.

Our sights are also extremely user friendly. Operated by a mechanical switch or push-buttons, an Aimpoint sight can be easily and quickly changed to the right setting while simultaneously aiming through your sight. Our mechanical switch and push buttons will not freeze and are easy to use when wearing gloves.

Aimpoint® red dot sights don't require any maintenance while used under conditions such as:

- Extreme heat (moist or dry);
- Extreme cold - extreme cold might shorten battery life;
- Dust storms and sandstorms - we only recommend to keep lens covers closed when the sight is not being used;
- Salt air;
- High altitudes;
- Sea spray, water, mud, and snow: Ensure that the battery cap and the two adjustment caps are tightened before exposing the sight to sea spray, mud,



Aimpoint's ACRO P-2 is a 60 g enclosed red dot sight for use primarily on handguns but also suitable for shotguns and carbines.



Photo: Mipictures.com

Many adapter plates are available for mounting the ACRO P-2 sight directly on optic-ready pistols.

snow or before immersing the sight in water - hand tighten only. Clean lenses with lens paper or cloth and wipe the sight dry as soon as possible after exposure to water, sea spray, mud or snow.

ESD: What is the difference between those devices suitable for police and military end-users?

Ardemalm: The products delivered to professional users must be able to withstand the most challenging physical situations and environmental conditions. Therefore, we use even stronger components for critical parts, and we put them to even more extreme tests. All the products for professional users are compatible with all generations' NVDs.

ESD: Has Aimpoint reached the "off-the-shelf" point for police / military availability? Under what conditions could red dot sights be "standard issue"?

Ardemalm: Aimpoint products are considered to be part of the standard equipment in many police agencies, special forces and military units; and they are in service with most NATO countries. All Aimpoint sights for professional use are optimised for use with night vision devices.

ESD: Are red dot sights suitable for all kinds of weapons? What are the limitations?

Ardemalm: Aimpoint offers a wide range of red dot sights suitable for most weapons – from handguns to crew served weapons. The smallest sights in the Aimpoint portfolio, weighing only 60 g, belong to the ACRO series which have been tested and proven to withstand the extreme shock, vibration, temperatures, and material stresses generated by firing over 20,000 rounds of .40 S&W ammunition. And on the other hand, we have the Aimpoint FCS13RE™, fire control systems for crew served weapons. This is a direct view, Dynamic Universal Reflex Sight (DURS) which utilises an integrated laser range-finder and ballistic computer to give the gunner an aiming point corrected for range, type of munition, terrain angle, and environmental conditions. But these two extreme products have in common the fact that they belong to the next generation multiweapon sights.

ESD: Why are more red dot sights being sold for pistols than in previous years?

Ardemalm: The primary reason is that there were no red dot sights available on the market rugged enough to be even considered for professional use. By launching the first generation ACRO series in 2018 – an enclosed red dot sight mounted on the pistol slide, there was finally a sight rugged enough on the market. With the improved 2nd generation ACRO series launched in 2021, we have strengthened our head start and now have a wide range of adapter plates for optic ready pistols and many mounting solutions. The ACRO series becomes an all-round sight for a variety of weapon platforms.

Handgun optics allow shooters to extend the ranges at which they can shoot with precision and speed. This is especially noticeable at ranges of 25 m and above. The most relevant advantage is that the dot allows you to stay target focused. At the shooting range, we have time and do not always realise the full benefits of being target focused. On the other hand, in a real-life violent confrontation, seeing the sight without compromising your visual attention offers a great advantage.

ESD: Which innovation(s) will define the next generation of red dot sights – or, has the technology been taken as far as it can go?

Ardemalm: Aimpoint invented the electronic red dot sight in 1975 and has continued to lead development in electronic red dot sights. We strive to remain number one in that field and constantly endeavour to redefine the standard of excellence in everything we do. Therefore, we are open to ideas that challenge the conventional views and drive innovation, no matter where the ideas come from. The only constant in life is change and we believe that to stay relevant we must constantly improve with changing needs.

Time is irreversible. You have no time to lose when you are under pressure. Our sights are a major player on hunting grounds, shooting ranges and the world's toughest combat areas. By listening to our customers, we are continuously developing new products, using only state-of-the-art technology. We are creating customer needs through innovation and finding solutions to problems our customers did not know they had. There is more to come. Stay tuned.



Aimpoint products are hand-built in Sweden and made subject to rigorous testing and numerous quality control checks.

Israeli Arms Exports to the EU: Land Systems

Eugene Kogan

The demand in Europe for missile defence systems and border-patrol UAVs, coupled with what a number of countries perceive as a threat from Russia, are driving defence investments.

The Russian-Ukrainian war that began on 24 February has substantially increased the chances for Israeli companies to supply land systems to the EU with one conditional caveat.

The Israeli Ministry of Defence (MOD) imposes strict end-user restrictions to donate SPIKE ATGMs to Ukraine as a result of Israel's delicate balancing act, of keeping Russia happy and Ukraine satisfied. Despite this balancing act, pressure on NATO members to increase their respective defence budgets and military modernisation processes – particularly in Eastern Europe – is proving fruitful for Israeli companies, as businesses there can offer systems already proven on the modern battlefield.

Photo: Rafael Defence Systems



The TROPHY APS on a MERKAVA MBT

SPIKE LR2 ATGM

It appears that Rafael Advanced Defence Systems' SPIKE LR2 (long-range) anti-tank guided missile (ATGM) is the most common product that the Israeli company sold via Eurospike to EU Member States. This is a European Joint Venture between Rafael Advanced Defence Systems (also known as Rafael), Diel Defense and Rheinmetall Electronics.

Wolfgang Herrnberger, Eurospike Managing Director, said in March 2020: "Procurement by Slovakia follows past contracts for the SPIKE missile by Germany, and the Baltic States - Estonia, Latvia and Lithuania, and also Denmark and Slovenia, which has created common ATGM capabilities within Europe, serving interoperability and potentially future cross-nation mutual support." It needs to be emphasised that in 2003, Rafael agreed to provide Mesko (PGZ member) with the necessary technology to produce the SPIKE LR ATGM. In September 2021, there were reports that Rafael would like to sign a new agreement

to supply Mesko with new technology, allowing the company to produce the SPIKE LR2. In the author's inquiry sent to PGZ, the company answer was that: "Due to our contractual obligations, we cannot disclose our agreements with Rafael." Therefore, it remains unknown whether or not Rafael and Mesko signed a new agreement. On the other hand, on 14 July 2021, Hungary signed an agreement with Israel to procure the SPIKE LR2 ATGM. The announcement states that the products for the armed forces will be procured in the first round and they should be tested in Zalaegerszeg on the locally manufactured LYNX KF41 IFVs procured from Rheinmetall. The number of missiles due to be purchased is not specified; however, the chances are good that the missiles will be used more extensively sooner rather than later.

SPIKE SR ATGM

The Tallinn-based Centre for Defense Investment (known as RKK) reported that on 20 January 2022, that Estonia had agreed to purchase the Rafael-built 500 SPIKE SR ATGM. The first consignment will arrive in late 2022, and will include ancillary equipment such as training missiles. The launchers are reportedly already in the country. Ramil Lipp, the Armament Category Manager at the RKK, said: "This is a single-use anti-tank missile with a range of up to two kilometres and it is also capable of attacking moving targets." Colonel Eero Rebo, Defense League Chief of General Staff, said that: "The new weapons will significantly increase Estonia's anti-tank capabilities. The new anti-tank weapons will ensure better combat power for the units of the Defense League,

Author

Eugene Kogan is an Eastern European defence and security expert based in Tbilisi, Georgia.

thus helping us neutralise an adversary from further away and more accurately."

PANZERFAUST 3-IT – Exception to the General Rules

The PANZERFAUST-3-IT is an anti-tank missile capable of destroying tanks such as the Soviet-era T-72 and T-80. Manufactured by Germany's Dynamit Nobel Defense, a subsidiary of Rafael is expected to arrive in Ukraine.

In order to clarify the aforementioned case, it needs to be remembered that Germany, the original equipment manufacturer (OEM), did not need to ask for Israel's approval to transfer the weapons because the plant based in Birbach was only acquired by Rafael in 2004. In addition, the German Government had been financing the development of the missile since its introduction into service in 1973. Therefore, this case differs from that of the Baltic States, which were not allowed to donate SPIKE ATGMs to Ukraine.

TROPHY Active Protection System

The success of the Eurospike joint venture led to the formation of a new Eurotrophy Joint Venture between Rafael, Krauss-Maffei Wegmann (KMW) and General Dynamics European Land Systems (GDELS). A new joint venture is responsible for the marketing, sales and production of the TROPHY Active Protection System (APS) for wheeled and tracked armoured vehicles to EU Member States. The first deal for delivering the TROPHY APS for the German Army's LEOPARD 2 tanks was signed between Germany and Israel in February 2021. German defence officials told parliamentarians that they considered the TROPHY, which is already in use on Israeli and American tanks, as the most advanced and operationally proven system available on the market. Apparently, the TROPHY is also used on British tanks. It remains to be seen whether 12 additional European countries that use LEOPARD 2 tanks will order the TROPHY. They are: Austria, Denmark, Finland, Greece, Hungary, Poland, the Netherlands, Norway, Portugal, Spain, Sweden and Switzerland.

David Farmer, Team Leader for the CHALLENGER 3 delivery team at Defence, Equipment and Support, the procurement arm of the UK MoD, said in June 2021: "I am delighted to welcome Rafael to our cohort of industry delivery partners who are working together to bring CHALLENGER 3 to life."

Photo: Rafael Defence Systems



A life fire demonstration of the SPIKE SR

Brigadier General (Retired) Michael Lurie, Head of Rafael's Land Manoeuvrability Systems Directorate, said: "The UK's decision to choose the TROPHY for the protection of its crews, ushers a new era for its armoured forces as well."

IRON FIST APS

In February 2021, BAE Systems Hagglunds chose Elbit Systems to provide the Royal Netherlands Army with the Iron Fist APS and Commander Open Architecture Panoramic Sights (COAPS) for C90 IFVs under a US\$82M contract. Work under the contract will be carried out for a period of four and a half years.

Yuval Karakookly, the Vice President of Survivability for Elbit's Land Systems Division, said: "The deal could lead to further work with the CV90 and potential business in other European markets." The CV90 in addition to the Netherlands is in operation with Denmark, Estonia, Finland, Norway, Sweden and Switzerland.

Hybrid Slat Fence

Plasan Sasa Limited (also known as Plasan) announced on 3 February 2022 that it had signed a contract with Tess Defence S.A. to provide its advanced armoured package for the Spanish Army's VCR DRAGON 8x8 wheeled combat vehicle.

The contract was signed in November 2021 and covers the first 348 DRAGON vehicles. The contract specifies that Plasan will supply its innovative lightweight and modular RPG protection, branded as Hybrid Slat Fence (HSF), and its unique mine protec-

tion solution for under belly and improvised explosive device (IED) side blast with its corresponding energy absorbing mine seats. Deliveries under this contract started in January 2022 and will continue until 2026. Plasan CEO, Dan Ziv, said: "This contract is an important milestone in Plasan's effort dedicated to the VCR DRAGON during the past years and a remarkable evidence for Plasan's unique ability to adapt its technology and solutions to specific platform and customer's needs. Plasan is proud to take part in the prestigious programme of the Spanish MoD and will continue to work closely with Tess Defence S.A. to ensure the successful implementation of the VCR programme."

M339 Tank Rounds

Elbit Systems announced on 21 March 2022 that it has been awarded a contract worth US\$27M by the Swedish Defence Materiel Administration. This is to provide the Swedish Armed Forces with M339 rounds, 120 mm ammunition, and Data Setting Units, for its LEOPARD MBTs. Elbit said: "The Swedish Armed Forces selected the M339 to improve firepower and the ability of the battle tanks to engage different types of targets. The M339 complies with the applicable standards of the US military, the EU and NATO."

Elbit Systems Land General Manager, Yehuda Vered, said: "I believe that this selection by Sweden underscores the growing recognition by Western armies of the unique quality of our portfolio of products." It remains to be seen whether or not other European countries are set to order the M339.



The SMART SHOOTER SMASH X4 system

photo: SMART SHOOTER

SMART SHOOTER's or SMASH Technology

Israeli small arms manufacturer Smart Shooter has offered the EU a solution against increasing UAV threats. These include systems to counter civilian quadcopters, as well as larger UAVs. The company's SMASH family of solutions can be integrated onto assault rifles, and the business specialises in what it calls "one shot, one hit" capabilities to confront small UAV threats, meaning that the system controls the fire of the rifle so that each shot is released when the moving target is in the sight.

In February 2022, the Dutch military ordered the SMART SHOOTER system. Michal Mor, founder and CEO of Smart Shooter,

hopes that the first European contract will lead to more deals within the EU.

Mor added that the market for Smash technology on rifles relates to transforming optics and fire-control, much like navigation apps have changed how smartphones are used. She said: "This is our vision of what modern armies will have in digital fire-control systems. Hopefully, we can bring the infantry to a new world: smart, precise and connected soldiers." The current range for the system is around 250 metres which pairs with the effective range of hand-held assault rifles.

Smart Shooter's Dutch representative, Technische Bureau H.A. Muller, is to take care of the logistics and direct support.

Conclusion

Israeli arms exports to the EU allow for continued extensive investment in R&D in order to remain in the forefront of the world's defence industries, maintain Israel's qualitative edge and remain an attractive supplier of land systems to badly needed EU Member States. Despite the Israeli MoD imposing end-users with restrictions to donate Rafael SPIKE ATGMs to Ukraine, it appears that the end-users, such as the Baltic States, accepted Rafael's stringent conditions, because they urgently need SPIKE missiles that no other country can deliver. It appears that both the ATGMs and various APS systems will continue to dominate the EU Member States' requirements for the foreseeable future. ■

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“XENTA has been a game changer for Weibel.”



Images: Weibel

Frode Scott Nilsen joined Weibel Scientific from a position as Senior Vice President in Glamox. Prior to that assignment, he had more than 20 years of experience from international positions in the oil and gas industry as the former CEO of Multi Phase Meters and FMC Separation Systems.

ESD: Could you give a short overview of the company's key capabilities and products, number of employees, and financial power?

Nilsen: Weibel's prime business is providing range instrumentation radars in X-band on a global basis. In addition to this, we have been the World's premier supplier of muzzle velocity radars for artillery and mortars for the last 30 years. Lately, Weibel has launched a surveillance product line designated XENTA which addresses the rising demand for counter UAS and short-range air defence radars. XENTA is remarkably different in that this radar offers both detection of small, low and slow micro UAVs at long distances, and long distance detection of traditional air targets such as helicopters and fighter jets. Weibel has tripled the revenue and number of employees over the past four years. With the addition of the XENTA product line, we aim to triple again over the next few years.

ESD: 12 April marked your first 100 days as CEO at Weibel Scientific – a time that

As of 3 January 2022, Frode Scott Nilsen has been the new Chief Executive Officer at Weibel Scientific. The 49-year-old Norwegian intends to lead the radar company through yet another growth journey by strengthening the global presence in existing markets and gaining traction with the XENTA surveillance radar for defence and commercial applications.

ESD had the opportunity to interview him three months after he was appointed CEO.

most business leaders feel lays the foundation/sets the pace/fixes the course of their tenure. To what extent have your first 100 days met your expectations?

Nilsen: It is always exciting to get closer to a company. Prior to my appointment becoming effective, I had a very close look at the company in the scope of conversations with the Board, and I feel I was given an honest impression of the company. What I have seen during my 100 first days is products and technology that are superior. The technical depth and expertise of the company has surprised me, and the technical talent in Weibel is simply unmatched. Weibel has always worked very close with our customers, and to some extent tailor-made equipment for each application. Going forward, Weibel needs to combine this flexibility with industrialisation and standardisation to be able to serve a bigger market. In addition, our ability to attract and attain employees will be critical to continue the growth path and deliver according to our ambitions. We have multiple ongoing development programmes and with our current growth, we are continuously seeking new employees.

ESD: Where is the company going in terms of its partnerships with Thales, Kongsberg and other primes?

Nilsen: Partnerships are an important part of our market strategy and Weibel is always open for business with OEMs and system integrators. We see partnerships with international companies as mutually beneficial. We certainly value each partnership.

ESD: How have the recent “wins” prepared Weibel for future collaborations and

new business? And what impact is this having on your business strategy?

Nilsen: First of all, our strategy for the XENTA radar in the defence market is that we do not sell directly to end-users, but through system integrators and other OEMs. The cooperation with system integrators has reinforced our perception of the relevance of the XENTA radar. We have built a new production facility and we are scaling up our organisation on a monthly basis to bolster and prepare Weibel for the future.

Very important for the company is that we now have two business areas. Weibel is already strong in our traditional market for tracking and instrumentation radars, and now we are opening the huge market for surveillance radars. XENTA has been a game changer for Weibel.

ESD: Being a medium-sized, vertically integrated company, you are cooperating or competing with companies much larger than Weibel. Can you describe what that means for your daily operations and what challenges it poses for your business?

Nilsen: Firstly, our vertical integration is our strength. We have control over our supply chain and this has been beneficial to us during the global supply challenges. Secondly, I believe that being a focussed company is a strength. We do Doppler radars, we are dedicated, and we are lean. We have short chain of command, quick decisions and agility; and this is important to us to maintain as we grow.

ESD: What are your longer-term goals for growing Weibel Scientific? In which sectors should we expect to see new solutions?



Aerial view of Weibel's headquarters in Lillerød, Denmark

Nilsen: We are currently in defence and space. We now are getting into Critical Infrastructure Protection (CIP); airports, and other critical civilian targets such as power plants, concert and open-air venues and sport arenas.

ESD: Denmark implemented a new strategy for Danish defence business in 2021 and your predecessor mentioned that your company size would have been at least 5 times bigger if this strategy had been implemented earlier. Could you explain what the difference is between then and now?

Nilsen: Historically, Weibel has not been subsidised nor supported by the Danish Government. With the new Danish defence strategy, three major ministries have committed themselves to support the Danish defence industry. We have significant expectations from the initiative. The intentions of the strategy will help us in many aspects. The new Danish defence strategy will not only help in Denmark, but also in our engagements with other international companies and governments.

ESD: Denmark has just agreed to reach the 2% GNP level of defence spending by 2033 and to give the armed forces 1 billion DKK extra for the next two years. What impact will this have on your business?

Nilsen: We sincerely hope that it will have a positive impact. We have radar capabilities that fit the needs of the Danish Defence for e.g. short range air defence, counter-UAS, ballistic missile defence, space etc. In addition to that, the discussion on national resilience may also spawn growing interest in our capabilities.

ESD: The Danish Government has asked the Danes to vote for (or against) our defence reservation in the EU on 1 June. If Denmark joins the EU Defence Agreement this will mean that Denmark will gain access to the

European Defence Agency (EDA) and can influence the Permanent Structured Cooperation (PESCO). What implications do you expect for the Danish defence industry and Weibel Scientific?

Nilsen: From our side and an industry perspective, we are strong advocates to remove the exemption. To gain full and unhindered access to e.g. EDA and PESCO projects may be a huge benefit. With the war in Ukraine in mind, the push for greater autonomy and a stronger European axis in NATO has never been more important. It is a delicate debate as defence contractors may be portrayed as supporting the vote because we want to make profits, but for us it is about the ability to influence EU decisions that impact Denmark.

ESD: How do you interpret the EU taxonomy not allowing investors to invest in the defence industry. The exclusion of investments in military equipment by the

European Investment Bank (EIB) and affiliates are sending a strong signal which encourages civilian banks and other financial institutions to apply a similar policy. Well known banks in Denmark are also applying this policy. How does this affect a company like Weibel Scientific?

Nilsen: As a privately owned company we are not directly affected by that limitation. Returning to the recent events and the drastic change in the security landscape, we think that reconsidering such limitations may be necessary. Looking into national and European resilience and the ability to survive as democratic societies, we do believe that investing in our common security is a requirement.

ESD: As Weibel's founder once said: "We will not be satisfied until we reach the limits of physics" – are we getting close to it yet?

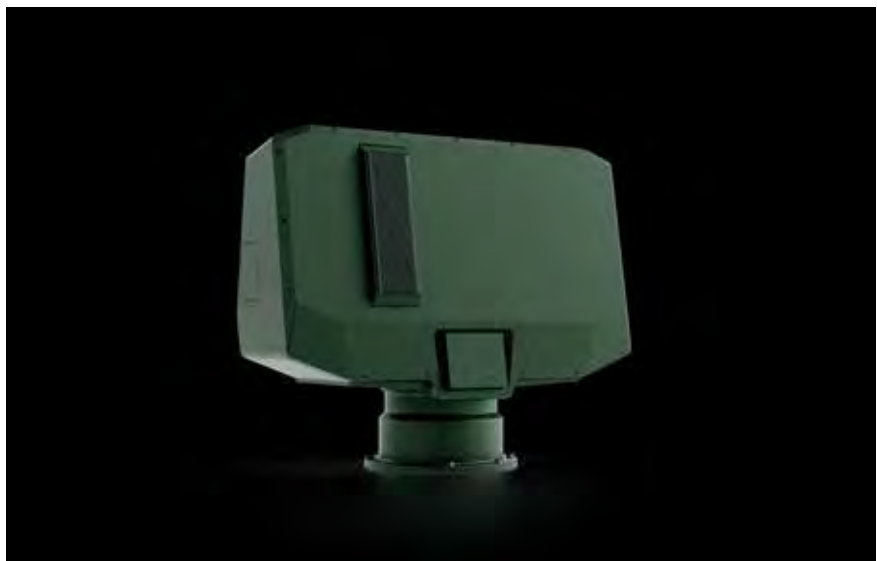
Nilsen: Weibel produces the best radars in the industry. In the way we have designed our radars, it is actually the processing power that constitutes the limitation. We collect more data than can be processed

"We will not be satisfied until we reach the limits of physics"

Erik Larsen, Weibel's founder

with present IT technology. As more powerful processors are released our radars get more advanced and sophisticated. We have not reached the limits of physics yet, but we are certainly getting closer. ■

The interview was conducted by Bo Leimand



The XENTA radar offers both detection of small, low and slow micro UAVs at long distances, and long-distance detection of traditional air targets such as helicopters and fighter jets.

US Army Enters New Small Arms Era

David Saw

The US Army has selected a winner for its Next Generation Squad Weapons (NGSW) programme to replace the M4/M4A1 carbine in the form of the Next Generation Squad Weapon-Rifle (NGSW-R) and the M249 Squad Automatic Weapon (SAW) in the form of the Next Generation Squad Weapon-Automatic Rifle (NGSW-AR).

The NGSW programme commenced in October 2018, replacing the previous Next Generation Squad Automatic Rifle (NGSAR) programme, which was a simple M249 replacement effort. The NGSW winner was SIG Sauer and they will provide the XM5 rifle for NGSW-R and the XM250 automatic rifle for NGSW-AR requirements. This marks the second major US Army small arms win for SIG Sauer, previously they won the 9x19 mm M17/M18 Modular Handgun System pistol programme. Both the XM5 and XM250 will be equipped with the SIG Sauer SLX suppressor and will fire the 6.8 Common Cartridge family of ammunition. The ammunition, developed by SIG Sauer, is a 6.8x51 mm round featuring a hybrid metallic case that offers increased velocity and on target effects.

The NGSW Winner

The initial delivery order for SIG Sauer is valued at US\$20.4M. This amount is said to cover the supply of 25 XM5 and 15 XM250 systems, plus associated ammunition for continued testing. The contract ceiling value is US\$4.7Bn this covers the US Army intention to purchase a total of 107,000 XM5 rifles and 13,000 XM250 automatic rifles, a confirmed order timetable and delivery dates for these weapons is yet to be established. In fact, the contract actually covers the potential purchase of 250,000 weapons covering more weapons for the US Army, other US services and possible Foreign Military Sales (FMS) customers. Operational testing with the new weapons will commence in late 2023/

early 2024 and the first US Army unit to be fully equipped with the XM5/XM250 will be operational most probably in the third quarter of 2024.

As regards ammunition for the XM5 and XM250, in January the US Army Lake City Army Ammunition Plant in Independence, Missouri, which is operated by Winchester, won a contract to prepare for manufacturing facility requirements analysis and production capacity planning for the 6.8x51 mm NGSW round. However, it is expected that Lake City will only be producing NGSW ammunition in volume in FY25 or FY26. Until that point, SIG Sauer will be the source for the 6.8 Common Cartridge family of hybrid ammunition. The US Army is also looking for a conversion kit for their M240 medium machine guns



The US Army has selected SIG Sauer as the winner of the Next Generation Squad Weapons (NGSW) programme to replace the M4 carbine and the M249 Squad Automatic Weapon (SAW). The XM5 rifle in the 6.8x51 mm calibre will replace the M4, offering more range and hitting power.

(US version of the FN MAG), to allow M240B (standard barrel) and M240L (short barrel) weapons to fire the new 6.8x51 mm round.

Another key element of the NGSW programme, the Next Generation Squad Weapons - Fire Control (NGSW-FC) system was awarded in January, when Vortex Optics, received a 10-year firm fixed price, Follow-on Production Other Transaction Agreement (P-OTA) with a maximum ceiling value of US\$2.7Bn covering the production and delivery of up to 250,000 XM157 NGSW-FC systems over a 10-year period. According to the US Army: "The XM157 integrates a number of advanced technologies, including a variable magnification optic (1X8), backup etched reticle, laser rangefinder, ballistic calculator, atmospheric sensor suite, compass, Intra-Soldier Wireless, visible and infrared aiming lasers, and a digital display overlay."

The M16 family, of which the M4/M4A1 carbines are the latest iteration, has been in service since the early 1960s, and the US Army has been trying to develop an M16 replacement for more than 40 years. It would appear that it has finally managed to achieve this goal with the XM5. The impetus for developing and fielding these new weapons comes from recent combat experience and the ac-



Photo: US Army

Range qualification with an M4 carbine at Fort Stewart, Georgia. The M4 is the latest variant of the M16 assault rifle family that entered service in the mid-1960s. Now nearly 60 years later, a successor weapon, in the form of the SIG Sauer XM5, has finally been selected.

knowledge that 5.56x45mm round of the M4 and M249 has reached the limit of its development potential. The new weapons offer accurate fire at extended ranges and the ability to defeat hard targets i.e. wearing body armour. The arrival of the NGSW weapons and their 6.8x51mm round is truly significant

in that it will force those militaries in the process of seeking a new assault rifle, such as the British and the Canadians, and perhaps even the Germans to consider options beyond 5.56x45mm NATO weapons. As things stand at present, the US Army has opened a new era in small arms. ■

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Russian Helicopter Deal on Hold

India Looks Towards Homemade Choppers

Suman Sharma

The Indian Government's recent clearance of 15 indigenous LCH (Light Combat Helicopters) under LSP (Limited Series Production) from the Indian state-owned HAL (Hindustan Aeronautics Limited), coming after the announcement for 12 LUH (Light Utility Helicopters), in November 2021, is a decision steeped in timely wisdom and necessity. The Indo-Russian deal valued at US\$1.2Bn for 200 Ka-226T helicopters, has been put on hold pending further review, as the issue of indigenous content sharing which remains unresolved has been exacerbated by the ongoing Ukraine-Russia conflict resulting in crippling economic sanctions on Russia. Heavy sanctions on Kremlin have put a question mark on those defence deals which are not yet finalised. The Ka-226T chopper is fitted with twin French engines, which might be affected due to sanctions. The inter-Governmental agreement, signed in May 2015, for the long pending deal to replace the ageing CHETAK and CHEETAH fleet of the Indian Army and IAF (Indian Air Force) could be heading towards cancellation according to MoD (Ministry of Defence) insiders. The Indian military has been very vocal about its requirement of replacing its vintage choppers, which are paramount at high altitude for their role in reconnaissance, surveillance, evacuations, and logistic support. Recently CHEETAHs and CHETAKs celebrated their Diamond Jubilee in service. There has been a demand to replace these ageing helicopters which have served for more than 60 years. The other probable factor affecting India's decision to look at its homegrown products, in the wake of the conflicting geopolitical scenario affecting foreign equipment, is the prolonged Indo-China boundary standoff in eastern Ladakh, where the need for new choppers was felt to carry out high altitude operations. Former head of Indian Army Aviation Lt-Gen (Retd) BS Pawar says, "The Indian military is in a dire state as far as helicopters are concerned, as the Government and the military, both have failed. The issues in the Russian deal for Ka-226T over indigenous content and costing have not been resolved. Maintenance of the more than 60-year-old CHEETAHs is an issue and warrants immediate replacement, as these helicopters are the lifeline of Indian soldiers operating at high altitude."

Photo: Anand t83 / CC BY-SA3.0



HAL's Light Combat Helicopter at Aero India 2013

The Light Combat Helicopter (LCH)

Valued at US\$511.45Mn along with infrastructure cost worth US\$49.6Mn, the 15 LCH deal approved by CCS (Cabinet Committee on Security) recently are divided into ten for the IAF and five for Indian Army Aviation.

The locally designed and produced 5.5-ton LCH is a state-of-the-art modern attack helicopter comprising approximately 45 percent indigenous content by value which is likely to progressively increase to more than 55 percent for SP (series production) version. Equipped with requisite agility, manoeuvrability, extended range, high altitude performance and round-the-clock, all-weather combat capability to perform roles of CSAR (combat search and rescue), DEAD (destruction of enemy air defence), the LCH can operate in urban and jungle warfare CI (counter insurgency) environment, and also against slow moving aircraft and RPAs (Remotely Piloted Aircraft). These choppers are capable of successfully carrying out high altitude bunker busting operations, and support to ground forces. LCH is touted to be a potent platform and promises to meet the operational requirements of IAF and Indian Army. Other key features of the LCH are armour protection, night attack capability and systems compatible with stealth features such as reduced visual, aural, radar and IR signatures, crash worthy landing gear for better survivability integrated for deployment in combat roles catering to emerging needs

for the next four decades. LCH also boasts of several key homemade features like glass cockpit and a composite airframe structure. The future series production version will incorporate enhanced modern and indigenous systems.

The manufacturing of LCH by HAL is expected to give a further push to the nation's Self-Reliant India (Atmanirbhar Bharat) initiative and boost indigenisation of defence production and the defence industry in the country. Production of LCH will reduce import dependence for attack helicopters in the country. LCHs are already in the import embargo list. With its versatile features built in for combat missions, LCH looks promising with its prospects in the export market too. LCH was proposed to meet IAF's requirement of a dedicated light helicopter for offensive operations. It shares commonalities with the existing indigenous ALH (Advanced Light Helicopter), in its feature of a narrow fuselage with a pilot and co-pilot in tandem configuration.

The Light Utility Helicopter (LUH)

Under indigenous military hardware purchases cleared by the MoD's DAC (Defence Acquisition Council) in November 2021, noteworthy was the green signal for 12 LUHs to be produced by HAL, a deal worth US\$197.37Mn.

LUH was given a go-ahead for development in 2008 by the Indian Government, as a replacement of CHETAKs and CHEETAHs. LUH was seen to be competing for the same



Photo: CC BY-2.0

The Indian Army HAL LUH

space as the Ka-226T, and was given its due later by the decision that LUH would share the fifty percent burden along with Ka-226T by providing close to 200 helicopters for the Indian military, whose requirement was around 400 for all three services. LUH would assist this ambitious programme by providing half the numbers.

The new generation, indigenously designed and produced three-ton chopper equipped with a state-of-the-art MFDs (multi-function displays), the LUH took its first flight in 2016 and its army variant was given its initial operational clearance in February 2021. The Indian Army is expected to receive the first batch by December 2022.

Powered by a single Safran turbo shaft engine Ardiden 1U, LUH is equipped with a Smart Cockpit Display System (Glass Cockpit), state-of-the-art HUMS (Health and Usage Monitoring System) and is designed for various utility and armed roles. It has successfully completed its high altitude hot and cold missions in the Himalayas, with adequate power margins. The LUH has un-

dergone rigorous trials including envelope expansion, performance and flying technicalities at high altitudes of Leh.

It may be noted, that the LUH cleared a milestone in March 2021 after successfully demonstrating its operational capability in all types of environments, mainly focused on high altitude operations, mandatory for Indian troops functioning at the China and Pakistan borders. This resulted in LUH scripting its own success story in the category of homegrown platforms, paving the way for the Indian MoD clearing the LoA (Letter of Acceptance) to manufacture 12 choppers as part of the first batch.

Indian Parliament was informed by junior Minister Ajay Bhatt about HAL's order for manufacturing the initial four LUHs under limited series production by 2022-23, while the remaining eight LUHs to be built by 2023-24. Out of the initial quota of four helicopters, two each will go to the IAF and the Indian Army, while both services would get four LUHs each from the second batch of the limited series production. This would be followed

by the manufacture of series production of the helicopters by HAL. The new production facility at Tumkur, in the southern state of Karnataka, would cater to the enhanced requirement of helicopter production.

Orders for both the indigenous LUH and LCH have tremendously boosted the Self-Reliant India (Atmanirbhar Bharat Abhiyaan) initiative under Make in India, as India continues to grow in its capability to indigenously design, develop and manufacture advanced cutting edge technologies and systems in the defence sector. Former helicopter pilot and IAF Chief (ret'd) Air Chief Marshal F.H. Major says, "In the present scenario it is very wise to concentrate on the LUH. It is a very good idea, as it boosts the Atmanirbhar Bharat initiative, and we would no longer be dependent on others. The Government should ramp up production and induction of LUH and LCH, though LCH is a different class of helicopter, but the utility helicopters are very much required and therefore should be ramped up." About operational preparedness being affected due to shortage and delays, Major adds that these are catered for by the services as it is known that procurements are spread over a period of time. Lt-Gen Pawar however suggests a solution to meet the immediate needs of services, which is to lease some helicopters belonging to the same class.

Various steps taken by the Government to bolster self-reliance in the defence sector, in the past couple of years, include an increase in FDI (foreign direct investment) in defence production, thereby setting aside a dedicated budget for buying homemade military hardware and announcing two import embargo lists comprising 209 defence equipment to be enforced from 2021 to 2025. ■

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DIMDEX 2022 Report

Luca Peruzzi

The seventh edition of the Doha International Maritime Defence Exhibition and Conference (DIMDEX 2022), which took place on 21-23 March in the Qatari capital, registered record numbers of attendees and exhibitors, starting from the highest number of warships participating in the show's history.

Under the patronage of His Highness Sheikh Tamim bin Hamad Al Thani, the Emir of the State of Qatar, this biennial event is hosted and organised by the Qatar Armed Forces (QAF). This year, it registered more than 200 worldwide and national exhibitors, including from Iranian industry and with a strong Turkish industry participation, in addition to the signature of 32 deals among memoranda of understanding (MoU) and letters of intent (LoI). The 'connecting the world's maritime defence and security community' theme of the show and of the concurrent international conference attracted a turnout close to 20,000 visitors and as many as 90 VIP delegations.

Photo: Luca Peruzzi



The Qatar Emiri Naval Forces' stand showcased models of new naval platforms and weapon systems entering service. The MBDA VL MICA, MARTE ER and MM 40 EXOCET BLOCK 3 munitions were joined by the new mobile coastal defence system and fleet of new generation combatant and amphibious platforms.

New Generation Platforms

The Qatar Emiri Naval Forces (QENF) showcased the models of its large fleet of new generation platforms, weapon systems and coastal missile defence equipment which represents a quantum leap in term of capabilities for a naval service currently equipped with fast attack craft. Among the participating warships was the first of its two 90 m cadet training/patrolling vessels delivered to QENF by the Turkish Anadolu shipyard in August 2021. Fincantieri has also delivered the first of four AL ZUBARAH class corvettes and two MUSHERIB class combatant OPVs respectively in October 2021 and January 2022. The training of their crews by the Italian Navy is being sped up in order for the ships to reach Qatar later this year and contribute to the protection of the 2022 FIFA World Cup. The remaining five ships, including the under-construction Landing Platform Dock (LPD), are following with deliveries in-country to be completed in 2025. In the meantime, the landing craft tank, two landing craft mechanised and a landing craft vehicle and personnel platforms under construction by the Turkish Anadolu shipyard (also present at DIMDEX 2022), will be delivered in October 2023. Late last year, the QENF also received from

Photo: DIMDEX Organization



The seventh edition of the Doha International Maritime Defence Exhibition and Conference registered more than 200 worldwide and national exhibitors, including from Iranian industry, and with a strong Turkish industry participation with nearly 20,000 visitors and as many as 90 VIP delegations.

MBDA the elements of the first new mobile Coastal Defence System (CDS) with MM40 EXOCET BLOCK 3 and MARTE ER anti-ship missiles under delivery, also showcased at the service's and MBDA stands. The European group is also delivering VL MICA and ASTER 30 BLOCK 1 naval air defence missiles, the latter capable to provide, thanks to early warning by national air defence networks and Leonardo shipborne KRONOS radars, a defence against tactical ballistic missile threats. In addition to the already-in-service fleet of the Qatar Coast Guard built by the Turkish Ares shipyard and the fast missile craft of different dimensions delivered by the Turkish Yonca-Onuk company, the Qatar Emiri Special Forces Command signed an MoU during DIMDEX 2022 with the latter shipyard for delivering four additional MRTP 24/U fast patrol craft, alongside Balhambar and Performance Marine companies' platforms.

Innovative Systems

Building on Leonardo's experience in maritime surveillance centres, together with innovative systems and technologies, as well as the full integration of air and maritime components, the QENF awarded the Italian group a contract for a Naval Operation Centre (NOC) capable of providing a fully integrated situational awareness capability to support all operational and tactical stakeholders' decision-making processes. BAE Systems, however, signed an agreement with Barzan Maintenance Shield and the QENF to deliver support for the BARZAN class fast attack craft, as well as naval base management services for the new Umm Al Houl main naval base near Hamad port.

Also involved in a huge modernisation and expansion programme, the Qatar Emir Air Force has been showcasing the cockpit functional replicas of the new generation Boeing F-15QA and Eurofighter TYPHOON combat aircraft, alongside the models of in-service Dassault Aviation RAFALE, Boeing C-17 and new rotary-wing platforms. With deliveries in Qatar ongoing from November 2021, the Boeing F-15QA is joined by the Dassault RAFALES, while the first deliveries of Eurofighter TYPHOONS by BAE Systems are planned for this summer to the joint UK-Qatar squadron in the UK, to be followed by transfer to Qatar in time for safeguarding the FIFA World Cup. The deal with BAE Systems also includes nine HAWK advanced trainer under delivery to another joint UK-Qatar training squadron, alongside a consistent training and in-service support package for both aircraft types.



Photo: Luca Peruzzi

Among a high number of participating warships, the highest in the show's history, QENF was showcasing the first of its two 90 m cadet training/patrolling vessels delivered to the service by the Turkish Anadolu shipyard in August 2021 - here depicted in model.

During the Qatar National Day parade last December, the QEAF also showcased the first two of six M-346 advanced and lead-in fighter trainers under delivery by Leonardo together with a training package provided in Italy by the International Flight Training School (IFTS), a partnership between Leonardo and the Italian Air Force under the umbrella of the two countries' defence agreements. In addition to 24 new Boeing AH-64E APACHE combat helicopters, in December 2021, the QEAF received the first NHIndustries NH90 in the tactical transport (TTH) version under a contract awarded in 2018 to Leonardo as prime

contractor with NHIndustries for the supply of 16 NH90 TTHs assembled by Airbus Helicopters and 12 NH90 in the NFH naval version by Leonardo; the scale model of the latter was presented at DIMDEX 2022. Just one week after, the first two NH90 NFH were delivered to the QEAF by Leonardo, while the training package provided by the Italian Army and Leonardo has so far accumulated over 2,000 real and 2,500 simulated flying hours.

During the exhibition, the Qatar Armed Forces signed an important cooperation agreement with Canadian CAE Group, which is actively involved in the latest ma-



Photo: Fincantieri

Fincantieri already delivered the first of four AI ZUBARAH class corvettes and of the two MUSHERIB class combatant OPVs and the training of their crews by Italian Navy is speeding up in order to reach Qatar later this year and contribute to the protection of the FIFA 2022 World Cup.

for local combat air programmes and which lays the base for joint air operations simulation developments.

The Qatar Emiri Air Defence Forces (QEADF) was also present at DIMDEX 2022, displaying the latest developments and deliveries in terms of surveillance equipment and effectors. Alongside the main elements of a Raytheon PATRIOT battery with Lockheed Martin PAC-2 launcher and PAC-3 MSE missiles, the QEADF displayed a diorama with the model of Raytheon AN/FPS-132 Block 15 Early Warning Radar for detection of ballistic missiles up to a maximum range of 5,000 km, according to US Defense Security Cooperation Agency documentation, as well as of the mobile and fixed air and missile surveillance network of Leonardo KRONOS GRAND 3D radars. In addition to the PATRIOT system, the QEADF is putting into service the Raytheon/Kongsberg NASAMS mid-range air defence missile system, of which the AMRAAM ER (Extended Range) displayed during the exhibition is planned to complement the in-service AMRAAM munitions later this year. For the first time, the QEADF also showcased elements of the Oerlikon SKYNEX VSHORAD (very short air defence) system, which European Security & Defence understood, will be delivered soon, making the service the first known customer of the new generation Rheinmetall Air Defence system. The baseline system includes four REVOLVER Mk3 35 mm guns, C2 and sensor modules, the latter equipped with Rheinmetall's Italia X-TAR3D 3D radar.

Although DIMDEX 2022 saw the participation of international companies specialised or involved in the land sector in terms of platforms, weapon and electronics, including Aselsan, BMC, Haselsan, Iveco Defence Vehicles, John Cockerill, Krauss-Maffei Wegmann, Leonardo, Lockheed Martin, L3Harris, MBDA, Raytheon and Roketsan,



Photo: Luca Peruzzi

The Qatar Armed Forces and Rheinmetall Barzan Advanced Technologies showcased a mobile surveillance suite based on the Nurol Makina NMS 4x4 vehicle with a new modular C2 system entirely developed in-country and deployable surveillance towers with a full suite of sensors.

together with Barzan Holdings' specialised companies, DIMDEX 2022 hasn't registered or announced any main contracts. Presenting for the first time in Qatar, Iveco Defence Vehicles displayed the SUPERAV LAND 8x8 armoured platform, independently developed from its SUPERAV 8x8 amphibious vehicle, while the Turkish Roketsan group was showing, among other weapon systems, the KHAN artillery missile system's capabilities. Jordan's Jadara company presented its new, still under development, SPEAR medium-range anti-tank guided missile. Pakistan's state-owned GIDS defence conglomerate showcased its armed variant of SHAHPAR II UAV and the Iranian defence industries conglomerate displayed the family of new air defence missile systems, including the AD-200 with a claimed effective range of 200 km. A series of MoU and LoI were signed with companies including Thales, Aselsan and Nurol Makina during DIMDEX 2022, to establish technical centres to support in-service and future equipment.

Barzan Holdings, which forms the backbone of Qatari efforts to develop its domestic defence and security industry, was present with its subsidiaries Barzan Aeronautical, which was showcasing its latest surveillance platforms under development, including the manned Q02 ISR Observer, and the unmanned A5000 and Orion, Barrood Ammunition Factory, Barzan Kongsberg, Special Operations Training Company, Bindig joint venture with Beretta, and Rheinmetall Barzan Advanced Technologies (RBAT) with the German group. The latter was showing the new modular and multi-domain C2 system entirely developed in-country for defence and security customers.

An Experimental Anti-Drone System

Interestingly, during the show, the QAF signed an MoU with RBAT regarding an 'experimental' anti-drone system (as termed by local media outlets). The protection against these threats became a major requirement in the light of 2022 World Cup, being closely followed by European and US companies. The Qatar Armed Forces have, however, heavily invested in advanced training facilities with the 'Project 401 integrated training centres' including the Brouq joint special forces naval centre. The Qatari Government also showed how Barzan Holdings invests directly in technologies and programmes for national development, with the participation of the Emir of Qatar at the unveiling ceremony of the two full-scale mock-ups of the UK's Aeralis company's innovative modular jet, for which Barzan Holdings provided investments in the early phase of the development programme.

Photo: Luca Peruzzi



Iveco Defence Vehicles was presenting for the first time in the country and presented the SUPERAV LAND 8x8 armoured platform, independently developed from its SUPERAV 8x8 amphibious vehicle.

2022

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and 4 organisations
(representing 760 delegates)

690

journalists

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