

# 4x4 Armoured Vehicles

- French Army Acquisition Programmes
- **European Artillery Requirements**
- **Dismounted Situational Awareness**
- **Precision Strike**
- Tactical UAS
- Fuses and Propellants



# Politics · Armed Forces · Procurement · Technology

# IAI Loitering Munitions

**Combat Proven Hunter-Predators** 



As the world pioneer in Loitering Weapons, IAI's family of loitering missiles leverage the heritage, and solid foundation earned in decades of research, development, testing and operational experience. Sharing the common DNA of IAI's missile engineering, system integration, mission planning and control, logistics and ergonomics, these combat proven loitering weapons are the role model of decisive weapons achieving overmatch and defeat.

www.iai.co.il • iai-mth-sms@iai.co.il





# **Editorial**



## **Qualified Majorities Instead of Unanimity**

The Brussels authorities are always looking beyond the Ukraine war. It is becoming clear that the war is more than just a crisis. "It is a catalyst for far-reaching changes in the European integration project. The question is not whether EU member states will continue to pull together, but whether they can take their cooperation to a much higher level, " notes Giles Merritt, founder of the think tank Friends of Europe. In response to the Russian invasion of Ukraine, MEPs are calling for faster implementation of the Versailles Declaration of 11 March 2022, in which the heads of state and government of the EU leaders called for the strengthening of defence capabilities, the reduction of energy dependence and the building of a more robust economic base in the wake of Russia's aggression against Ukraine.

The EU Parliament's Foreign Affairs Committee again called for the EU to cooperate more closely with like-minded partners around the world, especially with allies in NATO. Complementary to this, strategic autonomy of the EU must be an important goal of the EU's foreign, security and defence policy, the MEPs argue. The paper then goes on to include the usual policy phrases, ranging from urgent investment in and development of credible military capabilities for better European defence to food sovereignty. The recommendations will now be submitted to the Parliament for adoption, with a vote still expected in June.

In contrast, the re-elected French President Emmanuel Macron seemed to want to forget his abstinence from the Council Presidency with renewed vigour. His idea, presented to parliamentarians in Strasbourg, of reforming electoral law and giving the European Parliament the power of initiative smacks of a commercial break. He pleaded for a new organisation that would associate those countries with Europe that are not yet "ready for the EU". This is hardly sufficient consolation for Kiev after Macron's statement that a process towards Ukrainian EU membership could still take years or even decades. Macron added salt to the Ukrainian wound by referring to an EU summit to be held in June with Albania, Bosnia and Herzegovina, Kosovo, Montenegro, Northern Macedonia and Serbia, all of which are at different stages in their accession processes, but clearly further along than Ukraine. That there can be different speeds in admission procedures in Europe has been obvious since the NATO procedures for Finland and Sweden.

The French President's call for a fundamental reform of the EU institutions is somewhat reminiscent of the brain death he diagnosed some time ago for another Brussels patient. That he is serious is shown by the idea of a convention to be convened to work out reforms for the Union. Paris is in agreement with Rome. Italian Prime Minister Mario Draghi also calls for the abolition of unanimity in EU foreign policy and speaks out in favour of qualified majorities. He also proposes better coordination of national defence planning and systems.

### **The Berlin Perspective**

Thus, the gaze is always directed towards the other leading nation of the EU, which not only instantly ducks away from every demand to take responsibility. But this assumption of responsibility is expected from others. Is this being overlooked in Berlin? A new culture is beginning to establish itself in Europe. Strategy is seen holistically and not just in its parts: Economic, trade, energy and supply policies are included in security considerations almost overnight. This should lead to stronger political and economic integration. But it is also quite possible that the EU will muddle through again. Whichever way it goes, the future weight of the self-proclaimed geopolitical EU will largely depend on it. Independent Berlin positions on the necessities of a more powerful EU as well as on the institutional development options are scarce. This is a cause for concern because it means that a broader German public is not being prepared for what is required. This would be necessary to lay the foundation for acceptance through transparency. The field is left to others.

Hans Uwe Mergener

## Contents

#### SECURITY POLICY

- 12 Afghanistan and the Militant Crossroads Dr. Andreea Stoian Karadeli
- 18 Europe and the United States -**Strained Alliances and Different Visions** David Saw
- 22 Israeli-Turkish Relations: **Challenges and Opportunities** Eugene Kogan
- **Denmark Provides HARPOON** 26 **Anti-Ship Missiles to Ukraine** Hans Uwe Mergener
- A Self-Reliant India Venturing 28 into UAV Technology Suman Sharma
- 32 **China's Countermeasures** and US Theatre Missile Defence Debalina Ghoshal

#### **COUNTRY FOCUS: FRANCE**

- 34 French Defence Policy Overview David Saw
- 38 "To be better equipped and better armed" Interview with Joel Barre, Head of the DGA
- 46 A Global Player: The French Defence Industrial Base David Saw
- 52 Perspectives on the Future of the French Defence Industry A Conversation with Emmanuel Levacher, President of Arguus
- 56 The International Reference for Land and Airland **Defence and Security Exhibitions** Charles Beaudouin

#### **ARMAMENT & TECHNOLOGY**

- 58 Strong and Versatile: 4x4 Armoured Vehicles Sidney E. Dean
- 66 **UK 4x4 Armoured Vehicles** Christopher F Foss
- 68 **Europe Beefs up Artillery Capability** Christopher F Foss
- 76 **Defence of Vital Points in Today's Changing Operational Environment** Tim Guest
- 80 **French Army Acquisition Programmes** David Saw
- 87 The Future of War is Unmanned Aircraft Systems and Loitering Munitions John Antal

- 90 SCORPION Update Christina Mackenzie
- 93 **CV90 Wins in Slovakia** Martin Smisek
- 94 Precision Strike- A Techniology in its Infancy J. C. Menon
- 100 Situational Awareness for the **Dismounted Warfighter** Tamir Eshel
- 104 Franco-German Combat Aircraft Developments Giulia Tilenni
- **108** Preparing the Alliance for Future CBRN Defence The Joint CBRN Defence Capability Development Group Frank Sabath, Paul Weaver-Smith and Joseph Kopcha
- 112 Markets and Developments in Vetronics Tim Guest
- 117 Course Correction Fuzes and Modular Charges Tim Guest
- 122 Shells, Bombs, Zeros and Ones Thomas Withington

#### **ARMED FORCES**

- 126 How the French Army Prepares for the Battles of Today and Tomorrow Jean François Auran
- 132 "We are concerned about Russia's aggressive actions that violate the sovereignty of independent states" Interview with Lieutenant General Dr. Romulusz Ruszin-Szendi, Hungary's Chief of Defence
- 136 Swedish Army to Build-up Four Fully **Equipped Brigades** Lars Hoffmann
- 137 Combat Support Service of the **French Land Forces** Jean François Auran

#### **VIEWPOINT FROM ...**

- 116 New Delhi Suman Sharma
- **COLUMNS** 
  - 1 Editorial
  - 4 **Firms & Faces**
  - 5 **ESD Spotlight**
- 99 Masthead

2

### **Index of Advertisers**

ADL	77
Aeronautics	89
Aimpoint	47
AM General	59
Arguus	91
Aselsan	17
Autoflug	11
Belss	37
Beretta	4 <sup>th</sup> cover
Bren-Tronics	63, 111
Bittium	35
Bofors Text Center	95
CES	19
Collins Aerospace	81
Controp	78
СТА	127
Daimler	3
Defenture	61
Diehl Defence	7
DND	49
ESG	43
Euronaval	110
Eurosam	39
EVPÚ Defence	73, 115
Excalibur	23
FCMS	107
FMV	72
FSAD	48
Future Forces	44
GDELS	21
Guardiaris	75, 84
Hirtenberger	29, 123

IAG	62
IAI	2 <sup>nd</sup> cover
Innosystec	45
Invisio	41
iXblue	27
Litef	25
MSPO	74
NBC Sys	33
Nexter	31
NFM	103
ODU	13
Ophir	79
Oshkosh	15
PBS	86
Pearson Engineering	83
Photonis	69
Pik-As	67, 71
Plasan	64
Raytheon ELCAN	53
Rohde & Schwarz	82
Saab	65
Safran	51
SAHA	113
Smart Shooter	9
SMM	131
Tencate	85
WB Group	55, 88
Weibel	57
Will-Burt	101
Yugoimport	3 <sup>rd</sup> cover



# **Operational Readiness.**

**Mercedes-Benz Defence Trucks.** Gebaut, um jede Mission zu erfüllen. Mercedes-Benz Defence Trucks bietet Ihnen mit den Baureihen Unimog, Zetros oder Arocs eine maßgeschneiderte Lösung für jeden betrieblichen Bedarf. Unsere Lkw unterstützen Sie zuverlässig in allen Einsatzszenarien – ob in schwierigem Gelände oder auf normalen Straßen. Außergewöhnliche Mobilität, Sicherheit und Effizienz: mbs.mercedes-benz.com/defence-trucks



Mercedes-Benz Trucks you can trust

### 40th Anniversary of Pik-As Austria



(jh) This year, Pik-As Austria GmbH, headquartered in Mariasdorf (Austria), is celebrating the company's 40th anniversary. Founded in the early 80s by Franz Polster, the company has

grown steadily specielising in the sale and production of electromechanical components, such as high-power relays, LED interior lighting, power connectors and harnessing for special purpose vehicles. Pik-As is a private company and currently lead in by Christina Polster.

At the beginning of this year, Pik-As expanded its production capacities and opened a new production facility in Unterschuetzen (Austria). Pik-As has been a reliable partner since 4 decades and supplier to many high-quality manufacturers of land vehicles and their systems worldwide for four decades, the company writes in a press release.

## Sheik Mohamed Appointed President of the UAE

Photo: wam.ae



(jh) The President of the United Arab Emirates (UAE), His Highness Sheikh Khalifa bin Zayed Al Nahyan, passed away on 13 May 2022. As the first son of the late HH Sheikh Zayed bin Sultan

Al Nahyan, Sheikh Khalifa succeeded his father as Ruler of Abu Dhabi and became the President of the UAE in November 2004. Sheikh Khalifa (born on 07 September 1948) was also the Supreme Commander of the UAE Armed Forces. He has also served as the Chairman of the Supreme Petroleum Council since the late 1980s.

Following Sheikh Khalifa's demise, the UAE Federal Supreme Council elected His Highness Sheikh Mohamed bin Zayed Al Nahyan as President of the United Arab Emirates.

A statement issued by the Ministry of Presidential Affairs said that according to Article 51 of the Constitution, His Highness Sheikh Mohamed bin Zayed Al Nahyan was unanimously elected as the President of the UAE to succeed the late Sheikh Khalifa bin Zayed Al Nahyan.

# Babcock Begins Major Regeneration of Devonport Facility

(jh) Babcock International Group has started a series of major infrastructure projects at Devonport in Plymouth, the company writes in a press release. Over the next 10 years Babcock plans to develop state of-the-art facilities to meet the evolving requirements of the UK's Royal Navy.

Since 2020 the UK Ministry of Defence has awarded Babcock initial contracts worth around £140M for infrastructure design and enabling works that will support the ASTUTE class submarine, which is currently since 2015, a role in which he successfully drove Peli's commercial activities to a higher level across that region by implementing successful sales strategies and bringing an extraordinary increase of sales of 30 per cent while building long-lasting customer relationships within the company's distribution network and direct customers.

As a result of this promotion, Paul Bates, Senior Director of Sales UK and Emerging Markets and Estefania Fenoy, Marketing and Communications Director for EMEAI, are now reporting to Della Mora.



replacing the TRAFALGAR class SSN submarine. This is the first stage in a multi-year development programme for Devonport. These major upgrades are to enable deep maintenance work packages for the latest class of nuclear-powered fleet submarines. Dock upgrades to support the ASTUTE operational programme are expected to enable optimisation of maintenance on the platforms between HM Naval Base Clyde and Devonport dockyard.

### Francesco Della Mora Appointed VP Sales & Marketing EMEAI at Peli



(jh) Peli Products has announced several organisational changes within the Sales and Marketing departments effective from 1 April 2022. A key part of this reorganisation is

the promotion of Francesco Della Mora to Vice President of Sales and Marketing EMEAI. In his new role, Della Mora will be reporting directly to Piero Marigo, President of International Business EMEAI, Asia and Australia, as previously announced. Prior to this appointment, Della Mora as Director of Sales for Continental Europe

### Dagmar Steinert to Join Executive Board of Rheinmetall



((jh) Dagmar Steinert, 57, has been appointed to the Executive Board of Rheinmetall, effective 1 January 2023, Rheinmetall writes in a press release. Steinert, currently a member of the board

of management of Fuchs Petrolub SE responsible for commercial operations as well as legal affairs, compliance, and digitisation, is due to succeed Helmut P. Merch, 66, as Chief Financial Officer of Rheinmetall, who retires at the end of 2022.

From 2003 to 2013, Dagmar Steinert headed the Accounting Department of Rheinmetall AG. As well as holding a degree in Business Administration from the University of Cologne, she is a certified auditor and tax advisor. Steinert began her career at various auditing and tax consultancy firms, lastly spending five years at Pricewaterhouse-Coopers. Following her time at Rheinmetall, she joined the MDax-listed company Fuchs Petrolub in Mannheim, initially serving as Head of Investor Relations. In 2016 she joined the company's board of management as CFO.

### Teledyne FLIR Introducing SeaFLIR 240 and TacFLIR 240 Surveillance Systems

(gwh) At SOFIC, Teledyne FLIR introduced the SeaFLIR 240 and TacFLIR 240 high-resolution, multispectral surveillance systems for maritime and land-based operations. According to the company, SeaFLIR 240 is a lightweight, stabilised tower with inertial navigation for a wide range of HD payload options. This allows sensors to be integrated



as required for at-sea missions such as intelligence, surveillance and reconnaissance (ISR), search and rescue and special operations. Integrated image processing technology and the system's small size enable its use on combat ships, small boats and unmanned surface vessels, the company emphasises.

TacFLIR 240 is designed for use in manned and unmanned vehicles to identify and track smugglers, terrorists and other threats by day and night. The system supports the detection and assessment of medium-range objects and vehicles.

Key features of the new imaging products include: HD MWIR thermal, HD daylight and HD low light camera options; eye-safe laser rangefinder and laser pointer, high performance CPU/GPU/DVR with video processing and numerous interfaces and special protocols.

### Belgium to Receive CAESAR 155mm Wheeled Howitzers

(gwh) Within the framework of the expanded Capacité Motorisée (CaMo) programme, Belgium is procuring nine CAESAR NG selfpropelled howitzers. The contract, signed by the Belgian and French defence ministers, has a procurement volume of €62M. Deliveries are to start in 2027.

With CaMo, Belgium is leaning heavily on France. So far, the delivery of more than 400



GRIFFON multipurpose and JAGUAR reconnaissance vehicles as well as joint training have already been agreed.

The CAESAR NG wheeled howitzer is a 155mm artillery gun with a range of 40 km (with standard ammunition) from Nexter on a 6x6 chassis from Arquus. The new generation howitzer has received a protected cabin and a reinforced 340 kW engine. The French procurement agency DGA had commissioned the development in February and ordered 109 systems for the French Army.

### Inmarsat Offering Bandwith Uplift for ISR Operations

(jh) In response to increasing demand from military customers and governments for wider bandwidth in the air – especially for Intelligence, Surveillance and Reconnaissance (ISR), battlefield surveillance, border patrol, fishery, forestry detection, and protection missions – Inmarsat has launched its new L-MAX leasing service, the company writes in a press release.



L-MAX is to enable government users to connect via Inmarsat ELERA L-band through both the I-4 and ALPHASAT satellites. Until now, for ISR aircraft operations, customers have had to choose between the exemplary SWAP (size, weight, power and price) features of Inmarsat SwiftBroadband and the throughput advantages of the larger terminals of Inmarsat Global Xpress.

According to Inmarsat, government agencies can now benefit from the best capabilities of both worlds through the Inmarsat L-MAX service with only minor modifications to current SwiftBroadband (SB) installations. Launch partner Eclipse Global Connectivity worked closely with the Inmarsat global government team to launch the first commercial operation of this service with a NATO nation.

L-MAX reserves bandwidth and power over a geographic region for a specified duration and uses higher-order modulation and coding (MODCOD) to deliver Internet Protocol (IP) data.

## MSPO 2022 to Feature Turkey as Lead Nation

(jh) Turkey will join this year's International Defence Industry Exhibition as the Lead Nation, the MSPO organisers write in a press release. The Turkish defence industry



presented its capacities at the exhibition in 2013 for the first time.

The Turkish Minister of National Defence, Mr Hulusi Akar, in an official letter to his Polish counterpart Mariusz Błaszczak, emphasised the importance of events dedicated to the defence industry. He assured that many companies representing this economic sector would join the Turkish pavilion at MSPO 2022.

The Lead Nations exhibits have been an indispensable part of the exhibition since 2004. Until now, the European Defence Agency and the following countries have presented their capacities in this format: Germany, France, Israel, Sweden, V4 Visegrad Group, the United Kingdom, USA and Poland (twice), Italy, France, Norway, South Korea and Turkey.

MSPO will celebrate its 30th anniversary this year. According to the organisers MSPO is ranked third among all Europe's exhibitions, after the Paris and London trade shows. This year's MSPO is held from 6 to 9 September 2022.

### DIRCM and EW Systems for MRTT Airlifters

(jh) A330-200 Multi-Role Tanker and Transport aircraft (MRTT) soon to be delivered to various European air forces will be equipped with countermeasure systems against IR-guided surface-to-air missiles. Elbit Systems has announced that the J-MUSIC DIRCM has been selected as a direct countermeasure against IR missiles, including infrared-based passive air warning systems (PAWS IR).

Elbit's DIRCM systems feature laser technology, thermal imaging cameras and a dynamic density mirror turret that is to provide



### European Security Spotlight Defence

defence against surface-to-air IR missiles, the company writes in a press release.

Elbit Systems' DIRCM and EW systems are already common on numerous transport aircraft. These include aircraft of NATO's Multinational Multi-Purpose Fleet, the German Air Force and the United Arab Emirates Air Force.

### Rheinmetall Supplying Counter-sUAS System to Austria

(jh) The Austrian armed forces have selected Rheinmetall's C-sUAS system for a six-month period of testing and evaluation, the company writes in a press release. In May 2022, Rheinmetall Air Defence shipped the latest version of its deployable counter-small unmanned aerial system (C-sUAS) to the Austrian military. The system comprises two shelter units, enabling rapid deployment on standard trailers and trucks. The sensor unit elevates automatically and can be equipped with various detection technologies, including X-band and S-band radar, passive



emitter locator, ADS-B receiver and others if required. An integrated, stabilised 360° electro-optical PTZ sensor provides verification and tracking capabilities.

Based on the Oerlikon SKYMASTER command and control system, the separate C2 shelter is a fully fledged operator workstation. SKYMASTER provides sensor data fusion and multiple operational functions, including scalability to integrated target cueing devices and effectors for different countermeasures as well as links to higher echelons. The Austrian armed forces will put the Rheinmetall C-sUAS system through its paces at several locations in Austria, gaining expertise and experience by simulating air base protection, integration with other military units and providing C-sUAS protection in urban areas. A major highlight will be a public demonstration of the C-sUAS at the renowned AIRPOWER 2022 air show at Hinterstoisser Air Base, home of the Eurofighter, near Zeltweg, Austria, Rheinmetall writes.

### Second GOWIND Corvette for the United Arab Emirates Navy Launched

(jh) On 13 May 2022, AL EMARAT, the second GOWIND corvette ordered by the United Arab Emirates (UAE) from Naval Group, was launched in Lorient, France in the presence of an official delegation from the United Arab Emirates Navy. In 2019, the United Arab Emirates ordered two GOW-IND corvettes to be built in France. The first unit, BANI YAS, was launched in December 2021. Naval Group will also train the UAE Navy's crew from the equipment level up to the operational level. Starting in France, this

### **Saab - the Iberian Perspective**

(jh) In the scope of a press briefing, the Swedish company Saab informed about its intention to considerably increase its efforts and presence in the area of simulation and training in Spain and Portugal in the future. In other areas, the company can already point to noteworthy references on the Iberian peninsula. Among other things, Saab has about 300 mechanical components produced by subcontractors in Spain. Country Manager Ingemar Karlsson also listed the company's involvement in the following projects in this context:

- Spanish Air Force: TAURUS cruise missile, BOL countermeasure dispenser on EUROFIGHTER, High-Lift Control System and a door for the A400M transporter.
- Spanish Navy: Emergency rescue vehicles for the crews of the new S-80 submarines, transponder and navigation systems in cooperation with Spanish partners.
- Spanish Army: Four ARTHUR artillery detection radars, one of which is planned to be deployed in support of the Spanish contingent in Latvia. In addition, Saab has been supplying popup targets for firing ranges for more than 20 years, including a partnership with the Spanish company COHEMO.

Although the Spanish Army has not yet formulated a requirement or even issued a call for tenders, Saab sees a potential need for modernisation in the area of live simulation, specifically the replacement of a duel simulation system that is more than 20 years old and still in service in Spain. This capability gap identified by Saab could be filled with the company's GAMER technology, a laser and radio-based interoperable live training system that is in use or commissioned by armed forces on all five continents, part of which are 20 European countries. Among others, the Danish procurement agency DALO contracted Saab in March to deliver corresponding training solutions, and the US Marine Corps commissioned the company with further contract modifications as part of the Force-on-Force Training System - Next (FoFTS - Next) awarded in 2021. Lsst year also the Netherlands extended their agreement with Saab for continued live training. In addition to the existing training and simulation sites, four more are in the pipeline on behalf of the USMC in the USA, as well as multiple sites in Poland and one in Kenya.

According to the company, the following training segments in the area of land forces can be covered with the GAMER technology: Gunnery Training

Urban Training C-IED Training Combatr Support Medical Training CBRN Training LVC Training.





preparation will continue with teambuilding and practice on operational scenarios in every warfare area in the Gulf.

Thus far, 12 units of the GOWIND design have been sold. Most of them are built locally through transfer of technology and partnerships with local industry, for example in Egypt where three units are now in service within the Egyptian Navy.

## Joint Polish-British Tank Destroyer Production

(gwh) Nine companies of the Polish defence group PGZ have signed an agreement with MBDA UK on cooperation in the field of tank



destroyers. According to a statement from MBDA UK, the agreement will enable the development and production of vehicles in this class with the use of MBDA UK's BRIM-STONE anti-tank guided missiles.

Representatives from PGZ and MBDA UK had already reached an agreement to work

together in 2019. According to MBDA UK, this will now be continued and will form the basis for further cooperation in the area of integrating anti-tank guided missiles with the tank destroyer vehicles described by the customer and the production of the BRIM-STONE missile at PGZ's facilities.

The cooperation is part of the OTTOKAR-BRZOZA programme, which envisages that the Polish Armed Forces will procure battery equipment of self-propelled tank destroyers. Based on a modern platform, the systems are to be capable of destroying armoured targets with the help of anti-tank guided missiles. The battery equipment also includes support and command vehicles.

### CV90 Combat Support Vehicles Delivered to Norway

(jh) The first four CV90 combat support vehicles were delivered to the Norwegian Armed Forces during a ceremony hosted by local industry partner Ritek AS in Levanger, Norway, BAE Systems Hägglunds writes in a press release

The four vehicles are the first of 20 modernised CV90 engineering vehicles BAE Systems is deliver, in partnership with Ritek and the Norwegian Defence Materiel Agency.

According to BAE Systems, partnering with the Norwegian defence industry was a key factor in getting the contract signed and the vehicles into production quickly, under measures implemented by the Norwegian Parliament to support the country's economy through the challenges posed by the coronavirus pandemic. BAE Systems serves as the main supplier, while Ritek plays a central role in purchasing, logistics, final assembly, and integration. Ritek has also been responsible for coordinating the project and grow-



ing the participation of Norwegian industry. As a result, about 20 Norwegian companies are now qualified suppliers of products and components for the CV90 vehicles, and an integral part of BAE Systems' Norwegian supply chain, the company emphasizes.

### Rheinmetall Tests Laser Weapons Against Drones

(jh) Rheinmetall has tested the technology demonstrator version of a laser weapon built on behalf of the German Bundeswehr. The first trials with the laser testbed were conducted at Rheinmetall's proving ground in Unterlüß as part of a Counter-Unmanned Aircraft System (C-UAS) campaign, the company writes in a press release.

The laser testbed serves not only as a technology demonstrator laser weapon, but also as the basis for future R&D work at Unterlüß in Lower Saxony. It is designed so that all components of a future laser weapon sys-





The IRIS-T SLM Air Defence System protects urban areas, critical infrastructure sites and military units.

tem can be examined modularly. Every interface to the sensors – the radar, for example – or to the energy supply and laser source are "open" designs. This makes it possible to test every conceivable combination iteratively and then to compare the results, the company emphasises.

The objective of current studies in the laser testbed is to produce a suitable configuration for a mobile technology demonstrator with a laser output of over 10 kW for integration with a BOXER AFV vehicle by the end of 2022.

At present, the laser testbed consists entirely of subassemblies made by Rheinmetall. But open interface architecture makes it possible to integrate and test components from other manufacturers also.

The laser testbed consists of a 20-foot container divided into three compartments: laser, operator and infrastructure. Encompassing five 2 kW-fibre laser modules, the laser source is installed in the laser compartment. Bundled via spectral coupling, the individual laser modules achieve a total output of 10 kW. Rough orientation of the laser weapon station is based on data from the suite of electro-optical sensors in the weapon station. This is ready to operate around the clock. For fine tracking, the reflection of the target irradiated by the illumination laser is evaluated in the beam guidance system and transformed into corresponding guidance signals for tracking the target. Furthermore, under conditions of functional safety, all subassemblies necessary for target engagement, e.g., beam status monitoring and target point control, were achieved for the first time within the optical beam path.

According to the company. during the C-UAS campaign in Unterlüß, a variety of drone types were optically tracked and neutralised at ranges of engagement of up to one kilometre.

A demonstration was subsequently carried out for representatives of the Federal Ministry of Defence and the Federal Office of Bundeswehr Equipment, Information Technology and In-Service Support. The outcome met the expectations of all participants, Rheinmetall writes.

### HADRON 640R Dual Thermal Imaging/Optical Camera for Unmanned Systems

(gwh) At AUVSI Xponential in Orlando, Florida, Teledyne FLIR has unveiled the HADRON 640R, a camera that combines a 640×512 pixel resolution radiometric boson thermal imager and a 64 MP optical camera in a Size, Weight and Power Consumption optimised design. As Teledyne writes, the design of this camera system has been optimised for integration with:

- Unmanned aerial systems
- Unmanned ground vehicles
- Robotic platforms
- Emerging AI applications.

In these applications, extremely compact design, high battery life and long operating time are crucial. Reportedly, the Long-Wave Infrared thermal imaging camera, with a resolution of 640 x 512 pixels, provides a temperature reading for each pixel in the sensor field and can see through:

- Total darkness
- Smoke
- Fog
- Glare

Combined with the 64MP high-resolution optical visible camera, the HDRON 640R is capable of providing both thermal and vis-

ible imagery compatible with today's on-device and edge computing processors for AI and machine learning applications, the company emphasises.



# Japanese Body Armour for Ukraine

(sky) The Chief of the Japanese Ground Self-Defence Force GSDF®, General Keishu Yoshida, confirmed at a recent press conference that the body armour provided by Japan to Ukraine including the Type 88 helmet Mk2, was the latest version of the Mk3 KAI (modification) body armour. Mk3 KAI was first introduced in 2015, but only a small number has been delivered to the GSDF.



Mk3 KAI is an improved version of the previous Mk3 variant which uses the Pouch Attachment Ladder System (PALS) like other countries and is equipped with two armour plates to protect the front and back side. The shape of the bulletproof plates of the GSDF is unique and differs from that of other countries. The Mk3 KAI has additional removable armour plates at the flanks, shoulders and groin. The weight is 5 kg for the main body, and 9 kg for the soft armour and the additional equipment such as bulletproof plates, thus a total of 14 kg.

The majority of GSDF units are still using Mk3 and older Mk2, as only limited numbers of sets of Mk3 KAI have thus far been delivered. Approximately 1,900 sets of Mk3 KAI with 6,900 Type 88 helmet Mk2 were provided to Ukraine.

### INVISIO Launches New Headset

(jh) Racal Acoustics and INVISIO have announced the launch of their first joint product for the military: the RA5100 tactical communication headset. According to a press release from INVISIO, the headset has been designed as a solution for hybrid missions, protecting troops from the most extreme continuous and impulse noise exposure, whether in a vehicle or on foot.



The new RA5100 offers:

- Digital Active Noise Reduction (ANR) mode (SNR 30dB) – to maximise noise attenuation from constant high-level noise, such as when operating in or around vehicles.
- Situational awareness and hear-through mode, including adjustable volume control for extra enhanced hearing in quiet environments, with digital noise compression providing protection from high impulse noises.
- Dual hearing protection mode (SNR 41dB) for extreme noise environments.

### Rafael Unveils the AEROSPIKE Missile

(jh) As part of the 2022 Special Operations Forces Industry Conference (SOFIC), Rafael Advanced Defense Systems has unveiled AEROSPIKE, a new air-to-surface Stand-Off Precision Guided Missile (SOPGM) for fixed-



wing airborne platforms. According to the company, AEROSPIKE is a state-of-the-art, next generation EO/IR SOPGM system, designed to meet the needs of complex modern warfare. It is light-weight, high precision (CEP  $\leq$  3 ft), and offers a stand-off range of 30 km, all within a contested environment, independent of GPS.

### Slovenia Joins BOXER Programme

(gwh) Slovenia has become a member of the BOXER programme of the European procurement agency OCCAR. The accession agreement was signed on 11 May by the acting Slovenian Minister of Defence, Matej Tonin, and the Director of OCCAR, Matteo Bisceglia.

At the same time, OCCAR announced that Slovenia has ordered 45 BOXER vehicles, including an initial in-service support package, with a total order value of approximately  $\leq$ 281M excluding VAT.



The first vehicle deliveries are expected in 2023 from Krauss-Maffei Wegmann through the ARTEC consortium. The Slovenian BOX-

ER vehicles will be based on the Lithuanian version (called VILKAS) and will be equipped with a Rafael remote-controlled turret. Five countries are currently participating in the BOXER programme:

- Germany
- Lithuania,
- The Netherlands
- The UK
- Australia (observer status).

### MQ-9B REAPER Short Take-Off and Landing Capability

(gwh) Shortening the necessary take-off and landing distances of Unmanned Aerial Vehicles (UAVs) can significantly improve the range of applications for these devices. With the MOJAVE product line, General Atomics Aeronautical Systems (GA-ASI) has been developing Short Take-Off and Landing (STOL) kits for various UAVs since 2017.

Now the company has announced that a STOL kit is also being developed for the MQ-



9B REAPER, which is in international service with just under 300 units. This includes the SkyGuardian and SeaGuardian models. The MQ-9B STOL will combine GA-ASI's proven, highly reliable, long-endurance UAS products with the versatility to perform missions in more challenging locations, expanding the operational envelope for commanders across all forces and geographies, GA-ASI explains.

According to the company, the MQ-9B STOL configuration consists of an optional wing and tail kit that can be installed in less than a day. The core of the aircraft and its subsystems remain unchanged. Operators can perform the modification in a hangar or on an airfield, providing a capability that would otherwise require the purchase of an entirely new aircraft.

As a result, the MQ-9B STOL, which is part of GA-ASI's MOJAVE series of unmanned aircraft, also offers the capability for future operations aboard an aircraft carrier or large amphibious assault ship, GA-ASI emphasises. The wings can be folded, allowing the MQ-9B STOL to be parked on deck or in a hangar like other naval aircraft.

GA-ASI has not announced when the STOL kit will be available.

## Maritime HERON Tested in the United Kingdom

(jh) Israel Aerospace Industries (IAI) and 2Excel Aviation have completed a demonstration of IAI's Maritime HERON UAS in a series of live, beyond visual line of sight maritime search, and ISR scenarios, IAI writes in a press release. The demonstration was based out of West Wales Airport in Aberporth, Wales. Attending the demonstration were in-person and virtual observers from the UK Ministry of Defence, the UK Government and the civilian sector.

According to IAI, the HERON UAS was ready to fly within 36 hours of arriving at West Wales and maintained full serviceability throughout the period of the deployment. It reportedly achieved 100 per cent of its





EUROSATORY

PARIS, FRANCE, JUNE, 13-17TH 2022 Hall 6 – C680



### **TRUE FIRE CONTROL SYSTEMS**

Smart Shooter develops innovative fire control systems that significantly increase the accuracy, lethality, and situational awareness of small arms. Handheld operated, remotely controlled, robotic or UAV mounted, the **SMASH family of FCS** lock on target and provide multi-applicative capabilities for the platoon.

# Security Spotlight

planned objectives, despite challenging seasonal weather conditions.

In-person attendees were able to make requests of the system, which were relayed live to the Ground Control Station (GCS) during the presentation. Rule-based scenarios were also demonstrated via IAI's STARLIGHT data exploitation tool, which received inputs from the HERON UAS' multi-mission radar, EO/ IR sensor and AIS. Points of interest were then generated using STARLIGHT's Artificial Intelligence (AI) and data processing engine to produce actionable intelligence, insights and maritime awareness. Data gathered was simultaneously broadcast to in-person and virtual attendees using IAI's data dissemination tool (Commander's Remote Imagery Situation Picture - CRISP).

### SPIKE FIREFLY Loitering **Munition Evaluated by the US Armv**

(ih) Rafael Advanced Defense Systems and its US subsidiary RSGS demonstrated the SPIKE FIREFLY loitering munition at the Army Expeditionary Warrior Experiment 2022 (also known as AEWE), Rafael writes in a press release. AEWE 2022 is a collaborative

Photo:



venue under the Manoeuvre Battle Lab of the Manoeuvre Centre of Excellence at Fort Benning. It is the Army's primary venue for small unit modernisation, providing capability developers, Cross Functional Teams (CFTs), PEO's, the Army Science and Technology (S&T) community and industry a repeatable, credible, rigorous operational experiment supporting both concept and materiel development. This year the assessment included in addition to US army Soldiers from the Netherlands and British Armies.

### ABB DC Grid for F126 Frigates

(gwh) Damen Naval and ABB have signed a contract for the supply of onboard DC grid systems, transformers, generators, transverse thruster motors, energy storage systems, including associated control systems and cybersecurity solutions for all four F126 class frigates (plus two optional units) building for the German Navy, Damen writes in a press release..



According to Damen, this lays the foundation for a modern, requirements-based system for the generation, distribution and use of electrical energy on board the F126 frigates. The DC system will enable the diesel generators of the frigates to be operated with variable speed depending on the power. The robustness of the DC grid will enable the German Navy to use as few diesel generators as possible without power outages. Reportedly, this will significantly reduce the overall running time and thus the fuel consumption of the power generation systems.

The first F126 frigate is expected to be delivered to the German Navy in 2028.

### Raytheon Anschütz to **Design WINBS for HUNTER Class**

(jh) Raytheon Anschütz, a business of Raytheon Technologies, has signed a contract with BAE Systems Australia's maritime divi-



sion for initial design work of an integrated navigation and bridge system for the Royal Australian Navy's HUNTER class frigate programme, the company writes in a press release. Raytheon Anschütz is to design and manufacture a Warship Integrated Navigation and Bridge System (WINBS) for the Royal Australian Navy's nine antisubmarine warfare frigates.

The contract is for initial engineering work, with the potential for scope to ramp up over time. Under this initial scope, Raytheon Anschütz will provide systems design engineering and requirements verification for the WINBS. Raytheon Anschütz intends to leverage experience gained from integration of its WINBS with Type 26 frigates, under construction in the UK, as well as the radar replacement programme for the RAN's ANZAC class.

The HUNTER class frigates are based on the Type 26 reference ship design which is currently under construction in Glasgow for the Royal Navy.

### GLADIUS Drone for Poland

(Kristóf Nagy) The Polish Armed Forces are procuring a comprehensive package consisting of reconnaissance drones, loitering munitions, command and control systems, as well as associated logistics and training components. This was announced by Polish Defence Minister Mariusz Blaszczak in a statement at the beginning of May. The package is worth almost €426M and will primarily equip the eastern Polish artillery regiments, the minister said.

When asked by the press, the Polish military was deliberately reticent and referred to the increased importance of secrecy, which was necessitated by the war in Ukraine and the heightened tensions in relations with Russia. Thus, the head of the Polish Armament Agency, Colonel Artur Kuptel, emphasised that the projected figures for the respective systems would not be disclosed for the time being. The press release of the manufacturer does not reveal any quantities, either. However, the communiqué of the Defence Minister allows conclusions to be drawn about the structure and scope.

Thus, four so-called battery modules of the GLADIUS reconnaissance and effect system are to be procured from the Polish manufacturer WB Group in the first attempt. These consist of a number of vehicles with command and control and logistic tasks and also include the mobile ground station as well as a combat set of BSP-U GLADIUS loitering munition and associated launching equipment. According to press reports, the BSP-U is based on the WARMATE 2, which can remain in the air for up to 120 minutes and can be equipped with a shaped-charge, thermobaric or fragmentation warhead. For medium range, the GLADIUS system is supported by the same manufacturer's FT5 tactical area drone for target acquisition. In addition, it also serves as a relay between the agent and the ground station. According to the manufacturer, the 85 kg FT5 with a wingspan of 6.4 m is capable of remaining in the air for up to 10 hours. With a maximum steering range of 150 km, the drone can reach a summit altitude of 5000 m but requires a prepared runway for take-off and landing.

The GS2-UM gimbal, also developed by WB Group, with a combined day-vision and infrared camera, is used for reconnaissance and target tracking. In addition, a laser target illuminator can be integrated. The collected data is transmitted in real time via an encrypted



data link to the ground station's integrated guidance system known as TOPAZ. The data processed there allows direct guidance of loitering munitions, but also correction of the fire of tube or rocket artillery.

According to the Ministry of Defence, the project includes the purchase of several hundred drones, loitering munitions and simulators for training. The first partial delivery is already expected for the end of 2022. The announced procurement is the largest programme for unmanned aerial vehicles in the history of the Polish armed forces. The purchase of 24 BAYRAKTAR TB2 combat drones, as well as four ground stations and a training and logistics package, announced in May 2021, cost almost €230M, according to press releases.

### "Edge of Tomorrow" Demonstrated

(jh) The Directorate of Defense Research and Development (DDR&D) in the Ministry of Defence together with Elbit Systems, the project's integrator, and additional defence industries recently demonstrated the



"Edge of Tomorrow" project's capabilities at an IDF training centre. The demonstration included a simulated response to an operational scenario. IDF soldiers from elite units incorporated the wearable technologies and demonstrated initial abilities in the fields of lethality, survivability, and increased synergy.

"Edge of Tomorrow" is a project focused on the development of cutting-edge technologies to improve a range of mission capabilities among combat soldiers in the IDF's Infantry Corps including:

- Lethality
- Situational awareness
- Survivability
- Stamina
- Cognitive load

- Enemy exposure
- Performance analysis and simulation
- Command and control.

The project aims to strengthen the synergy between individual soldiers and their teams through the adoption of the Soldier As System (SAS) and the Platoon As System (PAS) approaches.

The "Edge of Tomorrow" project incorporates networked warfare technologies including communication for the soldier and team level as well as TORCH-X-based applications for team and platoon levels. The various technologies include:

- Augmented reality goggles
- A computerised assault rifle system
- A digital head-mounted display system
- Hostile fire detection technology
- A location-tracking system in GPS denied environments
- Tactile sleeves for navigation and command transmittance
- A voice command system (similar to systems used on smartphones).

### Rohde & Schwarz Australia Selected for HCFP

(jh) Rohde & Schwarz Australia will design and manufacture an Integrated Communications System for the Royal Australian Navy (RAN) HUNTER Class Frigate Programme (HCFP), following signature of a contract with BAE Systems Australia's (BAESA) maritime division, Rohde & Schwarz writes in a press release

Under the initial scope of the early engineering contract, Rohde & Schwarz Australia is to provide:

- In country programme management
- Systems engineering
- Integration

• Installation and verification services for the acquisition and introduction into service of the ICS.

Rohde & Schwarz Australia Head of Maritime Domain Kieran McLaughlin said the company will leverage experience gained from integration of its Naval Integrated Communications System into the Type 26 frigate now being delivered into service with the Royal Navy, as well as the EVOLVED CAPE Class Patrol Boats for the RAN.



# AUTOFLUG





Experience the OVERMATCH seat series live and in full motion.

## Hall 6 | Booth H618

EUROSATORY 2022 Paris Nord 2, June 13-17



### SECURITY POLICY

# Afghanistan and the Militant Crossroads

### Andreea Stoian Karadeli

As the world rolls from one crisis to another, the current Russian-Ukrainian war has shifted most of the international focus to the ongoing fight in Eastern Europe. Meanwhile, all the previous global challenges have been put on stand-by mode, although events have continued to develop.

n the aftermath of the US withdrawal from Afghanistan that was completed in 2021, the country is currently at a crossroads, struggling to resist a new power vacuum that will only give rise to more violence and extremism. A new stage is being set now in Afghanistan, but none of the actors there have the potential to play the main role in a script that closely resembles the previous one.

More than ten months have passed since the US withdrawal from Afghanistan, and the country is still fighting uncertainty, chaos, a lack of stability, poverty and violence. While its future is still not determined, the links between the main actors on the ground, mostly non-state actors, play a powerful role in defining the next phase for the Afghan transition. Defined by local, regional, national and international dynamics, the blurred lines between terrorist groups and the governing entity deepens the crisis, marked by some clear trends: the flourishing relations between the Taliban and al-Qaeda, the growing power of ISIS-K and the revived threat represented by TTK to Afghanistan's neighbour - Pakistan.

### Afghanistan in 2022

The Taliban may have returned to power, but they lack strategy and, most importantly, a governance plan. The local lead-

### <u>Author</u>

**Dr. Andreea Stoian Karadeli** is an independent researcher based in Turkey, an Associate Fellow at the Geneva Centre for Security Policy and a Visiting Researcher at the University of South Wales. Her interdisciplinary research varies from cultural and intercultural studies to conflict resolution and focusses on national security and terrorism, with a specific expertise in the Middle East.



On patrol in north-east Bamyian with Kiwi Team One, performing both mounted and dismounted patrols, a New Zealand LAV III

erships are reluctant to follow instructions from Kabul, reflecting a high level of distrust to the Taliban whose authority is still not entirely recognised. One example is the heated tensions on the Pakistan-Afghanistan border where the local leadership want to control the border on their own. The Taliban played the card of modernity and transformation, giving promises of a new age for Afghanistan, but the reality on the ground proves the opposite - a reversion to their old, conservative tactics. Just recently, women were requested to cover their faces in public places and young girls' access to education is still restricted. On top of everything, the Taliban comeback and the US withdrawal left more than 350,000 military personnel without a job, transforming them into an exciting pool of recruitment for the militant groups operating in the area.

Beyond these crucial factors, there are two main dimensions that provide the perfect conditions for the terrorism threat to thrive in Afghanistan. On the one hand, the Taliban are known for their close links with several terrorist groups, such as al-Qaeda, affecting their capacity to control and suppress the extremist threat. Unfortunately, most of the information coming in from the ground proves that the Taliban allowed many of the terrorist factions to rebuild and re-establish training camps in the country. On the other hand, the current Afghan context, defined by instability, uncertainty, poverty, a power

vacuum and vulnerability, can be seen as a perfect environment for the terrorist groups. As the Taliban have still not gained full control over Afghan territory, they have already proved unfit for the role they assumed, failing to establish basic services and pushing the country into greater chaos: in excess of a 40 per cent drop in the Afghan economy and an increasing poverty rate that reached 97 per cent. A weak state and a collapsing economy are perfect ingredients for the terrorist groups to develop and recruit among the desperate population. As those two dimensions intersect, it is vital to assess the current links between the Taliban and the main militant groups in the country, as those relations might have the potential to determine Afghanistan's future. Although uncertainty is the defining word for the moment and the Taliban's governance seems to be just weak front, the long-lasting bonds between the group and its former terrorist allies and enemies are rather complex and need an in-depth understanding that takes into consideration the local dynamics.

### Taliban vs. al-Qaeda

The ongoing relationship between the Taliban and al-Qaeda started in the 1990s, when Afghanistan became a safe haven to the group which was planning 9/11 and other terrorist attacks. Beyond their common battle against the US-led intervention in Afghanistan, the internal bonds between the members of the two

groups are reinforced through intermarriage and personal interaction. These are symbolic elements that provide a safe ground for the relations between the groups to thrive and flourish. As a result, in September 2021, the supporters of al-Qaeda were among the first who celebrated the Taliban comeback. The current benefits enjoyed by al-Qaeda due to the new Taliban status, explains the supporters' reactions to the developments that took place after the first half of 2021.

It is commonly accepted that al-Qaeda has lost its previous vigour, as witnessed on different battlegrounds around the world, but especially in Syria and Iraq. Still, their ties to the Taliban have remained strong enough to manage public opinion in order not to undermine the Taliban's quest for international legitimacy. The links between the two groups remain in the shadows although in public sight, gaining more strength through every move. The Taliban are likely to provide cover and allow the group and its main figures not only to stay in Afghanistan, but also to develop their capabilities. Al-Qaeda's leader, Zawahiri, released his fourth video since the Taliban takeover in 2021, after a long absence since 2020. Zawahiri's speeches were delivered on a rolling basis, in September 2021, November 2021, February 2022, and April 2022, proving a new level of confidence that coincides with the Taliban's usurpation of power in Afghanistan. This is another indication of the close relationship between both



Afghan tribal elders discuss with military representatives in the Council of Elders, in 2015



# FLEXIBILITY MEETS ROBUSTNESS



## ODU AMC° Series T

- 🛟 High vibration resistance
- Waterproof acc. to MIL standard 810
- 🛟 Sealed mechanical area
- Compatible with MIL standard crimp contacts
- Compatible with 38999 MIL standard backshells





US Air Force loadmasters and pilots assigned to the 816th Expeditionary Airlift Squadron, load passengers aboard a US Air Force C-17 GLOBE-MASTER III in support of the Afghanistan evacuation at Hamid Karzai International Airport (HKIA), Afghanistan, in August 2021.

groups. Although they lost most of their information gathering capabilities on the ground, US defence officials assess as of March 2022 that al-Qaeda has the intention, but not the capability, to conduct external operations; they further assess that al-Qaeda could reconstitute that capability in one to two years in the absence of sustained counterterrorism pressure. Beyond the mutual support for each other, both the Taliban and al-Qaeda face a common challenge in the form of ISIS-K, a group that is relatively new to the region, but proves desperate to claim power and territorial control in Afghanistan. A common enemy provides one more argument to the groups to share their forces and come closer to each other.

### Taliban vs. ISIS-K

ISIS announced the formation of its Afghan affiliate in January 2015, in the form of ISIS-K. The group was initially concentrated in eastern Afghanistan, particularly in Nangarhar province, which borders the region of Pakistan formerly known as the Federally Administered Tribal Areas . ISIS-K was mostly composed of former Tehrik-e-Taliban Pakistan militants who fled Pakistani army operations in the FATA after mid-2014. The group's history has been one of violent expansion and recruitment with sporadic fighting against former Afghan National Defense and Security Forces' (ANDSF), international forces, and the Taliban. Apart from the members of the Tehrik-e-Taliban, many of the ISIS-K's earlier fighters were disillusioned cadres from al-Qaeda and the Taliban. The group is taking advantage of the power vacuum and lack of political stability to increase their foothold and mount a challenge to the Taliban's rule. Despite capturing districts that were under ISIS-K control in the past, countering the group is proving to be harder this time for the Taliban as they transition from a guerrilla-style insurgency to a government.

The UN's sanctions monitors assessed in early 2022 that the number of ISIS-K fighters has increased to as many as 4,000 with the escape of former prisoners from jails opened after the Taliban takeover. ISIS-K controls a limited amount of territory in eastern Afghanistan and has claimed numerous largescale bombings against civilians, mainly targeting Afghanistan's Shia minority. The group's attacks in 2021-2022 include bombings of Shia mosques in Kunduz, Kabul, and Kandahar, as well as in Peshawar, Pakistan. US defence officials assessed in March 2022 that ISIS-K "could establish an external attack capability against the United States or its allies in twelve to eighteen months, but possibly sooner if the group experiences unanticipated gains in Afghanistan."

Currently, according to internal sources, the Pakistani Law Enforcement Agencies are running extended operations to dismantle the sleeper cells of ISIS-K.

In the official media of both the central IS and the regional ISIS-K, the Afghan Taliban is portrayed as the "apostate Taliban militia", and is blamed for "selling out" Islam in order to obtain international recognition by accepting the "unbelieving" nation-state global system. The rhetoric aims to alienate the local population from the Taliban who are already facing challenges in gaining trust and ruling a country on the verge of total chaos. Nevertheless, ISIS-K has enlarged its recruitment pool beyond the formal members of the militant groups in the region. Currently, the recruitment audiences include middle-class youth from Afghanistan's cities and other urban centres, most of whom have no jobs and are discriminated against by the Taliban government for various reasons. The old pattern of recruitment among the vulnerable population is reinforced once again by ISIS-K, and not only, within and beyond Afghan borders. As the situation is developing, the expert predictions for Afghanistan are not comforting the international scene, already filled with unsolved conflicts.

### Taliban vs. Tehrik-e-Taliban Pakistan (TTP)

Tehrik-e-Taliban Pakistan (TTP), also known as the Pakistani Taliban, has fought alongside the Afghan Taliban against the Afghan Government inside Afghanistan in the past. Due to its "distinctive anti-Pakistan objectives," and the current priorities of the Afghan Taliban, the relations between the two groups appear to have deteriorated since the US withdrawal. Moreover, several records claim that some senior leaders of TTP died in uncertain circumstances in Afghanistan, after 15 August 2021.

In 2014, some TTP members pledged allegiance to the Islamic State and subsequently relocated to eastern Afghanistan in response to Pakistani Army operations that mostly drove the group from its safe havens in the former FATA. The reunification between TTP and some former splinter groups in 2020, together with the Taliban release of TTP prisoners in Afghanistan after their comeback, reflects a consolidation of power among the TTP cells. Most of the attacks of TTP are now conducted inside Pakistan through Iranian locations, while returnees from the Syrian war have been join-

# IT'S BEST NOT TO MESS WITH

# AN ORIGINAL

## THE ONLY PROVEN JLTV SOLUTION

Oshkosh Defense is the design authority on the Oshkosh Joint Light Tactical Vehicle (JLTV) and the premier manufacturer of armored vehicles for the U.S. military. There are a lot of uncertainties in this world, but Oshkosh isn't one of them.





# SEEKING INFORMATION SIRAJUDDIN HAQQANI







DESCRIPTION

Aliases: Siraj, Khalifa, Mohammad Siraj, Sarajadin, Cirodjiddin, Seraj, Arkani, Khalifa (Boss) Shahib, Halifa, Ahmed Zia, Sirajuddin Jallaloudine Haqqani, Siraj Haqqani, Serajuddin Haqani, Siraj Haqani, Saraj Haqani		
Date(s) of Birth Used: Circa 1973 - 1980	Place of Birth: Afghanistan/Pakistan	
Hair: Black	Eyes: Brown or Black	
Height: 5'7"	Weight: 150 pounds	
Build: Medium	Complexion: Light with wrinkles	
Sex: Male	Citizenship: Unknown	
Languages: Arabic	Scars and Marks: None known	
REWARD		
The Rewards For Justice Program, United States Department of State, is offering a reward of up to \$10 million for information leading directly to the arrest of Sirajuddin Haqqani.		
REMARKS		
Haqqani is thought to stay in Pakistan, specifically the Miram Shah, North Waziristan, Pakistan, area. He is reportedly a senior leader of the Haqqani network, and maintains close ties to the Taliban and al Qaeda. Haqqani is a specially designated global terrorist.		
DETAILS		
Sirajuddin Haqqani is wanted for questioning in connection with the January 2008 attack on a hotel in Kabul, Afghanistan, that killed six people, including an American citizen. He is believed to have coordinated and participated in cross-border attacks against United States and coalition forces in Afghanistan. Haqqani also allegedly was involved in the planning of the assassination attempt on Afghan President Hamid Karzai in 2008.		
SHOULD BE CONSIDERED ARMED AND DANGEROUS		

If you have any information concerning this person, please contact your local FBI office or the nearest American Embassy or Consulate. Field Office: Washington D.C.

The FBI wanted poster for Sirajuddin Haqqani, a senior leader of the Haqqani Network

ing the group in high numbers in recent years. In Afghanistan, a new modus operandi has been observed in TTP attacks, where perpetrators first create a distraction through the use of fire weapons, pushing the population in the direction of the explosion. They only detonate after ending the opening fire.

While their ideological links are undeniable, the relations between the Afghan Taliban and the TTP have been eroding over the past two years. Due, in part, to pressure from Pakistan, the Taliban have attempted to restrict the presence of the TTP in Afghanistan and this has resulted in several clashes between the two. As a result, a few factions within the TTP, such as the Lashkar-e-Islam, are reported to have allied with ISIS-K and are establishing a broader anti-Taliban front.

### The Haqqani Connection: al-Qaeda and ISIS-K

The Haqqani Network has been a component of the Afghan Taliban, in the

form of an official, semi-autonomous, strong branch of the group. Back in 2012, the US designated the Haggani Network a Foreign Terrorist Organization, acknowledging its ties with al-Qaeda and other terrorist groups on the ground. The network was founded by Jalaluddin Haqqani, a leading anti-Soviet Islamist commander who became a prominent Taliban official and eventually a key leader in the post-2001 insurgency. As his death was confirmed by the Taliban in 2018, his son, Sirajuddin Haggani, became the new leader of the network. Sirajuddin Haqqani has served as the deputy leader of the Taliban since 2015. Sirajuddin's appointment to lead the network likely strengthened cooperation between the Taliban and Al-Qaeda, bearing in mind that UN monitors have described the Haqqani Network as the "primary liaison" between the Taliban and al-Qaeda. After the US withdrawal, once the new government was installed in September 2021, Sirajuddin became the acting Interior Minister in Afghanistan, the highest ranking of several Haggani Network-aligned individuals to hold cabinet posts. While the Haggani Network is blamed for some of the deadliest attacks of the war in Afghanistan, including the death or injury of hundreds of US troops, the new position offered to Sirajuddin Haqqani is rather controversial, but reflects the current strategy of the Taliban who no longer hide their ties to al-Qaeda. Although this might seem like an intrusion of the 2020 Doha Agreement, signed by the US and the Taliban, the latter cannot be held accountable for their murky relations: the Doha agreement calls on the Taliban to "not allow...groups, including al-Qaeda to use the soil of Afghanistan to threaten the security of the US and its allies".

At present, many of the members of the Haqqani Network that have been integrated among the Taliban lines, are blamed for coordinating ISIS-K attacks on several occasions, as claimed by the Afghan Ministry of Defence back in 2018.

### Conclusion

Unfortunately, Afghanistan's future remains to be determined by the developing relations between the prominent groups on the ground, most of whom are well-known for their terrorist activity. While in the past, the main sides in the conflict were visible, today the lines between the actors playing on the Afghan stage are rather blurred and their interaction depends on a sum of variables that have never been as complex as they are now. The vulnerable population is facing economic collapse and starvation, while militant groups are eager to recruit from an enlarging pool of former Taliban, unemployed ex-Afghan National Security Forces foot soldiers, and militants arriving from nearby countries. Bearing in mind that Washington's ability to understand the militant landscape in Afghanistan has already been dramatically degraded with the loss last summer of many of its human intelligence and technical collection platforms, the efforts to provide stability and peace in the country are rather limited, leaving the population in the hands of either the Taliban or the militant groups active in the region. And the chaos will, once again, hit beyond the borders of Afghanistan, deep to the heart of the West - and the ones who promised peace and democracy, but never provided any of these.

## EXPERIENCE LIFE'S EACH MOMENT IN **SAFETY & TRUST**



EUROSATORY 13 - 17 JUNE, 2022

TECHNOLOGY SERVING PEOPLE & PLANET

# Europe and the United States – Strained Alliances and Different Visions

### **David Saw**

When the subject of this article was agreed in December last year, the idea was relatively straightforward and it began with a question: Does Europe need the US and does the US need Europe?

Then came another question: Transatlantic security relationships are frayed but can they be restored, or is it time to find new ways of working together to preserve an international system that benefits both parties? These are certainly valid questions, but the world has changed dramatically since December 2021 and the global strategic environment is a much more complicated place than it was a few short months ago.

Cast your mind back to January 20, 2021, when Joe Biden was inaugurated as the 47th president of the United States. From a European perspective, the arrival of the Biden administration was a positive development. Unlike Trump, with Biden we were promised that the 'adults were back in charge,' and, as such, there would be a return to the comfortable world of the transatlantic security consensus that existed prior to Trump.

In fact, in many respects there was a feeling that defence and security were not issues that were at the top of the agenda. Back at the start of 2021, the primary focus was confronting COVID. Equally important was dealing with the 'climate crisis.' Then came the matter of the economic dislocation caused by COVID. Working together, perhaps the US and Europe could take significant steps to get the global economy moving again.

### **Strange Times**

These were strange times. Crcumstances were so unusual that it was understandable that there would be far more emphasis on domestic affairs than normal. No wonder, COVID lockdowns were still happening, and with travel bans the world had suddenly became a much smaller place. In this situation, getting the global economy moving again was critical. With China experiencing all kinds of difficulties with COVID lockdowns and with disruption to global supply chains, an economic crisis was gathering momentum. Now, to be fair, most



A PUMA IFV of Panzergrendierbataillon 112 will be part of the German contribution to the NATO Very High Readiness Joint Task Force (VJTF) 2023. It remains to be seen whether the German Government will finally provide the Bundeswehr with the resources to cure years of neglect.

governments were in uncharted territory at this point and inevitably, mistakes were made in trying to find solutions to COV-ID-related problems. However, the Biden administration were worse than most in confronting the crisis.

Biden campaigned for the presidency as a centrist, but once elected tacked to the left, enacting policies that that favoured the more radical element of the Democratic Party base. Consequently, there was something for the environmental groups; there was a massive increase in government spending, with promises of more to come, and a vast increase in regulations. All of this might have kept the progressive factions happy, something that has continued to be a core objective of the Biden administration, but it has also acted as a catalyst to rising energy costs and inflationary pressure on the US economy. Economic underperformance in the US has negative consequences for the global economy; instead of acting as a motor for economic recovery it acted as a drag factor.

### **Economics**

As things stand at present, there are very few who believe that the US economy will pick up before the elections for Congress and the Senate in November 2022. Unless something spectacular happens to boost the electoral chances of Biden and the Democrats over the next few months, time is running out for them to make any progress on their domestic agenda. High inflation, high fuel and electricity prices, rising food prices and potentially shortages in the future, persistent supply chain problems - it is all bad news. Even with the US media being universally favourable to Biden, affairs have reached a point where it is impossible to blame the situation on Trump. Switching to blaming Putin has not really helped either and as a result, the administration continues to shed support.

Being realistic, if you look at the current US administration it does not inspire confidence in terms of economic policy, foreign policy and defence policy. You have a president whose public utterances tend to becoming increasingly strange and a vice president who appears out of her depth and whose public speaking skills can head off into embarrassing directions. Across the rest of the administration leadership group there is not a lot of talent that might incline one towards positive thoughts.

A weak and ineffective US administration is certainly not in Europe's interest. For all of the European complaints that surface about the US government and its policies, the reality of the situation

is that Europe needs the US both economically and militarily. It was so easy to rely on the US to cover for Europe's inability or unwillingness to spend what was necessary for an effective defensive capability. It was so easy to let the US take the lead when military action was needed. It was also so easy to blame the US when something went wrong.

# The Russian Invasion of Ukraine

The problem with relying on others and letting them carry the burden, is when reality intrudes. The Russian invasion of the Ukraine on 24 February was one of those times when reality intrudes. Consider the European response to this crisis; there was none. For those who want to see Europe as a single political, economic and strategic entity, the response to the Ukrainian crisis demonstrated how far the EU is from reaching those lofty goals. This was yet another time when the EU leadership in Brussels had the opportunity to rise to the occasion and craft a European response and failed to do so. All of which begs the question, what is the point of ceding more power to the EU in Brussels when it appears unable to take a leading role? Initial responses to the Ukraine crisis also demonstrated the deep fissures between the majority of nations in the Eastern Europe and many of those in the West.

The desire for European solutions to European problems seems further away than ever. For all the talk about how wonderful it would be if Europe acted together, events before and after the invasion of the Ukraine demonstrate how strong national self-interest remains as a factor in decision making. This is inevitable as first and foremost national leaders answer to national electorates. At an elite level in Europe, and increasingly globally, there are shared world views, but national self-interest is still a powerful motivator.

### Energy

Another problem for Europe is the refusal of many European leaders to think strategically. While everybody was enthusiastically signing up to decarbonising their economies, it would appear that nobody thought seriously about how much power they would actually require for a modern state and where they would get it from. The decision of Germany and other European countries to become energy-dependent on Russia was incredibly short-sighted, yet it was a move that both



www.cesarmour.co.uk

Photo: US Army National Guard



US Army ABRAMS tank during the Defender 22 exercise at the Konotop Range, Drawsko Pomorskie, Poland in early May. Under the title DEFENDER EUROPE 22, the US Army is conducting a number of multilateral training exercises in Eastern Europe at the present time.

main political parties in Germany were perfectly happy to support for various different reasons. Russia was and still is a strategic competitor to Europe. Becoming energy-dependent on Russia was, as we now see, a foolish move.

On the other hand, France is credited with having a far more comprehensive set of options as regards energy security, with some 75% of its electricity generated by nuclear power. However, France was buying Russian gas as an important part of its energy mix, illustrating that it too was vulnerable in terms of energy supply. More recently, this vulnerability has increased, as evidenced by numerous media reports of technical issues with French nuclear stations. At one point in April, half of France's nuclear stations were offline and earlier this year, EDF, who operates the French nuclear system, announced that power output from nuclear stations would be reduced due to

corrosion and other safety concerns. Prior to the first Macron government, plans were being discussed that would reduce the proportion of French energy generated by nuclear down to 50%. Then policy changed as France recognised its energy vulnerabilities, six new nuclear reactors are to be built with eight more as an option, in addition funding is being directed towards finishing the development of a new generation of small modular rectors. The plan is that a combination of new nuclear power and renewables will meet French energy demands, with fossil fuels providing a limited proportion of the energy mix.

Considerations of energy security must also come into play as Europe looks towards moving towards a future based on Electric Vehicles (EV). Here again Europe is vulnerable. Lithium, nickel and cobalt are critical materials for energy storage, for example batteries for EVs. The problem is that in terms of processing and refining these materials globally, Europe only accounts for 10% of nickel, 15% of cobalt and zero for lithium. By contrast, China accounts for 68% of nickel, 73% of cobalt and 59% of lithium processing and refining. Europe only accounts for 7% of lithium-ion battery cell manufacture globally.

President Macron has called for Europe to become an "energy power." In a speech in early March, he stated that, "When it comes to our mobility, heating and the powering of our plants, we can no longer depend on others and, in particular, on Russian gas. That is why, after deciding to develop renewable energy and build new nuclear reactors for France, I will champion an independent European energy strategy."

European politicians continue to talk about climate goals and carbon neutrality, but they are less than forthcoming on how exactly they are going to achieve these objectives. Right now, Europe is in the midst of an energy crisis made worse by the inability of European leaders to recognise the need for energy security. Whether it likes it or not, Europe will have to import significant quantities of gas for many, many years to meet its energy needs. It is critically important that such gas supplies are sourced in such a way that they do not increase European energy vulnerability.

Across the Atlantic, the US is also in energy difficulty. This is the result of a policy choice by their government. Here environmental politics is considered more important than energy security, yet the US has access to plenty of oil and gas resources to meet its own needs and even for exports. US government policy choices have led to raised oil and gas prices globally; different policy choices would have led to downward price pressure and the possibility that US gas could have been exported to Europe to reduce dependence on Russia.

### **Divergent Paths**

We are now in a time of economic problems, energy difficulties and ongoing conflicts globally. The current US administration does not inspire confidence and many of its policy choices have negative impacts on Europe. Despite that, the US remains central to the NATO alliance and recent events have shown the continuing importance of NATO. In fact, NATO, thanks to Vladimir Putin amongst other reasons, is undergoing something of a renaissance. A year ago who would have



The French FLORÉAL class light frigate VENTÔSE on patrol in the Gulf of Guinea off Africa on an anti-piracy mission, a mission undertaken by the French Navy for more than 30 years. European navies are adding more missions globally, despite the fact that ship numbers are not growing.

thought of Finland and Sweden flirting with NATO membership!

For many, the importance of NATO and the central US role in NATO remain vital to the European security architecture. For others, recent events have demonstrated that there should be a different path to a viable European security architecture. In his address to the French nation on 2 March, President Macron noted that, "We can no longer depend on others to defend us, be it on land, at sea, under the sea, in the air, in space or in cyberspace. To this end, our European defence must step up." There are two paths here as regards Europe's future security choices: one is based on the Transatlantic vision of NATO that has served Europe so well since the establishment of NATO in 1949. The other, the Macron vision, sees a Europe that has its own security structures and capacity for military action in support of its own political/strategic objectives. Since he came to power in 2017, Macron has been guite clear in his preference for a European-led security solution as a part of his desire for further European integration.

Eventually, Europe will have to make a choice: Will its security strategy be continued reliance on NATO or will they



A Royal Netherlands Air Force F-35A Joint Strike Fighter (JSF). The Netherlands was one of the earliest European export customers. In an era where Europe talks about strategic autonomy and self-reliance, the large number of European JSF customers shows how strong defence links with the US are.

embrace the Eurocentric solution championed by France? Both solutions will require increased expenditure on defence in Europe as too many nations have been negligent in this regard for too long. Undoubtedly, many in Europe will avoid making a choice. They will continue with NATO, while contributing to a European force. Then for political reasons, there are those who would like to decouple European security from the US. Being realistic that remains a high risk gamble. What happens next will depend on Europe's appetite for risk.



# Israeli-Turkish Relations: Challenges and Opportunities

### Eugene Kogan

Even though Israel and Turkey normalised relations in June 2016 following the May 2010 Mavi Marmara Flotilla incident when Israeli soldiers killed ten people on board a Turkish vessel and the subsequent diplomatic rupture, Ankara's support of the Hamas movement situated in the Gaza Strip continues to undermine bilateral relations.

The establishment of an official office in Istanbul in 2012 and its members are perceived as a thorn in the eye by the Israeli Government. Tel Aviv would like Erdoğan to close the Hamas office and expel its members from Turkey; however, this Israeli wish is not going to be granted any time soon since Erdoğan's words do not translate into deeds.

The signature of the Abraham Accords highlighted two divergent trends in the region: Turkey's continued isolation and Israel's strengthened position. This resulted in Erdoğan's intention to improve relations with Israel; however, Israeli officials are not in a hurry for any rapprochement with Turkish officials because Erdoğan and his administration are not sincere in what they do. In addition, the Israeli Government learned its lessons that listening to the siren's wailing can be dangerous and harmful. Therefore, a real breakthrough in bilateral relations is unlikely to happen in the short-term.

### The 'Earthquake' and Repercussions for Turkey

After the Israeli-UAE-Bahraini normalisation agreement, also known as the Abraham Accords, was signed in August 2020, President Erdoğan began to send cautious signals of rapprochement to Israel. Erdoğan has realised that both Israeli-Greek-Cypriot diplomatic, economic and military ties that have grown steadily since 2012 and the Abraham Accords of 2020 have ultimately strengthened the Israeli position and made it a key partner in the areas of economy, energy, diplomacy and military issues ver-

### <u>Author</u>

**Eugene Kogan** is an Eastern European defence and security expert based in Tbilisi, Georgia.



In December 2010, the Turkish ship MAVI MARMARA made a harbour tour on the occasion of its return to Istanbul, displaying posters of the victims killed by Israeli soldiers on board the ship in May 2010.

sus Turkey that during the same period has become isolated in the Eastern Mediterranean and Persian Gulf regions. Moreover, strained ties with the United States are driving a bid by Ankara to normalise relations with Israel that have remained tense and hostile for the last decade or so.

### **Energy Connections**

The other important aspect of Israel's strengths is related to energy connections. Turkey has been excluded from the Eastern Mediterranean Gas Forum (EMGF, informally established in 2019) but officially established in September 2020 in which Cyprus, Egypt, France, Greece, Israel, Italy, Jordan and the Palestinian Authority (PA) are closely coordinating energy policies and would certainly want to be included in the forum in the future. The Greek Ambassador to Israel, Panagiotis Sarris, said in July 2020: "We want Turkey to be part of the East-Med and other projects in the Mediterranean [including the EMGF], but we have to make it clear, we want to be equal partners. They cannot be neighbourhood bullies taking advantage of their growth.

They must respect international law and the United Nations Convention on the Law of the Sea (UNCLOS)."

In addition to the recently proposed East-Med gas pipeline, the idea of an Israeli-Turkish gas pipeline was conceived years ago. However, in March 2022, Turkey's Foreign Minister, Mevlüt Çavuşoğlu, said: "A potential gas pipeline project between Turkey and Israel is not possible in the short-term and constructing an alternative system to cut dependence on Russia will not happen quickly." The problem, an unnamed Israeli official said in March 2022, is that "there were already two proposed routes for extra supplies from Leviathan, Israel's largest gas field via existing liquefied natural gas (LNG) plants in Egypt or a planned floating LNG (FLNG) facility. If Turkey responds quickly, then it may be a third alternative."

According to opposition lawmaker, Yuval Steinitz, who was Israel's Energy Minister until June 2021, "a pipeline to Turkey would cost US\$1.5Bn and take two to three years to build. The pipeline would run between 500 and 550 km making it more manageable financially than the  $\in$ 6Bn East-Med pipeline proposed to connect Israel with

www.excaliburarmy.cz

# EXCALIBUR ARMY

# PROTECT YOUR WORLD®



5A / K528

MORANA 155 mm SELF-PROPELLED GUN HOWITZER

(R)

### **WORLD PREMIERE**

1. 1. 180

TREVA-30 RECOVERY VEHICLE



Israeli President Isaac Herzog and Turkish President Erdogan at a joint press conference during Herzog's state visit to Turkey on 9 March 2022.

Cyprus, Greece and Italy." However, there is one serious obstacle for the pipeline from Israel to Turkey. Any subsea line would need to cross the water of either Cyprus, which Ankara does not recognise, or Syria, with which Ankara has no diplomatic relations and has supported rebels fighting the Bashar al-Assad government in Damascus. Therefore, diplomatic and military obstacles are likely to prevent the construction of the Israeli-Turkish pipeline. According to Gokhan Yardim, a Turkish gas industry consultant who worked on the assessment of the possible pipeline over two decades: "The lack of diplomatic relations could complicate construction and financing if Turkey had a direct stake in the pipeline." Besides, so far Turkey failed to receive or allocate financial support for the construction of the pipeline. Therefore, construction of the Israeli-Turkish pipeline remains a pipe dream for the time being.

In other words, the Egyptian option is currently the most viable. Since Egypt imports gas from Israeli reservoirs and produces LNG from it, Israel could shortly find itself supplying Europe. Therefore, the guickest way to boost gas supplies to Europe is to ship them via Egypt's existing FLNG terminals if Egypt and Israel expand production. Currently, the two countries' energy ministers are discussing such a possibility.

### New Israeli Government: A New Wind?

The emergence of a new Israeli Government in June 2021 under Prime Minister Naftali Bennett, augured a potential new beginning for Israeli-Turkish relations. That is at least how Erdoğan interpreted the new development. However, Bennett and his government have other priorities and Erdoğan's Turkey is not one of them. It should be stressed that the normalised relations in June 2016 have not brought the two countries closer to each other. This is partly because Israeli officials distrust Erdoğan and his administration and partly because of difficult personal relations between President Erdoğan and former Prime Minister Benjamin Netanyahu, after the latter's departure means that relations will have to work through official state channels, something that Erdoğan does not like and is not interested in.

An additional aspect where the two countries' interests diverge is the Palestinian issue. Erdoğan plays the card of a staunch supporter of the Palestinians in the West Bank, in general, and in the Gaza Strip, in particular. Despite visibly toning down its criticism of Israel in advance of Israeli President, Isaac Herzog's, visit to Turkey, Ankara has ruled out abandoning its commitment to supporting Palestinian statehood. For instance, in February 2022, Foreign Minister Cavusoğlu was guick to reiterate that "any steps we take with Israel regarding our relations, any normalisation, will not be at the expense of the Palestinian cause, like some other countries...we will never turn back on our core principles." As a result, Israel should not expect any change in Turkey's pro-Palestinian strategy, even in the post-Erdoğan era. And the opposition parties may also pursue the same pro-Palestinian strategy. As a result, there is very little ground for a genuine rapprochement between the two countries.

Despite the aforementioned difficulties, Isaac Herzog visited Ankara in March 2022.

It was the first official visit by an Israeli president to Turkey since 2007 when the late Shimon Peres as the first Israeli president, addressed the Turkish parliament. In order not to endanger Israeli relations with Greece and Cyprus that Israel has forged over the last decade, Herzog paid a visit to both countries before flying to Ankara. This was presented as a clear sign of reassurance that the normalisation of relations with Turkey will not be at their expense. Despite Erdoğan's praise: "I am very pleased to host the Honourable President Herzog here at our residence in Ankara. I believe that this historic visit will be a turning point in relations between Turkey and Israel," the gulf between the countries remains wide. And even flourishing trade relations that were not affected by the political crisis between the countries failed to impact diplomatic and political bilateral relations.

Although the Israeli president's post is largely ceremonial and any concrete steps toward rapprochement require the approval of the prime minister, Herzog's visit marks a first step on the long road to potential reconciliation. It needs to be stressed that although Prime Minister Bennett has been quiet over the Turkish charm offensive, leaving President Herzog to handle the direct dialogue channel with Erdoğan, Bennett gave tacit approval for Herzog's visit. Still, Bennett might take his time agreeing to travel to Ankara despite Erdoğan's requests.

On the other hand, the visit of Foreign Minister Çavuşoğlu to Israel in May 2022 might invigorate the normalisation process since Cavuşoğlu will use the trip to discuss the return of ambassadors to Turkey and Israel who were expelled in 2018. Çavuşoğlu will be accompanied by Energy Minister Fatih Donmez. Whether or not energy issues will be discussed between Donmez and his Israeli counterpart, Karine Elharrar, is currently unknown. What is known, however, is that Elharrar said in April 2022: "While Turkey really wants to cooperate, I do not have a meeting planned with the Turkish energy minister or a working plan. That is something that has to be decided as government policy. We have to examine the pros and cons and then decide."

### Conclusion

To conclude, visits and Erdoan's promises alone will not reinvigorate Israeli-Turkish relations from their deep alienation over the last decade. The closure of the Hamas office in Istanbul and the expulsion of its members would be be a clear sign that things are moving in the right direction. Until then, Israeli officials will remain

sceptical of a genuine policy pursued by Erdoğan. In addition, the Palestinian issue championed by Erdoğan remains a serious stumbling block in bilateral relations. I do not foresee Erdoğan and his government abandoning its commitment to the Palestinian issue.

Besides, Israeli officials will be very sceptical in their treatment of any concessions made by Erdoğan due to Turkey's dire economic straits. Furthermore, due to the parliamentary and presidential elections in Turkey in June 2023, the normalisation of bilateral relations may well proceed at a snail's pace. Another important factor is that even if Israel decided to normalise relations with Turkey, there are no guarantees when it comes to Turkey's hotheaded president, who can blow up the normalisation process at any moment. In other words, there are more challenges than opportunities ahead of the Israeli-Turkish normalisation process. As a result, Prime Minister Bennett is pursuing a policy of restraint towards Turkey.

Although Erdoğan is concerned with the development of rapid economic, political, and military relations between Israel, UAE



The EastMed pipeline countries. Turkey has been excluded from the Eastern Mediterranean Gas Forum.

and Bahrain, he cannot intervene and is forced to accept the developments of these relations with good grace.

As for the energy ties between the two countries, Israel can deliver gas to its neighbour, Egypt, and then the LNG will be delivered to the European Union from Egypt. This route is less complicated and less expensive than the construction of a gas pipeline from Israel to Turkey and then gas delivery from there to the European Union. As a result, Turkey finds itself ousted despite its wish to join the other countries.



As a partner for customers worldwide, we develop and produce navigation and stabilisation solutions for highest mission requirements. The continuous development of our key technologies ensures that the Army, Air Force and Navy can continue to rely on the performance of our products in every mission.

Feel free to talk to our experts about your specific requirements. You can reach your contact person at defence@litef.de.

# Denmark Provides HARPOON Anti-Ship Missiles to Ukraine

### **Hans Uwe Mergener**

The announcement was made by US Secretary of Defense Lloyd Austin on 23 May 2022 as one of the outcomes of another meeting of an international coalition for military assistance to Ukraine. In this case, twenty nations took part in the negotiations. Details of the party were not disclosed.

Already on 19 May, Reuters reported that Washington was considering providing HARPOON and Naval Strike Missile (NSM) to Ukraine. The Danish offer announced during the 'donor conference' appears to solve the problems associated with such a transfer. On the one hand, the US armed forces do not have platforms that enable the deployment of HARPOON from shore to sea. On the other hand, the technical adaptation of sea-based systems is not easy. Reuters quotes US officials "the United States was working on possible solutions, which included pulling a launcher off a US ship."

Alternatively, they were looking for a European ally to take over the transfer. In addition to HARPOON, the Naval Strike Missile



The modern HARPOON Block II has a range of 150 nautical miles.



The Danish Navy is operating the HARPOON Block II (RGM-84L-4).

(NSM) from Norway's Kongsberg was made subject to the selection. The challenge encountered by the USA in the process was that in the preliminary talks no one agreed not to be the first and only one, for fear of possible reprisals from Russia. Especially if a Russian ship were to be affected by a missile from the inventory of that country.

The relief was all the greater when Denmark agreed to provide the weapon systems to Ukraine. "I am particularly grateful to Denmark for announcing today that it will provide a HARPOON launcher unit and missiles to help Ukraine defend its coast," Austin said during a press conference at the Pentagon. No official statements have been made about the HARPOON version concerned. What is known is that the Danish Navy has HARPOON Block II (RGM-84L-4), which is capable of engaging land targets. The Royal Danish Navy was the first export customer for HARPOON Block II. The country ordered 50 retrofit kits in 1997, which were delivered in 2002. "Denmark, an existing HARPOON customer, was the first country to sign a \$10 million contract for 50 retrofit kits in 1997," according to a Boeing press release dated 26 April 2002, the day the first Harpoon Block II missiles were delivered after retrofit.

The Danish Navy had a mobile truck-based support unit until 2002/2003. Over the years, a pure replenishment unit, MOBA LOG, evolved into MOBA OBS, which cooperated with Danish and German fast patrol boats in situational awareness. After 1990, MOBA was equipped with HARPOON missiles. In 2003, MOBA was closed down in the wake of developments after the end of the Cold War. In this respect, it is questionable whether the two MOBA missile batteries (2x4 missiles) underwent conversion to HARPOON Block II.

### **Courageous Copenhagen**

In any case, the current decision could mark a turning point in naval operations in the Black Sea. In the meantime, the aim is to make Ukrainian grain exports possible - at sea, too. In this respect, the initiative now launched by Washington is a further indication that they are willing to end the naval blockade. With further capabilities to operate from the coast at sea, Ukraine would be capable of an A2/AD (anti-access area denial) operation, albeit on a small scale. Which could have an impact on the Russian blockade - to the point of opening transport corridors.

With the more modern version HARPOON Block II and its range of 150 nautical miles, operations against land targets have become possible - for example against military facilities in Crimea as well as other targets important for the logistical supply of the Russian armed forces.

Ultimately, by allowing the use of weapons systems 'made in the USA', Washington proves that Russian reprisals are not feared. The Biden administration shows itself determined to continue the war to Moscow's detriment. Both Washington and Copenhagen are leading dithering European allies by example and verve.

# Navigation, positioning and pointing solutions.

French industrial group, leader in inertial navigation systems, iXblue equips more than 60 armies and navies around the world. Its rugged and fieldproven solutions for land forces provide highly-accurate and reliable navigation and pointing information in the most demanding and harsh environments.



Advans Series Combat-proven FOG Inertial Navigation Systems (INS)



# A Self-Reliant India Venturing into UAV Technology

### Suman Sharma

### Indian Drones to Replace American REAPERs as Indo-US Drone Deal Looks Set for Cancellation

As India gets serious about becoming self-reliant in defence manufacturing, the Indo-US drone deal for 30 MQ-9 REAPER drones from General Atomics, valued at US\$3Bn, could be the second cancellation after the Indo-Russian helicopter deal, in favour of India's homemade products replacing imported equipment. A South Block insider has said that the Indian Government is very serious about boosting its 'Atmanirbhar Bharat' (Self-Reliant India) drive in the defence sector, adding that the other factor leading to the US drones being off the table was the exorbitant price tag.

With a bid to bolster the military capability of all three services, Indian Prime Minister Narendra Modi had announced these American drones, ten for each service, during his US visit in September 2021. The REAPER or PREDATOR--B, cleared under the Trump administration for a tri-services induction, was supposed to come with special features such as the ability to remain airborne for 27 hours at a stretch, and to operate at an altitude of 50,000 feet, armed with laser-guided bombs and HELLFIRE missiles. Indian military operates an imported mix of SEARCHER Mk-2, HERONs and SEA GUARDIANs (leased by the US to the Indian Navy), primarily for Intelligence, Surveillance and Reconnaissance (ISR) missions and not for direct combat. MQ-9 REAPERs would have made India the first non-NATO country to receive combat drones from the US. Vivek Lall, Chief Executive Officer, General Atomics when approached, said, "I am not aware, as this is now a Governmentto-Government deal."

### Favouring Home-Grown Products

Favouring home-grown products, two Indian manufacturers - one private and one Government-owned agency, have come forward with their drones as a replacement to the American REAPERs. One of them is HERMES, a joint venture between the Indian private manufacturer-Adani Defence and Aerospace and Israel's Elbit Systems, which is set to be the licence manufactured in India.

The other indigenous drone is the Tactical Advanced Platform for Aerial Surveillance-Beyond Horizon-201 or better known as TAPAS BH 201, a combined effort by Government agencies such as the Bengaluru-based Aeronautical Development Establishment (ADE), Defence Research and Development Organisation We need critical technology in UAVs in the immediate term, while we build indigenous capabilities."

### **TAPAS BH 201**

TAPAS BH 201, which recently successfully demonstrated 18 hours of endurance and achieved an altitude of 28,000 feet, has become the first India-made drone going in for certification by the Centre



A HERMES 900 UAV

(DRDO) and Hindustan Aeronautics Limited (HAL). TAPAS is reportedly 75 per cent homemade, as its engine is European.

Defending the Indian Government's mantra of 'Atmanirbhar Bharat' is India's former Foreign Secretary Harsh Vardhan Shringla, who said at the recently concluded Raisina Dialogue-2022, India's annual flagship foreign policy conference, "Self-sufficiency does not mean isolation, it does not mean ring-fencing yourself, self-sufficiency or Atmanirbharta means creating capacities that can help you and help others."

Indian Army's Lt-Gen (Retd) Vinod Bhatia says, "UAVs are critical and an integral part of future wars and border defence. for Military Airworthiness and Certification (CEMILAC). According to ADE director Y. Dilip, TAPAS, fundamentally meant for surveillance, can also be converted into a weaponised platform as it is predesigned that way.

Intended for small missions, and armed with a range of sensors, TAPAS, which can carry a limited payload of 150 kg, is capable of autonomous take-off and landing, besides day and night operations. The TAPAS team claims to have completed two major requirements, namely altitude and endurance, however, according to S. Rajagopal, project director of TAPAS, they, despite best efforts, are slightly short of the armed forces' expectations.



GRAM GRID AIMING MODE

FOR

FOR COMMANDO MORTAR 60MM M6 C-640

Visit us at: Eurosatory 2022 Paris/France Booth Nr. H341 Hall 5A

MDAS -MORTAR DIGITAL AIMING SYSTEM

FOR MORTAR 81MM M8 & 120MM M12

### **DIGITALISATION OF MORTAR SYSTEMS**

hds.hirtenberger.com



A TAPAS-BH-201 in flight

The first five TAPAS to be built by HAL are expected to be delivered between September 2022 and April 2023, as drawings for production are expected to reach the manufacturer by May 2022. The avionics, datalinks and flight control systems for the first five drones are ready, while the airframe is pending, on which these systems are to be fitted. Bharat Electronics Limited (BEL) is the primary provider for electronics and avionics. A total of 76 TA-PAS drones for the Indian Armed Forces will be divided up - 60 for the Indian Army, 12 for Indian Air Force (IAF) and four for the Indian Navy. The weaponised version is also under consideration.

TAPAS, currently powered by an Austrian-made Austro engine with twin turbochargers, is expected to have an Indian engine as its scientists are in talks with a private Indian manufacturer.

### **HERMES 900**

HERMES 900 is a medium altitude, longrange unmanned aerial vehicle (UAV) to be licence-produced in India by Adani Defence under a joint venture between Adani and Israel's Elbit Systems.

Designed by Elbit, HERMES, with an endurance time of 36 hours, is mission effective and highly autonomous. Capable of operating at an altitude of 30,000 feet, HERMES has multiple hard points and comes with a 250 kg modular internal installation bay. HERMES was recently certified to fly in civilian airspace and is capable of multi-payload and persistent wide-area surveillance.

Adani Defence has prior experience of working with Israel as it has delivered 100 SKYSTRIKER kamikaze drones to the Indian Army under a joint venture between Adani's Alpha Design and Elbit Systems.

### Indian Industry and its Challenges

RUSTOM-1, by India's state-owned DRDO, a programme which began in 2009, took its first flight in 2016. The large, twin-engined, remotely piloted RUSTOM, with an All-Up-Weight (AUW) of over 1,000 kg, is the first in its category designed by DRDO. While India lacks original aviation engine manufacturers for this class of drone, it has the wherewithal for design and development with respect to RUSTOM's autopilot and onboard systems. The RUSTOM-1 programme is facing issues that most Proof of Concept to Operational Product systems face during development.

TAPAS BH 201 is often hailed as RUS-TOM-2, which is an upgraded and weaponised RUSTOM-1. Desikan Srinivasan, Principal Consultant (Drones) in Cy-PhySignals. India Pvt Ltd, a Bangalorebased Homeland Security system design, development and manufacturing company, says, "It is unreasonable to compare RUSTOM with well-established drones like the REAPER and PREDATOR. We have a long way to go before we can operationalise RUSTOM for the armed forces. Most military drones are much heavier. Therefore, when we refer to Government-owned manufacturers, we must keep in mind that they are very capital intensive and require large time windows for development and operationalisation. If we want private companies to participate, they will need a lot of government support."

Military and commercial drone requirements, capabilities and specifications were very different. However, today's lines can be seen to be blurring, as the ongoing Russia-Ukraine war has demonstrated by using commercial, small, lightweight drones in a military role by making innovative modifications.

The brain of the drone is its autopilot, and the heart is the power train comprising Brushless DC Motors (BLDC) and Electronic Speed Controllers (ESC). India imports more than 95 per cent of these two important pieces of equipment used in these categories of drones. These units are imported predominantly from China, Europe, and USA. Most American manufacturers do not export to Indian companies as India is not cleared by the US Department of Defence (DoD) for export. The cost of these equipment varies vastly depending on the country of origin, with Chinese autopilots and motors being the cheapest.

The design and development carried out by DRDO is not commercially available for Indian companies to buy off-the-shelf; before which they need to be tested and proven for mass production. There are manufacturers of BDLC motors, controllers for industrial automation available in India; however, the requirement of very low weight and low power consumption for drones is a void that is yet to be filled. The cost of research and development is very high in this high capital investment sector.

# The Changing Nature of Warfare

Worldwide militaries are incorporating advanced and innovative systems in their inventories as the battlefield is changing rapidly. New dimensions have been added to warfare by drones and UAV-based surveillance and loiter munitions.

The Turkish BAYRAKTAR TB2 drones used in the Armenia-Azerbaijan conflict of 2021 and in the ongoing Russia-Ukraine war have successfully demonstrated the power of drone warfare.

Following the Indo-China standoff in April 2020, the US\$800M worth Project Cheetah was announced by the Indian Government, under which the Israeli HERONs with all three services were to be upgraded.

On a cautionary note, IAF's Air Marshal (Retd) B. Suresh says about the Indian context, "UAVs/ drones are effective in uncontested air spaces and against states which cannot or do not retaliate. No aerial vehicle can cross an IB (International Border). That will be considered an act of war."



Nexter, land defense architect and system integrator in France, is a major reference in armored combat systems, artillery, and in the ammunition field. Nexter designs innovative solutions for land, air, sea and security forces, in order to bring French and foreign armed forces a decisive operational advantage.













NEXTER-GROUP.FR

# China's Countermeasures and US Theatre Missile Defence

### **Debalina Ghoshal**

That the Chinese have repeatedly objected to a US Theatre Missile Defence in the Indo-Pacific Region is well known. Not only has China objected to such a missile defence system in the region, claiming that such systems would jeopardise nuclear stability in the region, but it has also developed countermeasures to US TMD systems in order to strengthen their nuclear deterrence vis-à-vis the United States.

n November 2021, the Pentagon reported that in the next decade, China "aims to modernise, diversify and expand its nuclear forces." The Pentagon further reported that China was "investing in, and expanding, the number of its land, sea and air-based nuclear delivery platforms and constructing the infrastructure necessary to support this major expansion of its nuclear forces." It is in this context that the article aims to study China's countermeasures against US Theatre Missile Defence.

The United States plans for missile defence systems not only on its own territory under the National Missile Defence (NMD) programme, but also plans to protect its forward bases under the TMD programme. The fielding of Aegis Ashore in Japan, Theatre High Altitude Area Defence (THAAD) in South Korea and Guam are just a few examples. However, according to the Congressional Research Service 2021 report on Navy Aegis Ballistic Missile Defence System (BMD) Program: Background and Issues for Congress, the THAAD is not yet "capable of meeting the current trajectory of threats from China." Thus, China's modernisation of its nuclear forces aimed at countering US 'defence by denial' strategy is worth analysing especially as it is a major component of China's 'Assassin's Mace Strategy.'

### Author

**Debalina Ghoshal**, is a Non Resident Fellow, Council on International Policy. Her areas of specialization 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.



The DONG FENG-21 medium-range mobile missile system is designed to strike the enemy's administrative and political centres, control centres and small-area targets: airfields, seaports, power plants, oil and gas terminals.

### **Qualitative Growth**

Though China's focus has always been less on quantitative growth of nuclear weapons and more on qualitative growth with a focus on the survivability of nuclear weapons - a reason why their posture shifted from a 'minimum deterrence' to 'limited deterrence' - the November 2021 Pentagon report suggests that China's nuclear warheads could increase to 1,000 in the next decade. The focus is on building a robust nuclear triad in order to strengthen its posture of 'limited deterrence'. This is augmented by the building of missile silos for greater survivability of land based missiles liquid fuelled missiles, modernising road and rail mobile missiles, modernising aerial platforms for nuclear delivery to equip them with cruise missiles for greater stand-off capability, and focusing on a robust sea-based nuclear delivery platform with greater command and control efficacy.

### **Nuclear Deterrence**

China has also focused on countermeasures against enemy missile defence systems in order to strengthen its nuclear deterrence. These include placing of multiple independently targetable re-entry vehicles (MIRVs) on land-based and submarine based ballistic missiles, manoeuvring re-entry vehicles (MaRVs), hypersonic glide vehicles (HGVs) mounted atop ballistic missiles such as the DF-17. This is similar to the US Hypersonic Technology Vehicle (HTVs) being developed as a component of the Conventional Prompt Global Strike System (CPGS). However, while the US HTV programme is a non-nuclear programme, the Chinese and Russian hypersonic glide vehicle programme are reportedly nuclear capable.

### **Countermeasures**

China has developed countermeasures such as decoys on missile systems to dodge



One of the Chinese hypersonic gliding vehicle projects

enemy missile defence systems. Dummy silos have also been built to strengthen survivability of land-based liquid fuelled missiles. China has built a new hot air balloon base in the northeastern port of city of Dalian as a component of an early warning missile attack system to monitor the Korean peninsula and US military installations. Missile detection systems can be deployed on helium filled balloons and a similar balloon was reported to be located near the Spratly archipelago. All these efforts are undertaken to move towards a robust and survivable nuclear force focusing less on SECURITY POLICY

counter-force targeting and more on counter-value targeting. While solid-propelled DF-21s could ensure strategic stability, its dual capability creates destabilisation. The fielding of more complex liquid fuelled silo-based DF-5 category Intercontinental Ballistic Missiles (ICBMs) adversely affects China's 'no-first use' doctrine, but provides greater thrust and hence, greater range and payload capacity.

Revisionist states like China would prefer to focus more on counter-value targeting than on counter-force targeting regarding greater powers like the United States. Hence, its nuclear forces are being modernised for credible counter-value strike weapons.

The credibility of China's 'no-first use' doctrine has been questioned, considering that the doctrine is a conditional one. Furthermore, it does not apply to territories that China considers its own. And the fact that China distinctly draws a difference between 'counter-strike' and 'second strike' could provide assurances on China's pledge of 'no-first use' doctrine in other regions where it is trying to expand its influence, such as in the Arctic and African regions, and more specifically Djibouti.



## **COUNTRY FOCUS: FRANCE**

# **French Defence Policy Overview**

### **David Saw**

French security planners have to deal with a number of difficult strategic conundrums as they try to define the most appropriate defence policy for France.

France is a power with global interests, which is inevitable since the country has a permanent seat at the UN Security Council. However, there is more to it than that. It might seem obvious that France is a major European nation, though this fails to take into consideration the fact that France also has numerous national territories distributed across the globe. As a result, French national interests and global interests are closely intertwined.

To provide some context, it might be worth quickly describing the French overseas territories. In the North Atlantic, there is the island of Saint Pierre and Miquelon, in the Caribbean and South America, the islands of Saint Martin, Saint Barthélemy, Guadeloupe and Martinique, plus French Guiana. In the Indian Ocean, there are Mayotte and Reunion, further south come the French Southern and Antarctic Lands. In the Pacific, there are French Polynesia, Clipperton Island, New Caledonia and Wallis and Fortuna. Many, but not all of these territories host French military facilities.

### A Network of Bases Overseas

France also has a global military presence via a network of bases overseas; in West Africa there are long-term bases in Côte d'Ivoire, Gabon, and also at other locations in the area, in order to support Opération Barkhane in the Sahel. With Barkhane winding down, that does not mean that French involvement in the Sahel is ending, not least as the area remains of strategic importance to France. In East Africa, there is the base in Djibouti, and the French have a base in the Middle East in Abu Dhabi, while French forces in support of Opération Chammal are located in Iraq, Jordan and Syria. It should also be noted that France has access to the Evangelos Florakis Naval Base in Cyprus. Add into this other NATO defence commitments and you gain an idea of just how heavily tasked the French military is currently. There is more to consider in terms of defence commitments though, and this is due to the fact that the French military is also deployed on Opération Sentinelle, an ongoing anti-terrorism/



Two French Air Force RAFALE combat aircraft with an A330 PHÉNIX MRTT tanker/transport over Eastern Europe. This illustrates the ongoing commitment of France to the defence of NATO and European partners in Eastern Europe.

security mission on French national territory, a personnel-intensive activity.

### **Defence Environment**

In the final analysis, French defence policy and strategy are limited by the resources that the State is able to devote to defence expenditure. When Emmanuel Macron was elected in 2017 to his first term in office, he called for a Strategic Review to define the state of French defence strategy and what was required to meet French security requirements into the future. In turn, this led to the 'Loi de Programmation Militaire 2019-2025' (LPM) released in February 2018 - the military programme law that sets the French defence budgetary objectives and then defines the final structure necessary to fund them.

What was important about this LPM was that its aim was to restore and further develop French military capabilities over the lifetime of the programme, in a properly funded manner. The LPM included a rise in defence spending of  $\in$ 1.7Bn per annum through to 2022, and from this point there was to be a major boost in funding, with defence spending rising by  $\in$ 3Bn per annum

from 2023 onwards. When the LPM was issued in 2018, the aim was to reach defence expenditure equivalent to 2 per cent of French Gross Domestic Product (GDP) by 2025. Ironically, as the French GDP declined in 2020 due to COVID, France was able to meet the defence expenditure at 2 per cent of GDP target far earlier than planned! On paper, consistent increases in defence expenditure look very good, but there are other factors that need to be considered. If the French military had been able to take on board these budgetary increases and use them to restore existing and add new capabilities, that would have been excellent. The problem was, that every time you commit forces to an operation, it costs money and most of the time this comes from existing defence expenditure, meaning that money must be re-allocated from other purposes. This in turn means that equipment purchases are delayed, training budgets cut, while money for maintenance and spares are reduced.

We have already listed some of the missions that the French military are undertaking at present; we should add to that list by mentioning an unexpected mission that the French military was tasked with in
# Connectivity Across the Battlefield

Resilient IP based software defined tactical communications systems for superior situational awareness.



Meet Us at Eurosatory Hall 6 / Stand H300!



Find out more!

Connectivity to be trusted. **www.bittium.com** 

# Bittium

2021. The collapse of the Afghan Government saw France respond with Operation Apagan to evacuate French nationals and Afghan refugees from Kabul; between 15 and 27 August, French forces evacuated nearly 3,000 people. This was achieved by 26 rotations from Air Base 104 at Abu Dhabi to Kabul, and 16 flights from Abu Dhabi to Paris. The operational burden and the resultant financial burden on the French military never seems to be reduced.

On 11 May, the Cour des Comptes, which is described as "the supreme body for auditing the use of public funds in France" and is independent from the French Government and Parliament, issued a report on the current status of the LPM entitled "La loi de programmation militaire 2019-2025 et les capacités des armées." Overall, the Cour des Comptes report was actually positive on progress as regards the LPM, but public spending is under pressure in France and they note that the government will have to make some hard choices regarding the defence budget. Areas of concern listed in the report covered, inter alia, training limitations, operational availability issues and long-standing capability gaps that have not been resolved.

This Cour des Comptes report makes an important contribution to the ongoing discussions surrounding French defence policy. Despite the fact that President Macron has committed to increasing defence spending since the invasion of Ukraine, there is a limit to what the government can actually do; there is no bottomless pit of money that the government can raid to fund defence.



The frigate FORBIN (D620) was the lead ship of the HORIZON frigate class for the French Navy; she was launched in 2005 and commissioned in 2008. Based in Toulon, FORBIN is currently operating in the central and eastern Mediterranean with the Italian Navy, amongst others.

The answer in these circumstances would seem to be reducing French military commitments. Achieving this objective is not going to be easy, but there are solutions that could work. For example, sharing the burden of international missions with European or regional allies. Then there is Opération Sentinelle to consider; is it really necessary for the military to be permanently on the streets of France, since surely this is a law enforcement activity, unless the government declares a national state of emergency?

#### **Strategy Search**

Even if France was able to prioritise its defence commitments to operate within the financial constraints it is experiencing, it still has to define an overall defence strategy and then develop a security architecture based on that strategy. This is still a work in progress and one could argue that events in 2019 are still having an impact on the French search for a defence strategy. In November 2019, The Economist published an interview with President Macron (conducted in late October 2019), where Macron said: "What we are currently experiencing is the brain death of NATO." He then went on to express his view that Europe must be in control of its own destiny, which reflected his oftstated view that Europe must have its own sovereign military capability.

It is no secret that Macron is a believer in 'European Strategic Autonomy' and it was also no secret that he despised Donald Trump, but despite the best efforts of France, no concrete progress has been made in developing a viable European defence capability. On the other hand, the defeat of Trump and the arrival of the Biden administration appeared to be a positive development.

#### **AUKUS Shock**

solutions it can afford.

As previously stated, there are French territories in the Indo-Pacific region and France had developed what it thought was a regional security relationship with Australia. The highpoint of this was the Australian decision to purchase 12 ATTACK class submarines from France in a contract with a value in excess of €56Bn. Then, in September 2021, Australia cancelled the submarine contract and the newly formed AUKUS alliance between Australia, the UK and the US was announced. This was a massive financial and strategic blow to France. Remember that the AUKUS shock came on top of the collapse of Afghanistan, a situation made worse by unilateral US action and lack of consultation with allies such as France. All of these events provided further impetus for France to think about European strategic solutions. And yet, after the Russian invasion of Ukraine, it is plain that NATO is not "brain dead." Indeed, with Finland and Sweden applying to join, the NATO alliance is seemingly in robust health! Consequently, France now finds itself looking for strategic



French infantry on exercise in Estonia, part of the French force allocated to NATO and deployed to protect Estonia. One of the most pressing problems that the French military faces today is that it is over-committed, with too many missions and not enough resources.

# **BELSS –** Baltic Military Integration Leadership

Kaspars Ziediņš, BELSS, Board Member

#### Latvian Developed Military Production

Latvia's military sector is making extensive changes in 2022 as Latvia's Foreign Ministry strengthens secure supply chains in order to reduce production and delivery delay risks due to the current economic and geopolitical situation worldwide.

Wartime conditions significantly changed the market and relationships while local industry increases developments and investments in the defence industry through various grants and national research programs. This fosters the production development of goods and spare parts in Latvia, guaranteeing a secure and fast supply chain. It is important that most or all weapon components (including ammunition and gunpowder) are produced in Latvia, as well the food and clothing, as a broad spectrum of material support is required.





### Wide-Ranging Defence Solutions

The range of military solutions from BELSS includes a wide spectrum of services and products up to complete turn-key solutions: tents and parachutes, satellites, masts, elop systems and ruggedized computer equipment. BELSS has decades of experi-



ence in developing, installing, maintaining and modernizing secure radio monitoring systems, and is Latvia's official representative for Motorola Solutions with Platinum Certificate Authorisation.

BELSS provides a comprehensive range of engineering telecommunications solutions and services – including satellite communications, architecture-construction and civil engineering for militaries and civilians as well.

#### **Implemented Projects**

As the Baltic region military integrator, BELSS implemented projects of different complexity and purpose. It signed an agreement in 2019 with the NATO Support and Procurement Agency for rapid deployment of mobile camps and hangars with full equipment and various functionalities. These were loaded in convenient, safe packaging, marked with the packaged item weight as per NATO limits.

BELSS is the second largest supplier of tactical communications equipment in Latvia, manufacturing and supplying radio communications and equipment to the Latvian National Armed Forces. In modernizing the military radio monitoring and frequency control management system, the cooperation was performed and based on Rhode & Schwarz hardware and software developed in Latvia. Developing their competence and ability to use their resources, BELSS has proven to be worthy by receiving a Latvian Ministry of Defence (MoD) grant in 2021 for a Remote-Control Weapons System (RCWS) project to create an exportable RCWS with universal mounts for a variety of firearms.

BELSS has many civilian projects as well, for example – six air monitoring stations across the country for Latvia's Environment, Geology and Meteorology Centre and Latvian Railways' radio network through a dual-use grant from Latvia's MoD.

#### **Local Partner Support**

BELSS is a reliable local military integration partner to an extensive network of foreign partner companies. When the Latvian MoD concluded cooperation with ECA Robotics for mine ship modernization project/ initiative, ECA concluded cooperation with BELSS as its local subcontractor partner. BELSS coordinated product integration processes in Latvia, including various administrative and legal aspects and procedures – which enabled and fostered the project development.

#### **The Future**

BELSS strength lays within the expertise and knowledge of its engineers who are engaged in research and development. With more than 28 years of experience, BELSS offers a wide range of competitive solutions and expands its services worldwide. BELSS goal is to develop and produce more high-value-added military goods in Latvia by investing in research and development over the coming years.



# "To be better equipped and better armed"



With more than 10,000 employees, the French Direction Générale de l'Armement (DGA) coordinates armament projects with industry in France, within Europe, and also with export customers. All in all, this amounts to more than 100 major weapons programmes and operations in all areas of defence. The DGA also undertakes the testing and assessment of equipment and military technologies. In addition, the DGA supervises engineering schools that operate under the scrutiny of the Ministry for the Armed Forces. In the October 2021 issue, Joel Barre, the Head of the DGA, answered our questions in an interview. In the version below, the questions and answers he gave at the time have been updated and partly supplemented.

**ESD:** Can you briefly elaborate on the role, organisation and duties of the DGA? Is your organisation comparable to other defence procurement organisations like the Swedish FMV or the German BAAINBw? Are there other organisations involved in defence procurement in France?

Barre: The DGA is the French Government Armament General Directorate in charge of project management, development and purchase of weapon systems on behalf of the French Ministry for the Armed Forces. The operational and technical departments of the DGA cover the same missions as the Swedish FMV or the German BAAINBw, meaning procurement and management of armament programmes but DGA is also responsible for additional missions. More precisely, the DGA has four missions: to equip the French military forces while preserving the national procurement sovereignty; to prepare the future of defence systems; to promote European cooperation; and to support the export of our military equipment. All these missions induce a strong industrial policy.

The DGA's workforce of more than 10,000 women and men, military and civilian personnel, working at one of its 18 sites, covers every domain of defence: land, naval and air combat, electronic communication and information systems, cybersecurity, robotics, deterrence, and space. In 2021, as the top investor of the French State, the DGA placed orders worth €23.5Bn with industry and invested €1.4Bn in defence innovation and defence technology projects.

Over the years, since its creation in 1961, the DGA has developed a unique knowledge in managing complex programmes.

In most countries, these activities are conducted by separate entities within the Ministry of Defence. DGA's model is therefore peculiar. The centralised organisation of the DGA has been designed as a lever to conduct a sovereign and coordinated armament policy. This holistic vision is highly efficient in dealing with multi-dimensional issues, combining industrial policy strategies, international actions, future planning, procurement and programme management. Actions undertaken in the framework of European initiatives (PESCO, EDIDP, EDF) typically require such a combination of expertise. This is a major asset of the DGA.

**ESD:** What effects did the establishment of the Permanent Structured Cooperation pattern (PESCO) have on your organisation's structure and work? What developments are to be expected in this context?

Barre: The DGA considers that PESCO is an appropriate tool to develop cooperation in Europe at the governmental level. The cooperation developed in this context may lead to armament projects conducted in other collaborative frameworks, through dedicated multinational arrangements, and possibly with the support of the European Defence Fund (EDF). The past years have already demonstrated that this approach works. Thanks to PESCO, and in combination with the European Defence Industrial Development Programme (EDIDP), new governmental and industrial cooperation programmes have been established, for example in the domain of radio-navigation, to develop GALILEO receivers, which can be used by armed forces. The DGA has ambitious PESCO projects on the collaborative combat, materials and components, or detection and interception of missile threats. These PESCO activities, combined with the development of industrial solutions, have an impact on DGA. Since the launch of PESCO in 2017, the DGA has been strongly involved in its implementation. In coordination with the French military staff, the DGA has devoted specific resources and expertise for PESCO. As a result, the DGA is involved in 80 per cent of the 60 PESCO projects: it coordinates 13 projects, two jointly with another Member State, is a participant in 29 projects and an observer in six projects. Through PESCO projects, the DGA cooperates with almost all EU Member States. The DGA has contributed to shaping these new EU instruments, demonstrated success in implementing them, and will carry on learning and adapting to make the best use of them. Now, the process has to demonstrate that the initiated projects really deliver results and are turned into industrial solutions.

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

**Barre:** To provide the French Armed Forces with efficient equipment in the short term but also to face the future threats, innovation support and R&D is also included in the DGA's core activity. In 2021, the DGA paid  $\in$ 890M and invested a record  $\in$ 1.4Bn in defence innovation and technology projects and intends to reach  $\in$ 1Bn of payments and  $\in$ 1,129Bn of investments in 2022.

# SAMP/TNG

Global Airspace Sovereignty – Country & Forces Protection

The new **European** Long-Range Ground-Based Air Defense



**Range** Detection  $\ge 350 \text{ km}$  - Interception  $\ge 150 \text{ km}$ 



Mission-proven Permanent protection of airspace



**360° protection** Rotating radar and missile launched vertically



#### Mobility

Fast deployment on all kind of roads



#### Interoperability

Easy to integrate into all types of air defense network - Fitted for IAMD



#### Autonomy

Preserve sovereign employment in operation



eurosam.com | 🛛 🖬 🖸





THIS CODE S WNLOAD T ROCHURE

ACCESS OUR WEBSITE



The DGA has been responsible for the successful delivery of the BARRACUDA nuclear-powered attack submarine programme.

In 2018, Florence Parly, the French Minister for the Armed Forces, decided to create the Defence Innovation Agency placed under the supervision of the chief executive of the DGA - in order to federate and coordinate all Ministry initiatives in the field of innovation, while pursuing longterm programmatic innovation works. Since then, the DGA's departments and the Defence Innovation Agency work very closely together in order to turn the innovation concepts into assets within the programmes.

First, by orienting and piloting the scientific and industrial studies needed for tomorrow's capabilities. More than 100 technological projects with industry and 165 research projects with academic partners were launched in 2021, in a cross-feeding approach with DGA's long-term technological roadmaps.

The DGA also takes advantage of the ecosystem outside the defence sector: in 2021 for instance, 419 start-ups and SMEs from the civilian market were identified as being of defence interest by the Defence Innovation Agency. Valuable projects are tested and - if deemed satisfactory - are fast-tracked thanks to defence support provided to the companies: 121 projects from the civilian market were labelled in this way in 2021.

Regarding R&D personnel, the DGA and the Defence Innovation Agency have their own personnel for analysis, orientation and support. However, their workforce is enhanced via their collaborative work with national research and academic organisms such as CEA (the French nuclear and alternative energy research centre), CNES (the French centre for space studies), ONERA (the French aerospace lab) and ISL (the French-German defence research institute) and the four engineering schools placed under the DGA's supervision.

ESD: Is the budget available for defence procurement exclusively provided from the defence budget of the Ministry of Defence, or can you also take advantage of other resources? How have procurement budget allocations developed over the past five years? Barre: The French defence procurement budget comes almost exclusively from the budget of the Ministry for the Armed Forces. Over the last six years, the procure-





The DGA has been supervising the FDI programme which aims at completing the HORIZON and FREMM frigate fleets.

ment budget has increased by 43 per cent, from €9.9Bn in 2016 to €14.2Bn in 2021, in line with the Government's commitment to bring our global defence financial effort up to 2 per cent of GDP.

In addition, the Ministry for the Armed Forces can also take advantage of cooperative initiatives, such as the EDF. Together with PESCO, it forms a comprehensive defence package for the EU, aiming at financing the industrial R&D in the field of defence programmes. The total envelope is €7.9Bn over the 2021-2027 period. The DGA is fully involved alongside French industry in proposing eligible cooperative projects.

The sale of government owned assets is another significant contributor to the procurement budget. In 2021, such sales amounted to a total of €0.5Bn.

The other resources, such as royalty fees or expertise and test activities sold to external customers by the DGA's technical centres, are marginal (less than 0.5 per cent of the total procurement budget).

**ESD:** What are the most important defence programmes currently executed by your organisation?

Barre: The DGA conducts more than 100 major weapons programmes and operations in all areas of defence: submarines, ships, satellites, command systems, airplanes, helicopters, missiles, armoured vehicles, land weapons, nuclear weapons, etc., with the aim of meeting the operational objectives and technical performance required by the armed forces.

In the field of combat aeronautics, the DGA is focusing on the development of the penetration, stealth and interoperability performance of the evolutions of the RAFALE and the preparation of the future air combat system, which will be linked to manned and unmanned aerial vehicles.

In transportation aviation, the DGA is pushing to ensure that the A400M completes the set of its tactical functions, in order to further increase its operational capabilities. In the naval field, the key point is the successful delivery of the BARRACUDA nuclear-powered attack submarine programme, the preparation of the replacement of the aircraft carrier and the next generation of nuclear-powered ballistic missile submarines whose industrial and systems engineering phase is currently underway since February 2021. At the same time, the renewal of the first rank frigates continues, with the FDI programme, whose first-of-class will be delivered in 2024. It will complete the HORI-ZON and FREMM frigate fleets.

Regarding land forces, the equipment renewal initiated with step 1 of the SCOR-PION programme is progressing with the



**INVISIO** V-Series Gen II

# The future of mission critical comms performance

VERFD

The new V-Series, powered by artificial intelligence, provides unparalleled audio performance in extremely noisy environments and market leading hearing protection – including 42dB SNR double hearing protection.

Configuration possibilities are limitless and voice prompts, VOX, and dual net support on all COM ports enables easy and intuitive operations.

Mission Adaptive INVISIO Audio<sup>™</sup> Market Leading Hearing Protection Flexible and Intuitive



#### COUNTRY FOCUS: FRANCE



The DGA has been supervising the FDI programme which aims at completing the HORIZON and FREMM frigate fleets.

Photo: DGA



The SCORPION programme is progressing with the well-established production of the GRIFFON vehicle.



The DGA is renewing its capacities with two new generations of satellites.

well-established production of the GRIFFON vehicle, the delivery of the first JAGUAR vehicles in 2021, and of the SERVAL vehicles in 2022. There are potential challenges for French-German cooperation around the "heavy tank" (MGCS) and "artillery" (CFIS) components. The air-land dimension is also considered with the launch in late 2021 of the Joint Forces Light Helicopter programme and the launch together with Spain in early 2022 of a new standard of the combat helicopter TIGRE.

As far as the space domain is concerned, the DGA is entirely renewing the capacities with two new generations of satellites, the CSO family for observation and SYRACUSE for telecommunications. We are also currently deploying a new electromagnetic intelligence space capability, unique in Europe, with the CERES programme.

**ESD:** Which of your current programmes are carried out in international partnerships with other national or multinational procurement organisations? Are there defence procurement efforts executed in the scope of public-private partnerships?

**Barre:** Promoting cooperation is one of the four missions of the DGA. With the exception of sovereign areas such as deterrence, the DGA is now systematically looking for European cooperation opportunities for each operation. Currently, the DGA carries out numerous programmes with other European countries: the motorised capacity strategic partnership CAMO, in cooperation with Belgium in the land domain; the Logistic Support Ship (LSS) programme, in cooperation with Italy; the Maritime Mine Counter-Measures (MMCM) programme, in cooperation with the UK. In the air domain, the DGA is cooperating with Germany and Spain for the future combat air system (NGWS/FCAS - Next Generation Weapon System / Future Combat Air System) and with Italy for the anti-aircraft defence system SAMP/T NG. Regarding the space domain, the DGA is conducting the CSO observation satellite constellation programme with Belgium, Sweden, Italy and Germany. Finally, the secured software radio ESSOR has been progressing in cooperation with Italy, Spain, Finland, Poland and Germany. Furthermore, the DGA is strongly involved in the European initiatives such as PESCO, EDIDP and EDF. We cooperate with almost all Member States to foster competitiveness and sovereignty of the European Defence Technological and Industrial Base and ensure that these cooperation programmes deliver concrete results. Regarding public-private partnerships, this solution has rarely been used by the DGA in the past and is less and less considered for new defence programmes.

**ESD:** Are there special regulations and procedures for the acquisition of nuclear weapons? Are such programmes also subject to competitive tenders?

**Barre:** The acquisition of strategic defence systems follows the same rules as conventional systems, in application of the French Code of Public Procurement Contracts. However, for reasons of sovereignty, the acquisition policy may lead to favouring French competitors for the weapons systems, with the possibility of open competition for constituent equipment. As with conventional systems, the sustainability of the defence industrial and technological base, as well as the maintenance of industrial skills over the long term, are issues for DGA's acquisition policy.

**ESD:** To what extent is the French defence industrial base capable of responding to the material requirements of the French Armed Forces? Are there areas where you have to rely on foreign contractors?

**Barre:** The DGA is responsible for preparing and implementing all the defence systems that allow France to ensure its independence and its strategic autonomy, as well as its freedom of decision and action. We must equip our armed forces at the highest technological level to ensure their operational superiority in their various operations.



The DGA is cooperating with Germany and Spain for the future combat air system NGWS/FCAS...

Moreover, since France has the ambition to maintain a full-spectrum and balanced force model with mastered technologies, it needs a sizeable, strong and dynamic defence industry and technology base. The DGA ensures the rise in competence of its major industrial groups and small and medium-sized enterprises in the technological areas identified as priorities by the Ministry for the Armed Forces. In addition, the DGA makes sure of their ability to develop, produce and sustain in the long term the equipment our armed forces need to fulfil their missions. The DGA strictly applies this national line of action for the critical heart of the strategic domains. For the rest, the DGA can accept mutual dependencies with other Europeans States relying on the framework of the European Defence and Security Market Code, or even rely on the international market for non-strategic domains.

# OUR CHALLENGE Partner for equipment and avionics



ESG



... and with Italy for the anti-aircraft defence system SAMP/T NG.

Most weapons systems of the French Armed Forces are the result of a virtuous triangular system between the DGA, the French forces and industry. However, French defence companies are largely globalised: their exports represent a significant part of their turnover and they purchase some intermediate goods from different countries, especially European ones.

At the same time, European cooperation has been developing. Quoting the President of the French Republic, Emmanuel Macron, in his official "Bastille Day" speech, delivered on 13 July 2021: "to be better equipped, better armed, we are developing more and more cooperation, especially with our European partners". So, in order to equip the French Armed Forces and develop European autonomy in strategic areas, the DGA is also increasingly counting on cooperative weapons programmes, as I described previously, relying on the European defence industry.

ESD: In Germany, the current conflict in the Ukraine has led to German Chancellor Olaf Scholz's pledge to increase the defence procurement budget by €100Bn covering a period of five years. Are there similar effects in France?

FUTURE FORCES FORUM

Barre: The defence budget in France has already been steadily increasing over the last few years. The military planning law has foreseen an unprecedented financial effort worth €295Bn over seven years (2019-2025) in order to modernise the infrastructures and capacities of the armed forces. In 2022, the planned budget is worth €41Bn, compared with €32Bn in 2017, this represents an increase of 28 per cent over five years. This new German budgetary effort could help accelerate cooperation on projects in which France is already committed, such as the Future Combat Air System (FCAS), the Main Ground Combat System (MGCS), or the TIGER Mk III and the Maritime Airborne Warfare System (MAWS). As regards France, in light of the new geopolitical context arising from the conflict in Ukraine and of the European statements made at the Versailles summit on 10-11 March 2022, I am sure France will give its armed forces the means to tackle the heightened tensions in Europe, alongside other European and allied armed forces.

The interview was conducted by Jürgen Hensel.

| EXHIBITION | EXPERT PANELS **NETWORKING** PRAGUE

- 21 OCTOBER 2022

General Partner

LOCKHEED MARTIN

Exhibition General Partner

GENERAL DYNAMICS **European Land Systems** 

In cooperation with

NATO OTAN





# SCOPE – Counter Terrorism "Made in Germany"

The monitoring of communications plays a key role in the prevention and investigation of terrorism and organised crime. This is a task of enormous complexity – not least due to the number of communication channels used and sheer volume of data that is constantly increasing. Such complexities cannot be processed without state-of-the-art IT solutions.

One of the few global players in this restricted market originates from Germany, the company: INNOSYSTEC, located in Salem on the Lake of Constance. INNOSYSTEC is the developer of SCOPE, a leading international multi-source analytics software enabling security agencies and law enforcement to detect, monitor and combat threats from crime and terrorism.

SCOPE also facilitates the effective tracking of cash flows in the fight against corruption, with a diverse range of German security authorities and allied intelligence services having depended upon the software for over two decades, confirming the system as a mature, proven solution. INNOSYSTEC is proud to have retained each and every client throughout this time. In addition, SCOPE is a purely German software and as such delivers a considerable contribution to European IT sovereignty within the intelligence domain.



The multi-source approach utilised by SCOPE confirms its suitability to evaluate the different communication channels used by terrorists and criminals, including landline and mobile phone networks, radio and satellite traffic as well as internetbased communication channels such as internet phone and messenger services like WhatsApp or Telegram, social media such as Facebook, YouTube or Instagram and of course the internet including the Dark Web. The almost incomprehensible volume of data from these sources is simply referred to as "Big Data". The consolidation and evaluation of such is simply no longer possible using conventional means of data processing. SCOPE was therefore specifically developed as a so-called 'Big Data analytics tool'. A comprehensive and powerful solution, which can help identify the relevant information and connect the dots.

SCOPE brings together the Big Data from various sources and sensors (SIGINT, OSI-NT, SOCMINT, etc.) and performs a crosssource analysis and evaluation (multisource analytics). Interrelationships and context are both visualised within the software enabling analysts to detect hazards before they have time to develop (data-based crisis prevention). Even historical data can be analysed by police and security authorities with SCOPE, as a means of clarifying past incidents or providing information to assist in the design of preventative measures for the future.

SCOPE is a software "made in Germany", meaning that the software is 100% compliant with the strict European and German data security standards. INNOSYS-TEC only works with European partners whom also comply with these standards.

At the same time INNOSYSTEC has no access whatsoever to a client's data, and as such provides only the SCOPE tool. This is the key difference from other providers, for example such as those from the US or Israel. Peter Zerwes, founder and CEO of INNOSYSTEC confirms: "It is about preventing security threatening events, not about creating full disclosure about people."

SCOPE can be easily adapted to the respective local statutory regulations present, such as data protection and sovereignty. The client's system administrator(s) can easily specify in detail who is assigned which rights and who may view what content within the system. At the same time, collaboration across departments, systems and teams of analysts (including the exchange of information in real time) is enabled. SCOPE is also highly adaptable to meet clients' exact requirements. Camilla von Baer, Co-CEO alongside Peter Zerwes, adds: "With SCOPE our objective is to make the world a safer place based on our European values."

#### About INNOSYSTEC

INNOSYSTEC GmbH was founded in 2000, and is a mid-sized, owner-managed software company that operates from the Head Office in Salem, near Lake Constance in Germany.

With its software products and services, INNOSYSTEC GmbH actively contributes to European IT sovereignty within the intelligence sector. The company H.Q., which was developed and constructed in 2020, proposes sufficient space to double the present 85-strong team of experts within the next few years.

#### www.innosystec.de



# A Global Player: The French Defence Industrial Base

#### **David Saw**

The French defence industry has one of the most comprehensive defence design, development and production capabilities in Europe. It is also fortunate in the fact that it is seen as a true national asset, allowing it to retain a full spectrum of defence industrial capabilities that some other European countries have allowed to evaporate.

aving a strong national defence industry also helps France to achieve 'strategic autonomy' and reduces dependence on foreign suppliers. That being said, French industry is not immune to change. In terms of both defence and foreign affairs, since the 1960s, France has followed its own agenda more often than not. To achieve this freedom of action, has required that France meets the vast majority of its major defence equipment needs from national sources. This guarantees national self-reliance in critical areas, and allows the development of advanced technologies that can be applied across the national economy in both the civilian and defence sectors.

The defence industry has also provided France with a unique foreign policy and economic tool. In the 1960s, the development of the French industry came at a time when most nations, if they could not build their own systems, had a binary choice in acquiring defence equipment. Put simply, you could either turn to the US or look towards the Soviet Union. France offered another solution as a supplier who did not require the political subservience expected when purchasing from the superpowers. This opened up a means of meeting independent foreign policy objectives to France, while also offering significant economic benefits.

#### **Independent Solutions**

The position of France as an independent supplier of high-end defence equipment still exists today, in many cases based on long-term supply relationships. An example of this is demonstrated by the actions of the United Arab Emirates (UAE), as regards the acquisition of a new combat aircraft for the UAE Air Force. In terms of combat aircraft, the UAE had been a long-term customer of Dassault, initially



A Dasault RAFALE DQ of the Qatar Emiri Air Force, the aircraft had experienced a difficult time in the export marketplace until 2015 and its first export success in Egypt. Since then contracts have been signed with Qatar, India, Greece, Indonesia and the United Arab Emirates.

purchasing the MIRAGE 5 and then the MIRAGE 2000 AED/RAD/DAD. In the late 1990s, the UAE decided to acquire a batch of 30 new MIRAGE 2000-9 EAD/ DAD aircraft and upgrade its existing MI-RAGE 2000 fleet to the new configuration. More recently, from 2019 onwards, the UAE MIRAGE 2000-9 fleet has been further upgraded to extend its service life. Also, in conjunction with the MIRAGE 2000 purchase came the acquisition of the full spectrum of French air weapons.

The defence relationship between France and the UAE remained strong, but the UAE looked to diversify its sources of equipment supply, acquiring systems from other European countries and also from Russia and China. The continuing presence of the US in the region also led to the formation of a defence relationship between the US and the UAE, one of the most visible manifestations of this relationship was the UAE decision to purchase the F-16. In 1998, the UAE announced that it had selected the Lockheed Martin F-16E/F Block 60 as its future combat aircraft, ordering 55 F-16E and 25 F-16D, accompanying this was a major air weapons package. All 80 aircraft were delivered between 2004 and 2006. There was an issue in the F-16 acquisition that took some time to resolve, in that for reasons of its own strategic autonomy the UAE wanted access to F-16 source code. Initially the US refused, but in the end came to an agreement with the UAE on the subject, once the deal was in danger of being cancelled.

The potential difficulties of relying on the US as a supplier came into focus for the UAE when they tried to acquire the Lockheed Martin F-35 Joint Strike Fighter (JSF). There were obvious strategic reasons to acquire the JSF, as it would have given the UAE a unique set of capabilities.



# NEXT GENERATION MULTI WEAPON SIGHTS

# FCS13RE<sup>™</sup>

#### **FIRE CONTROL SYSTEM**

For use on Multiple Weapon Platforms with built-in laser range finder, inclinometers, gyro, and ballistic computer calculating for lead and distance to moving, stationery and airburst targets. Exceptionally high first hit probability while reducing collateral damage.

### **RED DOT SIGHTS**

#### **TRUSTED BY MILLIONS**

The Acro P-2<sup>™</sup> represents the next generation of RDS optics. With over 5 years of constant-on use and tested to withstand over 20,000 rounds of .40 S&W ammunition, the Acro P-2<sup>™</sup> goes above and beyond the call of duty. For use on Multiple Weapon Platforms.

# Aimpoint

WWW.AIMPOINT.COM

007790

#### **OUNTRY FOCUS: FRANCE**



AL EMARAT, the second GOWIND class corvette ordered by the United Arab Emirates in 2019, was launched at the Naval Group yard in Lorient on 13 May; the first unit BANI YAS was launched in December 2021. This corvette class has also been sold to Egypt, Argentina, Malaysia and Romania

#### **The RAFALE**

There were also the political aspects of the acquisition to take into account. In many respects, the JSF was part of a guid pro guo for the UAE signing up to the Abraham Accords and recognising Israel. Then the Trump administration left office and were replaced by the Biden administration, who had a totally different set of foreign policy objectives in the Middle East and had decided to slow the UAE JSF acquisition. Rather than be a victim of shifts in US foreign policy, the UAE decided to demonstrate that it had its own national and strategic interests and would therefore evaluate other options to meet its future advanced combat aircraft requirement. This led them to open negotiations with France and on 3 December 2021, contracts were signed between Dassault and UAE Air Force and Air Defence covering the supply of 80 RAFALE F4 aircraft, making the UAE the first export customer to acquire the advanced F4 variant of the RAFALE. The RAFALE acquisition continues a combat aircraft relationship between Dassault and the UAE that has lasted for more than 45 years.

At that point, it is worth discussing the RA-FALE in some more detail, as this aircraft has in recent years totally transformed its fortunes in the export marketplace to the great benefit of Dassault, the rest of the French aerospace and defence industry in the RAFALE supply chain and the French economy. At the start, there was a programme to develop a European collaborative advanced fighter aircraft that failed to deliver an acceptable solution for political, industrial and operational reasons. This led France to embark on a national programme that would more closely meet French operational requirements for a land-based and carrier-based aircraft. The end result was the RAFALE.

Initially, the RAFALE found itself in a difficult position in export markets, where it was competing against US, European and

#### **Defence** iQ presents its 15th annual

# 5 P E C T R LI M IR DEFENCE

28-29 June 2022 Copthorne Tara Hotel, Kensington, London

#### The Premier Meeting Ground for the **International Air Defence Community**



#### **HIGHLY ESTEEMED SPEAKERS INCLUDE:** CONFERENCE CHAIRMAN:

Colonel (Retd.) David Shank, Former Commander, U.S. Army Air Defense Artillery School. **US** Army

Air Vice-Marshal Lincoln Taylor, Chief of Staff Capability, **Royal Air Force** 

Brigadier General Kazimierz Dy⊠ski, Chief of Air and Missile Defense Department. Polish Armed Forces

and and a

Colonel Mikael Beck, Commanding Officer, Swedish Air Defence Reaiment. Swedish Army

Major General Sean A. Gainey, Director, Counter Unmanned Aircraft Systems Office/ Director of Fires, Office of the Deputy Chief of Staff, US Air lucation and Training Command

1. Reduce decision time from detection to interception by improving the integration of air defence networks

**BENEFITS OF ATTENDING:** 2. Improve interoperability between air defence structures, both nationally and internationally through international collaboration

3. Harness new technologies to counter high volume/ low-cost weaponry in addition to BMD and personic th

4. Discuss emerging trends and focuses in the Great Power

5. Ensure your force is equipped to face future threats by exploring new threat analysis and solutions

robin

**KR**<sup>(A)</sup>TOS

WEIBEL

#### https://www.defenceiq.com/events-fullspectrumairdefence/agenda-mc

\*\*\*\* FOUR STAR LEAD PARTNERS







\*\*\*

THREE STAR PARTNERS



SID-FEND ECHODYNE

ONE STAR PARTNERS

HENSOLDT)

even Russian competition. This led to a number of failures in major fighter competitions, such as the Republic of Korea (ROK) and Singapore. On the other hand, RAFALE operational capabilities continued to improve in line with French national requirements and the aircraft was following a long-term capability growth strategy that kept it more than competitive with its fighter competition.

#### A First Breakthrough

Then in 2015 came the first breakthrough when Egypt ordered the RAFALE, with 24 aircraft ordered in February of that year. Subsequently, Egypt would go on to purchase an additional 30 aircraft. Then in May 2015, Qatar announced that it was ordering 24 RAFALE aircraft for the Qatar Emiri Air Force (QEAF) and placing an option on a further 12 aircraft. This option was turned into an order in December 2017. Then in 2016. India announced that it would acquire 36 RAFALE DH/EH aircraft. India was a long-term Dassault customer and this order opened the way to possible future Indian Air Force acquisitions and also put RAFALE in a strong position to meet the Indian Navy requirement for a carrier-based fighter.



French troops fire an MBDA MMP (Missile de moyenne portée) in the buildup phase to the major NATO HEDGEHOG exercise being held in Estonia. The MMP is a medium-range system that entered service in the French Army in 2017 as the replacement for the existing MILAN and JAVELIN systems.

Another new customer arrived in January 2021, when Greece ordered 18 RAFALE and then in March this year added a further six aircraft to the acquisition programme. France is building a strong defence and defence industrial relationship with Greece,

with Naval Group being involved and now Nexter working to expand relations with Greece. Nexter has a strategic partnership with Hellenic Defence Systems (HDS) to offer the PHILOCTETES, a version of the VBCI MkII, to meet the Greek Army requirement



#### COUNTRY FOCUS: FRANCE



In May 2022, the DGA took delivery of the first of eight NH90 helicopters to be delivered in 2022 for the Armée de Terre. This unit is the 52nd to be delivered out of the 74 NH90 being acquired under the Loi de Programmation Militaire 2019-2025.

for a new Infantry Fighting Vehicle (IFV). Returning to RAFALE, we have already mentioned the UAE programme, but there is another order signed earlier this year between Dassault and Indonesia under which 42 RAFALE aircraft will be acquired. This is the first time that Indonesia has purchased French combat aircraft. On top of that, it now appears that Serbia is flirting with the acquisition of a batch of 12 RAFALE aircraft. In the space of seven years, the RAFALE has obtained orders for a total of 272 aircraft, with more orders likely from India and Serbia amongst others. All of this has helped to sustain this sector of the French industry and created the basis for the development of a next generation of combat aircraft.

#### Deterrence

The French nuclear deterrent is the ultimate guarantee of French independence. After developing a nuclear weapon capability across the 1960s, France went on to develop a strategic triad of air, land and seabased delivery systems. Today, the landbased capability has been retired but an air capability still exists and now France is moving towards the introduction of a thirdgeneration of SSBN for the French Navy, a programme known as SNLE 3G.

At present, the French SSBN capability is based on four LE TRIOMPHANT class which entered service between 1997 and 2010, with the retirement of the first GENERA-TION LE REDOUTABLE class SSBN. Naval Group will be the prime for the SNLE 3G programme and the aim is to have the first of the new generation boats in service by 2035. The following three boats will be delivered at a rate of one every five years. These new submarines will provide a French deterrent capability through to the 2090s.

The ability to produce a new generation SSBN is testimony to the capabilities of the French defence industry. The ability to design, develop and deliver a system of such complexity is something that very few can match. The submarine, its electronics and propulsion system are all of French origin, as are the missiles and their warheads. This is a classic example of strategic autonomy.

#### **New Opportunities**

France has made no secret of the fact that it would like to see the emergence of a truly European defence capability. While this remains a future possibility, at an industrial level European solutions continue to emerge. The cost and complexity of next generation combat aircraft (SCAF/FCAS) made European cooperation inevitable and so France is working with Germany and Spain on the programme. The Main Ground Combat System (MGCS), a future tank programme, sees France working with Germany to deliver a solution. Collaborative ventures of this nature make sense. In these highly sophisticated areas, the cost of developing and fielding these advanced systems is increasingly beyond the resources of a single country.

Developing a European solution does not always mean major European collaborative programmes. There are other ways to meet these goals. Elsewhere in this issue, we have written at some length about the French Army SCORPION programme, under which the JAGUAR, GRIFFON and SERVAL armoured vehicles are to be supplied and 200 LECLERC tanks upgraded. Belgium provides an example of a bilateral solution to increasing European defence cooperation, via the purchase of JAGUAR and GRIFFON vehicles under the CaMo programme to equip a new mechanised brigade. This brigade will be fully interoperable with French Army units. More recently, the Belgian Land Components had ordered nine new generation CAESAR Mark II 155 mm artillery systems further enhancing both operational capabilities and interoperability with France.

Another option for French industry is to develop existing equipment to further enhance its utility and broaden its appeal to potential customers. Arguus, who are a major player in the SCORPION programme, also provide their HORNET Remote Weapon Station (RWS) to the French Army for this programme. Arguus have now developed a range of new HORNET variants. These include the HORNET Stealth Protection which adds the Lacroix GALLIX soft-kill self-protection system and the Metravib PILAR V acoustic detection system. Then there is HORNET AIR GUARD; here Arquus have worked with Cerbair, on an anti-drone system allowing the detection and engagement of drone targets. There is also an option to upgrade the combat capabilities of the HORNET via the integration of the MBDA MMP medium-range anti-tank missile. Existing HORNET users can upgrade to this configuration. Finally, Arguus have developed a version of the HORNET that can be integrated with the Milrem UGV system.

#### **Final Thoughts**

For many years, France has been one of the major providers of defence equipment globally, a position which continues to deliver both political and economic benefits. There has been some contraction in the French defence industrial base, for example, France no longer has a major small arms manufacturing capability. However, much more capability has been gained. Uniquely, France remains a major player in all of the key operational domains – air, land, sea and space.

As to the future, it is inevitable that we will see more defence industrial consolidation and where acceptable the creation of more European companies through cross-border mergers. We will also see a continuation of international collaborative programmes. Even so, the French defence industry will continue to thrive as a major contributor to French strategic autonomy.

**ELECTRONICS & DEFENSE** 

# OBSERVE, DECIDE, GUIDE

#### SAFRAN ELECTRONICS & DEFENSE, INTELLIGENCE ONBOARD

Day after day, you face critical challenges. The products and services developed by Safran Electronics & Defense, whether civil or military, deliver the technological superiority, effectiveness, reliability and competitiveness you expect. We're with you every step of the way, building in the intelligence that gives you a critical advantage in observation, decision-making and guidance. You can count on Safran Electronics & Defense, your strategic partner on land, at sea, in the air and in space.

safran-electronics-defense.com ¥:@SafranElecDef



# Perspectives on the Future of the French Defence Industry

#### **David Saw**

#### A Conversation with Emmanuel Levacher, President of Arquus

n 16 February, Arguus held a press conference in Paris to discuss their annual results in 2021 and to discuss the opportunities that they saw evolving across the course of 2022 as the post-COVID recovery hopefully gained momentum. Then on 24 February, Russia invaded the Ukraine and everything changed. In the aftermath of the invasion, there was suddenly a recognition by many European politicians that they would need to increase defence expenditure. However, there was far more complexity involved. Simply increasing defence expenditure was only an answer to a small part of the problem; the challenges facing Europe's defence industry are far more complicated than that.

In May 2022, ES&D had the opportunity to discuss the environment that the European defence industry currently faces with Emmanuel Levacher, the President of Arquus, the European military vehicle manufacturer. Mr Levacher was educated in France and the US, with his career being focused on the truck and automative industry, primarily with Volvo and Renault Trucks. He has a significant international business background, having been the Directeur Général of Renault Trucks in the Czech Republic from 1997 - 2002, he then headed up Renault Trucks international cooperation programmes and international operations. Between 2008 and 2013 he was the Sales and Marketing Director Africa and Asia for Renault SAS, this was followed by the position of Director International Affairs for Volvo Eicher Commercial Vehicles in New Delhi, India. Mr Levacher then returned to Europe in 2015 and became the President of Arquus, overseeing the birth of the new company on the basis of Renault Trucks Defense - Panhard.

#### **The Economic Situation**

We started by discussing whether post-24/02 the global defence environment had changed. Perhaps there will be change, but challenges and constraints still exist such as government debt burdens,



Arquus are playing a central role in the French Army SCORPION transformation programme, with the GRIFFON multi-role vehicle (shown here) and the JAGUAR reconnaissance and combat vehicle. Belgium is the first export customer for these vehicles.

public spending pressure, inflation and rising interest rates. Rising interest rates with make it harder for France and other countries to refinance their debt. For all the talk of rising defence expenditure, there was a concern whether there actually was a clear popular mandate to increase defence expenditure in Europe. Also because of the financial situation, governments face financial constraints and have limited budgetary room for manoeuvre.

If we have returned to an era of high intensity conflicts, it was clear that this would be a challenge and very expensive for Europe to recover from all of that post-Cold War military neglect. Indeed, this drives one to question whether the goal of spending 2% of GDP on defence is actually enough to meet military needs. The fact of the matter for France is that you cannot finance everything, especially when expensive programmes such the new aircraft carrier, nuclear forces and space are also battling for money. In the final analysis, it comes down to deciding what size of army can be afforded.

#### NATO and/or Europe

France has long believed that Europe needs its own independent defence capability to give it true strategic autonomy. Does the European capability develop in conjunction with NATO or instead of NATO? Mr Levacher responded by noting that what works today is NATO and that interoperability standards are NATO. Certainly, France has a vision of European strategic autonomy, but we are a long way from that becoming a reality.

Where Europe could achieve a more effective defence capability is via partnerships within Europe. A good example is the CaMo bilateral relationship between France and Belgium. Here the Belgian Land Component has established a Mechanised Brigade which will be equipped with 60 JAGUAR and 382 GRIFFON vehicles. This brigade can be integrated with French units on operations. This bilateral solution is potentially the pragmatic approach to enhancing European defence capabilities. ELCAN SPECTER® WEAPON SIGHTS

# The toughest sights. For the toughest missions.

The ELCAN Specter<sup>®</sup> DR dual role machine gun sight instantly switches between close-combat battle mode and precision ranged fire mode — delivering a decisive advantage in the field.



RTX.com/specter Visit Raytheon ELCAN at Eurosatory in the Canada Pavilion

©2022 Raytheon Company, a Raytheon Technologies company

#### COUNTRY FOCUS: FRANCE



Arquus are introducing new versions of their HORNET Remote Weapon Station (RWS), this image shows the HORNET STEALTH PROTECTION variant. Here the RWS is fitted with the Lacroix GALLIX soft-kill selfprotection system and the Metravib PILAR V acoustic detection system.

#### Sweden

Arquus is part of the Volvo Group, one of the main industrial companies in Sweden, and that is why it is worth exploring the change in the strategic position of Sweden recently. Since 2014 and the Russian invasion of the Crimea and the Donbas, Sweden has switched from relying on neutrality to feeling that they are facing an existential threat and this has led them to start re-investing in defence. In turn, this has led to a cultural change, hence the movement of Sweden towards seeking NATO membership.

This change in Swedish attitudes to defence is reflected at Volvo, who are now much more open to defence activities. That was not always the case. Indeed, in 2016 Volvo were looking to divest their defence capability in the form of Arquus, but in 2017 changed their mind and now there is much less pressure to retreat from the defence business.

This brings us to the subject of the Environmental, Social and Governance (ESG) trend where activist investors and increasingly politicians look to direct how companies operate and impose behavioural rules. The first to suffer from this were companies with fossil fuel interests, where ESG would limit the ability to attract investment, thus forcing these companies to become more ESG compliant and focus on renewables and other non-traditional business areas, rather than fossil fuels.

The growth of ESG could also affect defence companies and perhaps larger corporates might divest themselves of a defence business rather than deal with ESG problems. Since the Ukraine invasion, the emphasis on ESG measures has declined in both Europe and the US, but Mr Levacher cautioned that it was necessary for defence companies in Europe to show to European politicians and the European public that what they do is essential and what is at stake if the European defence industry is hobbled by ESG-related legislation.

#### Markets

Mr Levacher came to Arguus seven years ago and said at that time he was surprised that there were so many players in the military vehicles market. To survive and prosper in such a marketplace, a company such as Arguus has to become more competitive and agile, be cleverer than the competition and offer cost effective solutions. On the other hand, there are also possibilities offered by partnerships with players in other European markets to deliver end-user solutions that meet their national requirements. What is certain is that exports are essential to Arguus. Their aim is a balanced business model where 50% of their work is in France and the other 50% is in the export market (50% in Europe and 50% in the rest of the world). They also see service and support forming an increasingly important part of their business. Currently, platform sales account for 60%, with service and support at 40%. The objective is 50% product sales and 50% service & support.

As a result of recent events, the importance of credible ground forces has been rediscovered in Europe; in parallel with this comes the confirmation of the necessity of logistic support capabilities. This has led to a series of opportunities emerging for Arquus across Europe, for example in Romania and in Estonia. In the Czech Republic, where Arquus supply components to local truck manufacturer Tatra, there are emerging requirements for lighter 4x4 vehicles that Arguus can meet. Arguus are also talking to the Greek Ministry of Defence about a number of possibilities, one of which could be an upgrade programme for the Greek Army VBL vehicle fleet. There are also opportunities in Cyprus. Arquus will also continue to explore international market opportunities beyond Europe, these might be more complicated to obtain, but they are important.

As to the future, the long awaited French Army logistic vehicle requirement is moving forward slowly, with the Direction générale de l'armement (DGA) asking industry to register interest. This is a massive programme but as of yet no clear timetable exists. Another future programme is the Véhicule blindé d'aide à l'engagement (VBAE), this will be the VBL replacement in the French Army, with somewhere in the region of 2,000 vehicles being required. Potential early VBAE export opportunities exist in Belgium and Luxembourg according to Arquus.

Finally, mention should be made of a diversified business at Arquus in the shape of the HORNET Remote Weapon Station (RWS) system. Already selected by the French Army for installation on its GRIFFON and JAGUAR vehicles, the HORNET programme is now evolving with new variants and capabilities coming online to meet a much wider range of platform and mission requirements in domestic and international markets.



The Arquus SCARABÉE was developed by the company as a light armoured vehicle and features a hybrid propulsion system. The technology of SCARABÉE could provide the basis for the Arquus solution to the Véhicule blindé d'aide à l'engagement (VBAE), VBL replacement programme.

# "We specialize in the systems' integration."

WB GROUP is the largest Polish manufacturer of advanced electronic systems. The Group specializes in command, battlefield management and communication systems, as well as unmanned aerial systems for reconnaissance and strike missions (including loitering munitions).



#### Questions to Piotr Wojciechowski, CEO of WB Group.

#### We've heard of the release of the Group's new system at Eurosatory 2022?

The FONET tactical vehicle integration platform set the standard for vehicular Combat Management System by integrating it with system sensors, communication, effectors and combat management systems. It was so revolutionary that we have sold the FONET license to a great number of customers, including L3Harris in the US. At this year's Eurosatory we will display the FONET Mk 2. It's an improved solution, while still fully compatible with the older system that had been integrated into multiple military vehicles around the world. I don't think that there is a continent where you won't find a combat or command vehicle equipped with FONET. The new FONET Mk 2 is faster and more capable with new and powerful processor architecture. The system security is enhanced, as well as radios compatibility.

WB Group's UAVs arouse a great interest, particularly after signing the larg-

#### est contract for their delivery in Poland. What more can you say about them?

WB Group manufactures and delivers a range of UAVs to customers globally. We are proud to be one of the few producers in the world to offer FlyEye UAS and WAR-MATE loitering munitions combat-proven in the full-scale war. The conflict where the electronic warfare, GPS jammers and a strong anti-aircraft defense are being used. This is the outcome of many years of experience, development and close contacts with the end-users. We carefully listen to their comments and we modify our systems according to their requirements.

In 2021 WB Group presented for the first time the reconnaissance-combat system W2MPIR (a Vampire) that integrates our existing communication, battlefield management, unmanned recon and strike solutions. The product aroused a great interest in Poland and abroad - so great that a few days ago we have signed the 2 billion zlotys (€450M) contract with the Poland's Armed Forces. The deal covers the delivery of the Gladius system, based on W2MPIR. The system includes four artillery search and strike battery fire modules supplied with the FT-5-family UAVs, as well as the new recon-strike UAV. Each fire module includes command vehicles, launchers, ammunition vehicles and technical maintenance.

# Is TOPAZ battlefield management and combat system, created by WB GROUP, at the heart of W2MPIR?

TOPAZ has been ordered by the Polish military as a fire control system in mid-1990s. In time, it has become a fully operational BMS with many applications - strike, fires, logistic, recon, integrating many various SWARM effectors. The development of TOPAZ has first taught us the integration of effectors and sensors, then it has forced us to improve the radio communication (PERAD and COMP@N software defined radios, GUARANA modular vehicle radio) and to create our own and coalition waveforms (the ESSOR program). This has enabled us to seamlessly move towards designing the reconnaissance unmanned systems FlyEye and FT-5, and strike systems - the

WARMATE-family loitering munitions systems. We have learned to create the most advanced vehicles on the battlefield – the command vehicles.

Today TOPAZ is a powerful tool, used for command and management of independent fire units on multiple levels. Each artillery fire module unit has its own reconnaissance, command, effectors (tube artillery, rocket artillery, anti-tank guided missiles, loitering munitions and others), as well as logistics. Thanks to TOPAZ SWARM, we provide commanders with a flexible choice of combat means, depending on the detected targets.

#### Not long ago, WB Group displayed the new communication systems for soldiers and vehicles. Can you tell us more about it?

The Group's experience in UAV and radio communication have led to creation of a SILENT NETWORK. The main reason for this was a large number of electromagnetic emissions of the available radios. This could result in detection, identification and destruction of the radio users. We can see this is happening at war in Ukraine. We needed to create a network combining low-emission and narrowband/broadband SDRs capable of detecting and avoiding jamming. It's our UAV experience that has given us the idea of lifting them up in the air. A flying router integrated into a small UAV is an 'invisible' mast. It significantly increases the communication range, but thanks to this, we have gained the communication and data exchange's secrecy. For example: a battalion's communication networks are practically invisible for electromagnetic emission detecting systems. At the same time each soldier can access the data from the dismounted observation and command system U-GATE, send data and even a video stream, operate the UAV's observation payload, direct strikes from the loitering munitions or operate the unmanned turret, all by using a small handheld radio. The unmanned means are moving towards the area where our units are operating in radio silence, and so they are undetectable. This is a revolution in radio communication.

# The International Reference for Land and Airland Defence and Security Exhibitions

#### **Charles Beaudouin**

EUROSATORY, the leading trade show in the defence and security sector, will take place again on 13-17 June in Paris.

The conflict in Ukraine at the gates of Europe highlights the reality of a paradigm change in terms of armed conflicts with a shift from asymmetrical conflicts (which will certainly continue) to conflicts of higher intensity (symmetrical, asymmetrical) reflecting the full spectrum of Earth, Air, Sea, Space, Cyber capabilities. A number of defence systems in Europe and around the world, must be seriously reviewed in this light. In this context, EUROSATORY represents the richest and most professional place of exchange and information.

Indeed, the hallmark of EUROSATORY, and what makes it the leading defence and security show in the world, is the very broad and competitive spectrum of capabilities presented. It is the technological exhibition par excellence, presenting all the capacities capable of responding to a high-intensity conflict and with a ten or even twenty-year outlook. EUROSATORY therefore knows how to offer solutions and services, both for the most demanding capability questions, as complex as the structured force systems (coordinated ground-air defence with intervening in the 3rd dimension, digitisation of

#### Author

Charles Beaudouin is Directeur Général of COGES. COGES (Commissariat Général des Expositions et Salons du GICAT) is a wholly-owned subsidiary of the French Land and Airland Defence and Security Industries Association GICAT. It is devoted to promoting French land and airland Defence and Security industries and their sectors worldwide. In this purpose, COGES creates targeted events both inside and outside France. It organises EUROSATORY, the leading international land and airland defence and security exhibition. land and airland forces, etc.) and for interest in the so-called "off the shelf" acquisitions, including the simplest (assault rifles, for example).

Insofar as EUROSATORY presents a larger offer, it is of crucial interest for potential exhibitors to be able to situate themselves and compare themselves to the competition they will find on calls for tenders, and to also evaluate overall market tendencies. There is also an interest in it for companies, oriented towards the internal market of their country and wishing to open up to exports.

EUROSATORY is also for companies of all sizes (Start-ups, SMEs, ETIs, large groups) an exceptional and particularly attractive show-case in view of the particularly large number of institutional and private visitors, all professionals made up of 250 delegations from over 100 countries.

An example of EUROSATORY's ability to be inventive; we all see the multiplication of humanitarian disasters, whether they are climatic, industrial or conflict-related. These crises are characterised by their suddenness and their deadly and devastating nature both for infrastructure and for the environment, subject to destruction and pollution. Faced with this, and on the strength of its rather unique competence and experience gained over 30 years in the field of D&S, COGES Events applied the know-how acquired in the field of defence and "invented" HELPED (Humanitary Emergency Logistic Project and Eco Development), namely a reservoir of complementary capacities, coordinated, trained, projectable by adapting the means to the crisis. The means certainly already exist, but they are too segmented and incomplete, and not fully thought out. We are convinced that this is a global response, particularly efficient, to a crucial and growing need. It is of interest to regions, States, and international intergovernmental organisations.



In a very concrete manner, we will present a HELPED capacity demonstrator over the five days of the show.

#### **Three Mega Trends**

EUROSATORY must translate the three current global "mega trends", which have been exacerbated by the COVID pandemic and the current conflict in Ukraine. These include global warming and, as a result, the imperative to protect people and the environment. In this regard, HELPED is a concrete translation of this subject. Another is the return of symmetrical interstate conflicts (and here, our technology Fair is best placed to meet this challenge with the industrial base fabric of Defence and e-Security of exhibitors and conferences). Finally, the digital sector which is already a "key player", and tomorrow will be a "game changer", with its strengths and weaknesses, and whose future challenge is the management of meta-databases and the intelligence artificial as decision-making support in the fog of war and access to greater automation of systems.

The show is already looking like a success; six weeks before the 13 June deadline, we have as many exhibitors on as many square metres as in 2018, which was already a record year. There is a very strong momentum, especially on the part of the countries of northern and eastern Europe. For example, 30 Swedish companies have already registered compared to 14 in 2018 at the same



A dynamic demonstration at EUROSATORY 2018

time, and 40 exhibitors from Latvia, Lithuania and Slovakia compared to three in 2018. This year, 70 per cent of exhibitors are European, 80 per cent if we widen this circle to other NATO countries. There will be no Russian exhibitors at this year's event. Conversely, a Ukrainian national pavilion with a 200m<sup>2</sup> stand will be present. Furthermore, there will be considerably fewer Chinese companies, due to the resurgence of the pandemic in China.

We are also expecting at least 50,000 unique visitors who will visit the show over several days. They are all professionals or concerned with defence and security issues and come from about 150 countries. Among them, no less than 200 official delegations will attend, from 100 countries.

#### **Dynamic Demonstrations**

The dynamic demonstrations at EUROSA-TORY have the ability to present the mobility capabilities of a vehicle in a real way, its weapon system functions simulated by projection on a large screen with comments from a speaker. These demonstrations are the result of a communications approach and are spectacular.

The main families presenting in dynamic demonstrations in 2022 will be land robotics, armoured mobility, rescue and firefighting. There will be two types of demonstrations: those of the units of the French armed forces of internal security and those of the exhibitors. For the first, the French Army is planning a large-scale demonstration highlighting many of its components, including the special forces. There will also be demonstrations by the elite units of the Gendarmerie (GIGN), Police (RAID) and Paris firefighters. For the second type, we will have presentations of 4x4 armoured vehicles with different payloads, fire vehicles, and robotics and even swarms of drones.

The success of EUROSATORY and its place as a world leader are primarily due to the fact that my company, COGES Events, as the organiser, is entirely dedicated to security and defence. We are not your usual events company. COGES Events also effectively organises ShieldAfrica in the Ivory Coast and, in cooperation with CORFERIAS, Expodefensa in Colombia; both are biennial security and defence exhibitions, with the next editions taking place in 2023. Then we are extremely

#### **COUNTRY FOCUS: FRANCE**

attentive to the quality of the relationship between visitors and exhibitors and will ensure careful support for official delegations with a dedicated officer.

We also know, and this is essential in my view, the importance of giving meaning through a careful cycle of 80 conferences in situ at the show. We are also developing conferences in a more restricted circle.

Finally, and let's not neglect one significant asset: coming to Paris at the beginning of summer.

To conclude, I would say that EUROSATORY is where tomorrow's defence and security are shaped, which makes it the unmissable D&S event and I am used to saying that no delegation or exhibitor can come back without having clearly achieved progress in their business and prospects.

WEIBEL

# **XENTA** TAKE BACK TIME

The Optimal Radar Solution for Short Range Air Defense

Visit Weibel at the Danish Pavilion at Eurosatory to learn more.

www.weibelradars.com

#### ARMAMENT & TECHNOLOGY

# Strong and Versatile: 4x4 Armoured Vehicles

#### Sidney E. Dean

The 4x4 category of dedicated armoured vehicles fills an important niche between larger and heavier armoured vehicles (whether tracked or 6x6/8x8 wheeled systems) on the one hand and up-armoured tactical vehicles on the other. By achieving a compromise balance of mobility and protection, they are suitable for a range of challenging operational environments.

4 vehicles are produced in numerous variants, including general purpose tactical transports (personnel and cargo), scout vehicles, light armoured fighting vehicles with turret mounted guns, and specialized units such as field ambulance or command vehicle. Armour level can vary widely, from basic "protected" vehicles with comparatively light armour, to heavier types including mine-Resistant/Ambush-Protected (MRAP) designs.

#### **Oshkosh M-ATV**

While much attention is currently focussed on Oshkosh Defense's Joint Light Tactical Vehicle (JLTV), the firm continues to market a wide variety of systems including the MRAP All-Terrain Vehicle (MATV) family of vehicles (FoV). While one-third heavier than the JLTV, the MATV is considerably lighter and more manoeuvrable than earlier MRAPs. The US army's Training and Doctrine Command (TRADOC) describes MATV as a "high mobility, high protection" multipurpose vehicle "specifically engineered for treacherous environments"; it is able to operate on every area of the battlefield, "ideally suited for mountainous terrain" and other areas of restricted mobility.

Circa 10,000 units have been delivered since production began in 2009. In addition to the US armed forces, operators include five European and five Middle Eastern nations. The MATV FoV currently consists of five variants: Assault (optimised for special reconnaissance, target acquisition, unconventional and conventional warfare missions); Command (command & control, forward fire control); Special Operations; Engineering (combat engineering and EOD, with optional mine-roller mount and robot tie-downs); Utility (open-bed cargo transport).



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

Common technical specifications include: Oshkosh's proprietary TAK-4 independent suspension system which provides best-in-class mobility over difficult terrain; 400mm ground clearance; traverse 60% grades and 30-40% side slopes; 510 km cruising range; operational in all climate zones between -32 and +54 degrees Celsius; monocoque crew cell protected by Plasan-developed armour; optional manned weapon mount with armoured Gunner Protection Kit (GPK) or remote-controlled weapon station (RWS); payload 2.000-3,180 kg depending on variant; seating for 5-11, depending on variant.

#### **GDELS EAGLE V**

The EAGLE V light protected vehicle manufactured by General Dynamics – European Land Systems (GD-ELS) offers STANAG 4569 level 3 ballistic and level 2a blast protection thanks to a double-vshaped hull and a monocoque composed of electrically welded high-strength steel. This exceeds the protection level of most vehicles of comparable size (5.4 metre length, 7,000 kg curb weight). The protection level can be further enhanced through various steel and composite applique systems. For special operations forces which frequently require an open vehicle, GD-ELS offers a soft-top variant. Standard crew size of the 4x4 EAGLE V is 3-5 soldiers. At 6.5 cubic metres, interior space is somewhat larger than that of the preceding variant EAGLE IV, with which the EAGLE V shares 85 percent of components. Weapons options include two machine guns (including on 12,7mm) or an automatic grenade launcher on an RWS. The Cummins 5.9 litre engine produces 250 hp, which – together with the Allison 2500SP automatic transmission - provide excellent on- and off-road performance. Operational range and road speed are 700 km and 110 kph, respectively. Depending on configuration and optional armour carried, the standard EAGLE V 4x4 vehicle has a payload capacity between 1.4 tons and 3.3 tons.

# SOFT RECOIL TECHNOLOGY



Integrating soft recoil technology into a weapons system results in **up to 60% reduction in recoil forces** transferred to the platform. This technology is the key ingredient to enable larger guns on smaller mobile platforms, increasing:

#### SPEED | LETHALITY | AGILITY | DEPLOYABILITY | SURVIVABILITY

Visit www.amgeneral.com to learn more.





Supacat HMT Extenda Mk2 with 105mm Concept



International 155mm Mobile Artillery System Concept



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



Road testing the Arquus SCARABEE



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

Mission profile includes reconnaissance and patrol, NBC detection, armoured personnel carrier, command and control vehicle, artillery forward observation, EOD and field ambulance. Modular mission specific equipment can be installed, including electronic warfare systems. The vehicle is equipped with a digital dashboard display which consolidates both vehicle status data as well as input from on-board electronic and optical sensors. Primary users of the EAGLE FoV include Germany, Denmark and Switzerland.

#### **AM General/Arquus BASTION**

The BASTION is an example of successful transatlantic cooperation. The six metre long, 12.5 ton armoured personnel carrier (APC) is based on the unarmoured VLRA light tactical truck manufactured by France's Arguus. Since 2018, US-based AM General is producing an American-built variant which is being marketed globally through the US government's foreign military sales channel; before that, the vehicles were produced by US-based Mack Trucks. The vehicle's global versatility is enhanced by the optional left- or right-hand drive configuration. While most of the 18 operators of the BASTION are located in Africa, they have also been acquired by special operations forces in Saudi Arabia and Sweden, as well as by the special police unit of the Kosovo interior ministry. The vehicle can operate under fully tropical conditions as well as under extreme cold (-32 degrees Celsius).

The APC accommodates a crew of two plus eight fully-armed passengers in the spacious rear compartment. It is suited for combat, peacekeeping and reconnaissance operations. Alternate configurations of the BASTION include command vehicle, cargo transport, ambulance and maintenance vehicle, as well as the dedicated PATSAS special operations force variant. At 10 tons the PATSAS (Patrol SAS) is lighter but more heavily armed than the mainstream APC; it accommodates a crew of five, but can mount up to four machine guns.

Depending on configuration, the BAS-TION's armour protection can reach STANAG level 3 (ballistic) and level 2a/2b (blast). An IED jammer, external cameras, laser and sniper acoustic detection systems, and smoke grenade launchers augment the survivability suite. Armament options centre around a ring mount or RWS with either a machine gun or 40mm grenade launcher; additionally, vehicle occupants can fire assault rifles through six firing ports in the rear compartment.

European Security & Defence · 6/2022 60

The 330mm ground clearance permits scaling a 60% incline, crossing an 80 cm trench, or fording up to one metre of water. Maximum road speed is 110 kph, with an operational radius of 1,000 km.

#### **Nexter ARAVIS**

Nexter's six metre long, 12,500 ton ARA-VIS enjoys the highest protection level of any comparable-sized 4x4, leading the French army to designate it as the Véhicule Blindé Hautement Protégé (VBHP) or Highly Protected Armoured Vehicle. More than 80 percent of the 9.5 cubic metre interior space is fully protected. This is made possible through application of the firm's proprietary SafePro modular armour system which provides STANAG 4569 level 4 ballistic protection and level 4a/4b blast protection. Blast protection is further enhanced by the v-shaped hull.

The ARAVIS normally carries a top-mounted RWS with either a 12.7mm machine gun, 40mm automatic grenade weapon, or a 20mm automatic cannon. Optional equipment includes the Thales MARGO 5000 surveillance system consisting of mast-mounted electro-optical sensors and a laser targeting system. The vehicle requires a two-person crew and can accommodate six additional soldiers in the rear.

The 750 km range and 100 kph speed make the vehicle suitable for a variety of applications including reconnaissance, fire support, command and control, and field ambulance. The ARAVIS is in service with the armies of France and Saudi Arabia. The French variants have deployed extensively in Africa as well as Afghanistan and Syria.

#### **Iveco MPV**

lveco produces one of the heavier 4x4 armoured vehicles. The Medium Protect-



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

ed Vehicle (MPV), developed in cooperation with Krauss-Maffei-Wegmann (KMW) weighs 18 tons. Depending on variant, the vehicle is between 6.5 and 7.2 metres long. Internal space ranges from 13 to 16 cubic metres. Road speed exceeds 90 kph. Off road, the MPV's 400mm ground clearance enables it to master gradients and sideslopes of 60 and 30 percent, respectively, and fords up to 120 centimetres of water.

The MPV consists of an armoured monocoque mounted on an all-terrain Trakker MOTS truck chassis. The highly modular vehicle is produced in three configurations: troop carrier, route-clearance vehicle, and field ambulance. The troop carrier can accommodate a two-person crew plus eight passengers. The route-clearance variant can be equipped with sensor masts and manipulator arms to facilitate detection and neutralization of mines, IEDs and obstacles.

#### Otokar COBRA II / AKREP II

The Otokar COBRA II armoured vehicle is offered in both the standard config-

uration and as an MRAP. The 6,700 kg standard variant features a steel-armour monocoque hull, an additionally armoured engine compartment and a dualfloor structure designed to absorb shock from mine blasts. The highly angular hull design adds an additional layer of protection by deflecting projectiles. The COBRA II is available in numerous mission-optimized variants including armoured personnel carrier (ten occupants including driver and commander), weapon platform, command and control, reconnaissance and surveillance, fire control, and electronic warfare. The COBRA II can also be optionally equipped with hydraulic thrusters, making it one of the few amphibious-capable 4x4 vehicles. Roofmounted weapon options include 20mm guns, ATGMs, and air-defence missiles, making the COBRA II one of the most potent 4x4 armoured fighting vehicles. The MRAP variant is available in a threedoor configuration seating nine (including crew), and a larger five-door model seating 11. The MRAP offers even great-



#### GO SAFE. MOVE SAFE. HOME SAFE



SALES@DEFENTURE.COM



The Defenture GRF combines a central spine chassis, powerful engine and 4-wheel steering that enables it to combine the elements of durability and high operational payload with dynamic mobility and a low vehicle weight. The GRF is the ideal choice for airmobile operations and specialist interdiction missions.

er blast protection than the (already well-protected) standard model. The 450mm ground clearance is somewhat higher than the standard vehicle's. Both types offer a high degree of off-road mobility. Otokar's AKREP II armoured vehicle also offers an impressive combination of mobility and firepower. The 5.9 metre long vehicle has a six-metre turning radius, and is capable of sideways or "crab" steering thanks to an optional steerable rear axle. De-



signed for reconnaissance and firesupport missions, the vehicle carries a crew of three. In the fire-support configuration the AKREP II can field 30- or 90mm turret-mounted guns. Alternate armament includes ATGMs and airdefence missiles. Without a turret the AKREP's low 1,98 metre height over hull profile reduces likelihood of detection. Optional hybrid and electric propulsion systems add the benefit of reduced thermal and acoustic signature as well.

#### Small Armoured Vehicles

A recent trend is development of small, light armoured vehicles optimized for scout, rapid-response or special operations missions. Easily transportable by helicopter or small truck, these vehicles can pass where even medium-sized vehicles could not, while minimizing the risk of detection. With sufficient armour to withstand small arms fire, the option to mount their own automatic weapon, and the ability to egress quickly, these vehicles could even carry out strike missions against high value targets of opportunity. Two systems within this category stand out.

#### **Arquus SCARABEE**

The Arguus SCARABEE lightweight armoured vehicle is 5.25 metres long, 2.1 metres wide and two metres high, with circa 6 tons curb weight. The highly manoeuvrable vehicle is equally suited for urban operations and challenging terrain. With 385mm ground clearance and fully independent, adjustable height suspension, the vehicle can master 60% gradients and 40% sideslopes, and cross 90cm ditches. The 300 hp engine and 8+1 gear transmission permit road speeds of 130 kph. The hybrid drive offers the option to operate on electric drive reduces the acoustic and thermal signature, augmenting the vehicle's low visual profile. This is especially advantageous for stealthy approach to target or for overwatch missions.

The four-person crew is seated in a diamond formation, with the driver alone up front, enjoying a 200 degree field of vision over the vehicle's sloping nose. The gunner occupies the rearmost position, seated before the rear-mounted engine. Arguus cites a broad range of missions ranging from reconnaissance and pathfinder to hunter-killer and anti-armour operations in urban and field settings. Despite its size, the SCARABEE is specifically designed as a combat vehicle. Automatic weapons are mounted on the Arguus HORNET RWS; alternate payloads include the MILAN ATGM and the MIS-SILE MOYENNE PORTÉE ATGM. The vehicle can be airdropped and is mission ready within 15 minutes of landing. Arguus has developed three missionoptimized configurations of the SCARA-BEE. The Patrol SAS (PATSAS) variant is oriented towards special operations, and comes standard with a 12.7mm machine gun on the HORNET RWS. The reconnaissance variant mounts a 30mm gun to maximize firepower. The third variant, which carries a three-person crew, is optimized for security, counter-terrorist and urban operations. It is outfitted with Arquus' BATTLENET Battle Management System.

#### **Plasan YAGU**

The Plasan YAGU Ultralight Armoured Tactical Vehicle was unveiled in 2018. The use of comparatively lightweight composite armour permits keeping vehicle curb weight below 1,500 kg while providing the equivalent of STANAG 4569 level 2 ballistic protection. The cab is mounted on a fortified ARCTIC CAT WILDCAT allterrain vehicle chassis. The vehicle's high approach and departure angles, small dimensions and large tires permit it to master soft terrain include sand and snow, narrow mountain trails, and even urban sidewalks and staircases.



Iveco MVP of the Italian Army



**MATV of Marine Special Operations Command** 

The YAGU is configured for a three person crew consisting of driver, commander/navigator, and gunner. The vehicle can mount up to a 7.62mm machine gun on an RWS and carry a small surveillance drone, which can be launched without a crewmember egressing. It is targeted for special operations missions, although the firm also cites general reconnaissance, urban operations, anti-smuggling and border surveillance as potential applications.





Field testing the Plasan YAGU small armoured vehicle

#### Plasan ATeMM

One drawback of armoured vehicles is the fact that the weight of their protective plating can constrain payload capacity. Plasan's ATeMM (All-Terrain electric Mission Module) offers a solution. The two-wheeled unit can be hitched to any 4x4 tactical wheeled vehicle, instantly boosting payload capacity by nearly 1,200 kg. Two units can be

hitched in tandem, adding a total of 2,300 kg to the vehicles base payload capacity. The three-point fast connection system, independent suspension and electrically powered axle enable synchronized steering and braking, while preventing jack-knifing even during tight turning manoeuvres. The ATEMM can carry general supplies, or mount sensors, communications systems or weapons. Vital features are the 190 hp



electric motor and the ability to automatically charge the integrated lithiumion battery pack while the module is towed. ATeMM can provide power to systems mounted on the module or the towing vehicle, and still arrive at its destination with fully charged batteries. In camp, the module can provide power for light nd climate control, recharge soldierworn equipment as well as other battery-powered systems including robots and UAS. Module-mounted sensors and weapons can provide force protection. Two conjoined modules can even be deployed independently as remote-controlled unmanned vehicle.

#### Practika KOZAK FoV

This article would not be complete without mentioning Kyiv-based Practika's KO-ZAK Family of Vehicles. The lighter and smaller members of the FoV are designated the KOZAK 5 and KOZAK 7. Both variants are 6.1 metres long, with 10.5 to 11.8 gross weight and 300 to 310mm ground clearance. Both feature STANAG 4569 level 2 ballistic protection and level 1a/1b blast protection. Practika underscores the ergonomic design of the tenperson crew compartment, which features noise and thermal protection, variable lighting, and anthropometric seating to minimize fatigue. The KOZAK 5 and 7 are optimized for special operations and low-intensity tactical missions in urban and terrain settings.

The KOZAK 2 MRAP vehicle line is configured for a broad spectrum of combat scenarios including battlefield operations. The 6.6 metre long, 2.65 metre wide vehicles have a gross weight of 14+ tons (KOZAK 2M1 and 2M2 variants). Utilizing high-quality European steel applied in overlapping armour plates, Practika has endowed the KOZAK 2 with protection at STANAG 4569 level 2 (ballistic) and level 3a/3b (blast). The highly manoeuvrable vehicles have 430mm ground clearance, a 60% angle of approach, and master 30% side slopes. Mission range is 1,000 km.

Variants include the armoured personnel carrier (ten-passenger capacity plus crew), tactical vehicle, command and control vehicle, mortar carrier, and field ambulance. Top-mounted weapon options include crew-served or remotely operated armoured machine-gun turrets or missile launchers. KOZAK vehicles of the Ukranian army, naval infantry and national guard are currently proving themselves in combat. In addition to service with the Ukranian armed forces, the KOZAK FoV has been exported to several customers, including Saudi Arabia.

#### **Versatile and Affordable**

While this review discusses only a fraction of the 4x4 armoured vehicles in service or under development, it does present an overview of the major types and capability sets of this versatile category. Offering high mobility and a light-tomedium strike capability, they are well suited for support of light infantry forces or for reconnaissance and auxiliary missions. Lower acquisitions cost and fuel consumption, when con compared to heavier vehicles, are additional incentives for procuring vehicles of this class.



# CBRN threats: Protect and secure

Early warnings to units and personnel in the field are a key factor in limiting the effects of CBRN threats. With Saab's coherent and integrated CBRN defence communication and information system (CBRN CIS), CBRN specialists and decision-makers will have efficient tools to detect and identify a wide range of threats and receive the support needed for providing fast and accurate early warning.

Saab's CBRN solutions include customizable sampling equipment and certified transport packaging as well as a wide range of services and solutions for CBRN training, individual protection and support and the CBRN automatic warning and reporting system AWR. The AWR system integrates Detection, Identification, Monitoring (DIM) together with Warning and Reporting (WR) into one single system and provides a consolidated and comprehensive threat picture to the operational forces. DIM and WR combined will save time and resources and gain a head start with the information flow when you need it the most. The system negates the need for specialist CBRN personnel to be employed

widely throughout the operational forces, reducing the cost of training and personnel management.

#### Shorten time to action

The AWR system is based on a modular and open architecture that allows users to change sensor configuration over time in response to changing threats. It is therefore both cost effective and ready for future threats. All units, from fixed and mobile to the soldier system, are fully integrated into the system and it is possible to tailor it according to changing needs and adapt it to the organisation's tasks. The system uses a sensor network with distributed data, which enables early warnings with the purpose to support the decision process and shorten time to action.

In the CBRN field, Saab can provide a wide range of advanced technical services. We perform traditional tasks such as maintenance engineering, production of documentation, follow-ups and technical support services in connection with procurements, operation and phase-out of CBRN equipment. Saab also undertakes product development and production and we offer tailor-made system solutions including system integration and handling systems.

#### www.saab.com/france



# **UK 4x4 Armoured Vehicles**

#### **Christopher F Foss**

Armoured multi-purpose vehicles are highly survivable and thus are essential to the future of the British Army. They are regarded as reliable workhorses and have considerable export potential.

he latest British Army 4x4 armoured vehicle to enter service is the FOX-HOUND which is offered on the export market by General Dynamics Land Systems UK (GDLS UK) as the OCELOT. A total of 400 FOXHOUND were delivered to meet the requirement for a Protected Patrol Vehicle (PPV) with a high level of protection against small arms fire, mines and improvised explosive devices (IED). Production and final integration was undertaken at the facilities of Ricardo in Shoreham and it was the first British armoured vehicle to be fitted with the Generic Vehicle Architecture (GVA) in the UK which makes it easier to upgrade in the future as new electronic devices are developed and deployed. FOXHOUND features a V-shaped composite hull which offers a high level of protection

#### **OCELOT and FOXHOUND**

To meet potential export requirements, a steel version of the OCELOT was developed and tested but so far, this has yet to enter production or service. More specialised versions of the OCELOT, which have been developed and tested by GDLS UK using internal research and development funding are the OCELOT Special Operations Vehicle



The General Dynamics Land Systems UK OCELOT General Purpose Vehicle – Utility features a V-shaped lower hull for maximum protection against mines and improvised explosive devices with flatbed at rear capable of carrying two NATO pallets.

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

**Christopher F. Foss** has been writing on armoured fighting vehicles and artillery systems since 1970. He has also lectured on these subjects in many countries as well as chairing conferences all over the world. He has now driven well over 60 tracked and wheeled armoured vehicles. and in addition to the commander and driver can carry four dismounts in the rear. British Army FOXHOUNDs were fitted with the Bowman digital communications system, electronic devices to counter IED and roof mounted machine guns (MG). FOXHOUND has a high level of cross-country mobility and options for export include a central tyre inflation system, all wheel steering, winch and fire detection and suppression system. (SOV) and the OCELOT General Purpose Vehicle – Logistics (GPV-L). The latter retains the V-shaped hull but to the rear of the fully enclosed protected cab is a flatbed with drop sides and rear which can take a maximum load of up to 3,000 kg such a two standard NATO pallets.

In April 2022, GDLS UK confirmed that marketing of the OCELOT family of vehicles was still active. The UK has deployed FOXHOUND to Mali and these have been observed to be fitted with the AmSafe TAR- IAN Rocket Propelled Grenade net protection system.

#### **Other UK Contractors**

Supacat developed the Supacat Protected Vehicle 400 (SPV 400) as a contender for the UK PPV requirement subsequently won by GDLS UK. In a statement to European Security & Defence, Phil Applegarth Director of Supacat said, "SPV 400 still has interest from several overseas countries and the UK and whilst not being submitted to any tenders currently, there is a role for a vehicle of this type and protection. We would be willing to work with overseas partners as we have in the past and currently do."

Following a competition for a Future Command and Liaison Vehicle (FCLV) to replace the Daimler Ferret, the UK selected the Italian Iveco Defense Vehicles Light Multi-role Vehicle (LMV) to meet this requirement. A total of 401 of these LMV (4x4) were supplied under the name of PANTHER, with final integration taking place at the BAE Systems facility at Newcastle-Upon-Tyne which has now closed with the facility purchased by Pearson Engineering. Design authority for the PANTHER is today RBSL (Rheinmetall BAE Systems Land) at Telford. At one time, the PANTHER fleet was put up for sale but these are being retained for the time being at least.

NP Aerospace developed the SNATCH Land Rover (4x4) to meet the requirements of the British Army for deployment to Northern Ireland and these have gone through a number of upgrades to provide enhanced mobility and protection with the last of these being the SNATCH Vixen Plus standard.

#### **DEFENDER** and **UNIMOG**

In the past, other UK contractors have done very well on the export market in the 4x4 armoured vehicle market including Alvis, Daimler, Glover Webb, Penman, Royal Ordnance and Short Brothers, but these companies have now left the market or have been taken over and consumed with a larger organisation. Some of these contractors used the Land Rover DEFENDER (4x4) as the basis for their armoured vehicles which were normally optimised for the Internal Security (IS) role, but this chassis is no longer manufactured so these are no longer marketed. In addition, customers were requiring a higher level of volume, payload and protection and there was already a move away from Land Rover DEFENDER (4x4) platforms to heavier chassis with the German Mercedes-Benz U-5000 UNIMOG (4x4) being selected by an increasing number of contractors.



The Supacat Protected Vehicle 400 (SPV 400) is still on offer by the company to potential export customers.



# **Europe Beefs up Artillery Capability**

#### **Christopher F Foss**

In addition to investing in new fleets of armoured fighting vehicles (AFV), be they tracked or wheeled, most European armies are now upgrading their artillery capability with the introduction of new artillery systems plus suites of ammunition.

hile towed artillery systems are still deployed, especially for airborne and commando-type units, most artillery is now self-propelled (SP) as it is more survivable on the battlefield as it can come into action, carry out a fire mission, and then redeploy before any counter-battery fire. For many years, nearly all of NATO SP artillery was tracked but in recent years there has been a shift in some countries to wheeled SP artillery systems based on a 6x6 or 8x8 chassis. These have lower procurement and operating costs and have greater strategic mobility and can be deployed on long distances without resorting to heavy equipment transporters (HET), which are always in short supply. While there are some 155 mm/39 cal SP artillery system still deployed in Europe, including declining numbers of US BAE Systems M109A3 series, most of the recently introduced SP systems are fitted with a 155 mm/52 ordnance which meets the NATO Joint Ballistic Memorandum of Understanding (JBMoU). NATO did deploy significant numbers of US 175 mm M107 and 203 mm M110A2 SP artillery systems but these have now been phased out of service with most countries

as they have a slow rate of fire and need a dedicated ammunition resupply vehicle. The M110A2 was retained as it had a tactical nuclear capability.

#### France

The French Army was the first to field a wheeled SP artillery system with the Nexter CAESAR 155 mm/52 cal system based on an Arquus Defense Sherpa (6x6) chassis. The first versions were fitted with an unprotected cab but this was soon replaced by a protected cab. The French Army now deploys 76 CAESAR systems and these have seen extensive overseas deployment and according to Nexter have fired over 100,000 x 155 mm rounds during combat operations.

In February 2022, the French Direction Generale de l'Armement (DGA) awarded Nexter a four-year development and



Two French Army Nexter CAESAR 155 mm/52 cal self-propelled artillery system on Arguus Defense 6x6 chassis carrying out a fire mission



Prototype of the Nexter CAESAR 155 mm/52 cal self-propelled artillery system on a Tatra (8x8) chassis and showing in travelling configuration and unprotected cab

qualification contract for the CAESAR Mk II 155 mm/52 cal SP artillery system which will be based on a new Arquus Defense (6x6) chassis. In 2024, the DGA will have two options which will be to launch production of 109 brand new CAESAR Mk II or launch production of 33 brand new CAESAR MK II which would be supplemented by the retrofit of the 76 CAESAR currently deployed, with both options to give a total fleet of 109 CAESAR MK II by 2031.

In addition to the new Arquus Defense chassis powered by a 460 hp diesel cou-

## PHOTONIS AT THE HEART OF NIGHT VISION

EUROSATORY | 13 - 17 JUNE HALL 6 | BOOTH J70

### BE THE FIRST TO SEE

**CUTTING-EDGE IMAGE INTENSIFIER** 

**PHOTONIS : PIONEER IN 16MM** 

LIGHTER EQUIPMENT, SAME PERFORMANCE

### IMAGE AT EACH WAVELENGTH

STATE-OF-THE-ART SENSITIVE CAMERA

EXTENDED BANDWIDTH : UV | VISIBLE | THERMAL

**ULTRA COMPACT & FIELD PROVEN** 

www.photonis.com



A German Army Krauss-Maffei Wegmann PzH 2000 155 mm/52 cal self-propelled artillery system carrying out a fire mission



Latest Krauss-Maffei Wegmann Remote Controlled Howitzer 155 mm/52 cal system on Artec BOXER (8x8) Multi-Role Armoured Vehicle (MRAV) platform carrying out a fire mission



Rheinmetall MAN Military Vehicles HX3 (10x0) truck chassis with protected forward control cab and remote controlled turret at rear armed with a new 155 mm/60 cal ordnance fed by an automated ammunition handling system

pled to a fully automatic transmission, the CAESAR Mk II will feature a cab with STANAG 4569 Level 2 mine and ballistic protection plus the latest version of the fire control software and the new Thales Contact radio which is common for the French Army SCORPION programme. In addition to sales to the French Army, the CAESAR 155 mm/52 cal has also been sold to Indonesia, Saudi Arabia (on UNIMOG 6x6 platform) and Thailand. More recently Nexter has developed a version of the CAESAR based on the Czech Defence Vehicles (8x8) truck chassis which has a high level of cross country mobility and is fitted with forward control cab. The first customer was Denmark who has now placed contracts for a total of 19 systems with the most recent customer being Czech Republic who has ordered 54 systems. These will also be based on the Tatra Defence Vehicles (8x8) chassis with final assembly being carried out in the Czech Republic by Excalibur and these will have a locally produced four door protected cab.

#### Germany

The only tubed artillery system deployed by the German Army is the Krauss-Maffei Wegmann PzH 2000 155 mm/52 cal system with 185 delivered by 2002. Since then, 12 surplus PzH 2000 have been supplied to Croatia and 21 to Lithuania. Other customers for brand-new PzH 2000 include Greece (24), Hungary (24), Italy (70 of which 68 were built under licence), Netherlands (57) and Qatar (24). In May 2022 a small batch from Germany/Netherlands were supplied to the Ukraine.

The German Army has phased out all of the towed 216 FH-70 155 mm/39 cal systems, with some passed on to Estonia. These have also been phased out of UK service although the Italian Army is upgrading some of their FH-70 to extend their lives with this including installation of the Leonardo Laser Inertial Artillery Pointing System (LINAPS) which is already used by many other countries in their towed and SP artillery systems.

For some years, Krauss-Maffie Wegmann has been working on what was originally called the 155 mm/52 cal Artillery Gun Module (AGM) which has been shown on a number of platforms, tracked and wheeled with the original trials platform being a surplus German M270 Multiple Launch Rocket System (MLRS). The latest version of this is now referred to as the Remote Controlled Howitzer 155 (RCH 155) and is based on the ARTEC
Boxer (8x8) Multi-Role Armoured Vehicle (MRAV) which is being adopted by an increasing number of countries. RCH 155 has the same 155 mm/52 cal ordnance as fitted to the PzH 2000 deployed by the German Army but only carries 30 x 155 mm projectiles and charges compared to 60 of the PzH 2000, but as it is wheeled it has greater strategic mobility.

In late 2021, Rheinmetall revealed that they were developing a new wheeled SP artillery system. A full-scale mock-up on their latest Rheinmetall MAN Military Vehicles HX3 (10x10) chassis was shown in London in September and then in Washington. Mounted at the rear of the platform is the remote-controlled turret which is armed with a new 155 mm/60 cal ordnance which is fed by a fully automated ammunition handing system that holds 30 x 155 mm projectiles and associated charges.

## The K9 THUNDER

It was expected that like the LEOPARD 2 main battle tank (MBT), the PzH 2000 would become the standard 155 mm/52

cal artillery system of NATO, but this was not to be. Norway and Finland both had artillery competitions and, after careful consideration, selected the South Korean Hanwha Defence K9 THUNDER which has been built in large numbers for the Republic of Korea Army and an increasing number of export customers. By May 2022, customers included Australia, Egypt, Finland, India (VAJRA), Norway (Versatile Indirect Artillery System), Poland (chassis and called KRAB) and Turkey (local production as the T-155 FIRTINA). Some customer such as Finland and Estonia have refurbished K9 while others have brand new systems. The original K9 was followed by the upgraded K9A1, with the latest version being the K9A2 with many improvements including electric gun control equipment, air conditioning system, new fire control system and higher protection level.

South Korea also deployed the K10 Ammunition Resupply Vehicle (ARV) which is based on the same chassis as the K9 THUNDER and typically carries 104 x 155 mm projectiles and associated charges. The first customer for this system was the ROK Army. There is also a Fire Direction Centre version which will be supplied to Egypt as the K11.

The K9A2 is one of the contenders for the UK Mobile Fires Platform (MFP) mentioned later and for this a UK team has been formed which includes Leonardo, Lockheed Martin UK, Pearson Engineering, Horstman Defence and Soucy Defence for the composite rubber tracks.

## The BAE Systems ARCHER

The BAE Systems ARCHER 155 mm/52 cal SP artillery system was originally developed to meet the requirements of Norway and Sweden who were each to take delivery of 24 units. In the end, Norway pulled out and Sweden is taking delivery of all 48 systems and is expected to take delivery of an additional 24 to bring its fleet up to 72.

ARCHER is based on a Volvo (6x6) all-terrain chassis with the fully protected crew compartment to the rear of the power pack at the front and the 155 mm/52 calibre ordnance at the rear complete with protected magazine that holds 21 x 155 mm

## Product Feature: PIK-AS Austria GmbH



## PIK-AS LED map reading light PA2310R is positioned as standard for land vehicles

PIK-AS Austria GmbH announces that the **LED map reading light** PA2310R is **positioned as standard** for land vehicles and military workspaces.

With several thousand sold units for different international land vehicle programs, the map reading light of PIK-AS Austria proved that armies trust on the provided functionalities, such as: white light, blackout/color light, automatic change to blackout light, backup battery, stepless dimming, low voltage alert, EMC MIL-STD-461 approval, shock/vibration approval, combat approved.

The LED map reading light became the new standard for land vehicles and impressed through brilliant

light output, user friendly operation, robust design, high reliability and best performance on the market.

Besides the map reading light, PIK-AS offers also several series of dome lights with the same range of options and customized versions to suit the best way to existing or new designs of land vehicles, military shelters or containers.



The units will be presented on the **PIK-AS Austria** booth at **Eurosatory in Paris,** hall 5, stand 5H341.

The project team will be glad to demonstrate the units and support in your upcoming projects.

PIK-AS Austria GmbH

Mariasdorf 140a AT-7433 Mariasdorf Tel: +43 3353 7613 www.pikas.at



The South Korean Hanwha Defense K9A1 THUNDER 155 mm/52 cal self-propelled howitzer in travelling configuration

rounds and associated charges. Unlike some wheeled artillery systems, the 155 mm/52 cal weapon of ARCHER is loaded, aimed and fired with the crew in the protected cab and according to BAE Systems Bofors can come into action, carry out a fire mission and redeploy in 20 seconds. Like most modern artillery systems, ARCHER can carry out Multiple Range Simultaneous Impact (MRSI) fire missions. BAE Systems Bofors have also integrated the complete



## **An Artillery Competition**

The only major SP artillery competition in Europe is that of the United Kingdom who wants to replace its currently deployed Vickers Shipbuilding and Engineering Limited (VSEL) AS90 155 mm/39 cal tracked SP systems. These were to have been upgraded with a 155 mm/52 cal extended range ordnance and a modular charge system (ERO/MCS) but this programme was cancelled.

This programme is called MFP and in addition to the actual weapon with a 155 mm/52 cal ordnance, higher rate of fire, reduced crew requirement also includes a number of other key elements including a suite of ammunition (including top attack), ammunition resupply vehicle and a training package.

The Israel company of Elbit is also expected to enter the MFP and could offer the well-established ATMOS 155 mm/52 cal system on a 6x6 or 8x8 platform or the latest SIGMA. The latter is under development by the company to meet the requirements of the Israel Defense Force (IDF) who will use a 10x10 platform. The 155 mm/52 calibre ordnance is in a remote controlled turret at the rear which will be provided with 30 x 155 mm projectiles and charges and will be aimed, loaded and fired from within the protected cab. An unidentified export customer has also placed a contract for this system. AM General of the US are marketing low recoil versions of 105 mm and 155 mm artillery systems with the former being based on a version of their widely deployed High Mobility Multi-purpose



A Serbian NORA B52 155mm/52 cal self-propelled artillery system in travelling configuration showing protected turret at rear

Wheeled Vehicle (HMMWV) and is called the HAWKEYE 105 mm Mobile Weapon System (MWS). According to AM General, trials has shown that this can come into action and carry out a fire mission in around three minutes which is a significant reduction when compared to a 105 mm towed howitzer and in addition it requires a crew of four compared with seven. The HAWKEYE 105 mm MWS also features an advanced digital fire control system (DFCS) and the ordnance could be fitted with a muzzle brake if required.

The 155 mm system is called the BRUTUS Mobile Howitzer System (MHS), with the first example using the ordnance of the 155 mm/39 cal M777A2 towed howitzer and based on a Family of Medium Tactical Vehicles (FMTV) (6x6) truck chassis. It also has a DFCS and integrated muzzle velocity radar.

### Serbia

Although not a member of NATO, Serbia has a well-established capability in the land sector, especially wheeled artillery. All of the export of Serbian weapons is carried out by Yugoimport, with their 155 mm/52 cal NORA B52 being their flagship weapon. Early examples were based on a locally produced chassis but these were followed by using a Russian KamAZ (8x8) and, more recently, a German Rheinmetall MAN Military Vehicles (RMMV) (8x8) chassis with a fully protected cab. Mounted at the rear of NORA B52 is the protected turret armed with a 155 mm/52 cal ordnance 12 rounds of ready use ammunition (projectiles and charges), with another 24



The latest Serbian ALEKSANDAR 155 mm/52 cal self-propelled artillery system features a remote controlled turret at the rear which holds 12 x 155 mm projectiles and associated charges with additional ammunition to rear of cab for rapid reloading

rounds in reserve. In addition to being deployed by Serbia, Yugoimport has exported their systems to a number of countries, which are understood to include Cyprus, Bangladesh, Kenya and

Myanmar.

Currently undergoing

trials is a new version

called ALEKSANDAR,

which features a 155

mm/52 calibre ord-

nance in a remote

controlled turret at the

rear which is provided

with 12 x 155 mm pro-

jectiles and associated charges. This is aimed, loaded and fired from with the safety of the fully protected cab. The 8x8 chassis used for NORA and ALEKSANDAR

# <image>

The BAE Systems Bofors ARCHER 155 mm/52 cal self-propelled artillery system is based on a Volvo (6x6) all terrain platform and shown here carrying out a fire mission.





IN EVERY SITUATION





The AM General HAWKEYE 105 mm Mobile Weapon System is based on an AM General HMMWV (4x4) with a protected cab.

is also used by Serbia for other applications including the Sumadija modular SP long-range multiple launch weapon with pods of 400 mm or 267 mm rockets. In addition to these 155 mm (8x8) SP artillery systems, Serbia has also developed a number of 105 mm and 122 mm SP artillery systems, with the latter using the ordnance of the widely deployed Russian D-30 which has been manufactured in Serbia for many years.

## **Projectiles**

The role of artillery has always been to provide suppressive fire using high-explosive (HE) projectiles with other natures including illuminating and smoke. This is still the role but new munitions have been developed to enable high value targets to be engaged with more specialised top attack munitions with two developed and deployed in Europe. The 155 mm BONUS was developed by BAE Systems Bofors of Sweden and Nexter of France and in addition to being deployed by the two countries has also been exported with the most recent customer being the US Army. The other one is the SMArt 155 mm developed in Germany by a consortium consisting of Diehl and Rheinmetall and production of this is expected to start again in the not too distant future. One of the more recent developments 155 mm artillery developments is the Norwegian NAMMO ramjet powered projectile which offers a step change in range and for the US market the company is working with Boeing.



The Honorary Patronage of the President of the Republic of Poland Andrzej Duda Strategic partner







## International Defence Industry Exhibition 6-9/09/2022



**TÜRKİYE LEAD NATION** 

www.mspo.pl

## SAMT – Unveiling of the UnparalleLED Mobile Trainer

Guardiaris launched a cutting-edge allin-one simulation trainer, covering infantry small arms, anti-tank weapons, military vehicles, and remote weapon stations. At Eurosatory, Guardiaris will present the first-ever laserless Small Arms



Mobile Trainer – SAMT. The trainer supports both marksmanship and tactical training in a single system and allows for a unique training approach with the 4D-24/7 After-Action Review that provenly significantly shortens the learning cycle of young soldiers. Training can be performed with any type of small arms or anti-tank weapons used at individual or squad level with a perfect ballistic replica and no limits with movements of the trainees within the arena. SAMT ushers in a new era of soldiers' training that enables the perfecting of their skills with an abundance of fully immersive scenarios with realistic sounds.



www.guardiaris.com

## BANS – Revolutionary VSHORAD Tactical Weapon

Guardiaris' spinoff, the company Carboteh, successfully patented and launched a non-lethal weapon as a brand-new approach to air defence support weapon capabilities.

BANS produces a stimulation of a countermeasure of the aircraft missile launch warning and detection system. The warning system recognizes the signal produced by the BANS device and triggers the air platform missile launch warning and detection system. Upon the alarm, the targeted combat aircraft dispenses countermeasures, usually with a decoy of flares. BANS' ingenuity lies in its multiple fake stimulations of the anti-missile defence



system and the consequent multiple releases of aircraft countermeasures until the air platform runs out of them. The extensive use of dispensable countermeasures leaves combat aircraft completely vulnerable and easy to hit with anti-aircraft missiles or simply alerts the pilot to abort the mission. BANS' operation reach is up to 5 km. It enables multiple selections of the VSHORAD missile launching pattern signatures and exact flight patterns emulation. It is a light handheld device that is designed to be dust- and waterproof (IP56) and easily portable as a secondary weapon. It is battery powered and promises up to 500 shots with a single battery pack.



www.carboteh.eu

## Defence of Vital Points in Today's Changing Operational Environment

## Tim Guest

Defence of vital points, locations or ground during hostilities will incorporate proven doctrine and procedures, the deepest understanding of which will enable commanders in the field to go with the flow and adapt that knowledge to their immediate, tactical and situational defensive needs.

bridge, a road, a river crossing, a nuclear power station, vital and advantageous ground, a place whose location on the map means everything to the one who controls it, these vital or critical places, in terms of the tactical battlefield, come in all shapes and sizes and their defence can take on many forms. Only with an understanding and knowledge of well-proven military doctrine, however, will best results be achieved; the deeper that understanding of military doctrine and procedures the better chance a commander has of drawing up a winning defensive plan, one that suits the particular place, or location in the overall context of the active battlespace unfolding around him at the time.

This article discusses doctrine, rather than specific minutiae, in developing a defensive plan for a key location in a shifting defensive/ offensive landscape, as well as at some of the fundamental defensive principles, which form the basis for defences at the tactical level.

## Bedrock Doctrines in Shifting Times

While technological advances on the battlefield continue to change, fundamental methods of warfare, standard procedures and doctrine for strategic, operational and tactical-level decision-making by tactical commanders in offence and defence have changed little and have merely been adapted to the present, for they exist having been honed over time, tried, tested and proven in combat. They form a procedural bedrock that commanders on the ground can draw on in their tactical, decision-making and preparation processes for either offensive or defensive operations. These doctrines and procedures are independent of any technological advantage or disadvantage any of the belligerents involved in a confrontation might have. They form a basis on which to build a more specific plan that suits the moment, the ground, a vital point, weaponry, the objective and more. And the deeper understanding a commander on the ground has of these bedrock procedural guidelines, the better will be his/her chance of coming up with a tactical offensive or defensive plan that has the best chance to succeed.

That said, the technological shift that has already occurred in the hyper-connected battlespace, one awash with advanced sensors and advanced weaponry, has blurred the lines between who will hold the upper hand in battle, the attacker or the defender, with more factors than ever seemingly playing their part in the uncertainty. There is cer-



If a defender relies only on 20th century doctrine and weapons in the face of an attacker using 21st century procedures, tactics and weaponry, the offence will remain dominant.



A view to sea from bunker. A defender's ability to occupy and prepare positions before an attack, however, using available time to bolster and improve those defences, is one of the major inherent strengths of any defensive operation.



Bunker on the island of Vlieland from the Atlantic wall. The skills and grasp by the commander in the field of both an unfolding situation and his procedural knowledge of tactics will determine how effective his tactical plan for defence. tainly a shift to be aware of in any discussion about tactics or strategies, as to whether there will be continued dominance by the offence, or whether defensive dominance is on the rise at a tactical level. Even when an attacker has a 3:1 advantage over a defender in terms of combat power, (which has previously been the questionable accepted force ratio needed for an attack on a dug-in or fortified prepared defence if it is to be successful in breaking through at a certain point), with today's weaponry and advanced military technology, that ratio is no longer a given for a successful attack in all situations, if it ever was.

Indeed, in the Balkan Wars of the 1990s, analysts noted what they call 'modifiers' to the 3:1 ratio, including weaknesses that might exist in a defensive position that have been 'missed' or overlooked by a defender, or the potential disruption of a defence through the deceptive ruse tactics of an attacker. Such a ruse might take the form of a feigned retreat after an initial assault, luring defenders from their positions, only to turn and overcome them with unexpected, overwhelming force. Another approach was for attackers to entirely bypass a main defensive location or vital point and attack a different, less well-defended vital objective, yet one critical to the support and maintenance of the first. Such an action was calculated to force defenders from the first vital defensive location to protect the secondary critical position. The result, potential defensive failure at both locations. On the ground, there will certainly be many variations to tactical offensive and defensive manoeuvrings, but those commanders with the greatest knowledge and understanding of bedrock defensive/ offensive military principles, will be those to devise the most effective tactical plans.

And even though technological advances seem to be shifting the balance in conventional warfare scenarios to a new-found dominance by the defence, if that defender relies only on 20th Century doctrine and weapons in the face of an attacker using 21st Century procedures, tactics and weaponry, the offence will remain dominant. This was the case in the 2020 Nagorno-Karabakh war between an offensive and ultimately successful Azerbaijan and a 'legacy' Armenian defence. However, as new tech systems are introduced and embraced by all comers and taken into account in modified procedural doctrine, the shift in favour of the defender will be ever more real, particularly if combined with the advantage of fighting from prepared positions, time permitting.

## For Long Distance Surveillance



## New Model: HZ80X1235DPFIR-T

This new lens is one of the best for ...

- <u>High Zoom Ratio</u>
  80X Zoom
- <u>High Resolution</u>
  5.0 Mega Pixe

## Specifics:

1/1.8" Image Format Back Focus Adjustment DC Auto-Iris Boresight Adjustment

Fog Free Function Temperature Focusing Control

## ADL the First Name in Long Distance Surveillance, Accuracy & Clarity

Specify it by name: HZ80X1235DPFIR-T

www.adlinc.co.jp

ALL AND THE APPLE

Using new technology such as drones and satellite imagery, for example, defenders can keep a watchful eye over the whole battlefield without leaving their positions. Remote weapon systems, if in a defender's inventory, can be fired from a remote-control station a considerable distance from the system itself, the operator standing little chance of being detected by an attacking force. Defenders can use swarming drones against an attacker and more. And by using satellite, drone, surveillance radar and electro-optical sensor intel, defenders can monitor the unfolding battlespace in real time, prepare for exactly what is coming, yet remain undetected until the very last minute before an attack.

## **Guidance, Tried and Tested**

Defending a vital point or piece of ground is a tactical affair and falls to the commander in the field, whose skills and grasp of both an unfolding situation and his procedural knowledge of tactics, will determine how good his tactical plan for defence. Doctrine provides authoritative guidance in the form of combat-tested concepts and ideas. Latest iterations will highlight latest land, sea, air, space, cyber capabilities, current technologies, and all available weaponry, so a commander can take full advantage of whatever he has at his disposal, if anything. And that's where creativity comes in, too, for the tactical commander must be creative in his plan, make best use of all his many, or few, resources, and build a defence that will both surprise and defeat an attacker.

Moreover, as mentioned right at the start of this discussion, vital ground and locations will take on many forms and the tactics employed to defend any one of these will require adaptation to the unique circumstances of each differing scenario. That said, techniques and procedures of doctrine are established patterns or processes that can be applied repeatedly to differing situations. They are the foundations of any plan.

## **Doctrine for Defence Common to All**

With a variety of possible aims, be it to defeat an enemy attack, gain time, economise forces, or develop conditions favourable for offensive or stability operations, defensive actions are many in kind. A defender's ability to occupy and pre-

> pare positions before an attack, however, using available time to bolster and improve those defences, is one of the major inherent strengths of any defensive operation. And only when a defensive force goes retrograde, (a type of defensive operation that involves organised movement away from the enemy), or engages with the enemy, should defensive preparations, improvements, or repairs ever be halted. Even then, during lulls in combat, every effort should be made to bolster the defences.

In addition, defending a crucial and prepared position does not simply mean sitting and waiting for an attack to come. Ways of wreaking havoc on the offensive force before it arrives must be initiated, disrupting supply lines, restricting routes with obstacles and more, the ultimate



Calling on fire support from artillery and long-range fires will disrupt any enemy forward advance. Pictured: AS90 firing high angle from track Ex Steel Sabre.

intention being to turn the attacking force on its heals and transition from a defensive posture to one of offence.

There are two methods for doing this, the first, which is considered the preferred method, is for forces, not previously committed to being part of the defence, to be used. Why this approach is preferred is because defending units may still be decisively engaged, tired, or depleted from their contact with the attacker. The second method of transition to the offence is to perform an offensive operation using forces which are currently part of the defence. While this method has the general advantages of being able to be more rapidly put into motion and, therefore, more likely to catch the enemy by surprise, its disadvantage of calling on potentially fatigued defenders is clear. All that said, defensive plans need to be flexible to anticipate enemy actions and allocate resources accordingly as contact evolves. And with battle positions carefully planned in depth, reserves can be used in spoiling attacks and making counterattacks.

## **Defensive Planning**

In the overall scheme of things, many defensive planning considerations, fundamentals and doctrine are common to almost all defensive scenarios. A prepared defence, for example, is the most effective to defend a vital location, that is, if time has permitted such preparations to take place. Its effectiveness can be continually monitored and increased by establishing such things as supplementary positions and conducting







Doctrine and fundamental procedures of defence (and offence) have been learned, forged and honed over decades of hard experience in numerous, awful conflicts.

relies on planning and preparation – and there's an old adage for that, which most will know and requires no repeat of its vernacular here, other than to say without good planning poor results can be expected! Such planning must involve any and all the participating units and personnel who are stakeholders in a defensive op or position. Defending a location combines a mix of static and dynamic actions involving personnel, equipment, coordination, command and control. As events evolve and unfold, a defending commander will adapt his main and any supporting efforts in ways designed to unbalance the enemy force. Everyone needs to know what is expected of them. Ignorance of responsibilities and failure to coordinate a defence will lead to a weakness in the plan that, as mentioned earlier, can be exploited by the attacker.

rehearsals. With less time to prepare, however, a commander might send a security force forward from the main defensive body of troops to delay the enemy while the main defensive force prepares its position. In addition, any defending force will aim to disrupt the enemy at every turn, forcing them into pre-calibrated/adjusted-fire engagement areas, where calling on fire support from artillery and long-range fires, for example, will disrupt any forward advance, thereby seizing the initiative.

## Fire Support Coordination Measures

Commanders will typically engage the attacker with all available fires once it has entered a defending unit's engagement area and they will try to engage the enemy force at extended ranges as far as possible as the enemy's attack advances. However, to control indirect fires, commanders must adhere, amongst other things, to permissive and restrictive fire support coordination measures. These are means of facilitating the planning and execution of rapid engagement fire missions using appropriate weapons or groups of weapons, while at the same time providing safeguards for everything else on the battlefield. As a follow-on from an effective indirect fire mission on the enemy, counterattacks can be mounted on vulnerable and disoriented attackers. That's not to say that all attacking troops and equipment must be destroyed to succeed in defence. Merely by disrupting and preventing an attacker's combined arms capabilities will a defensive force be in a better position to transition to an offensive posture.

It cannot be stressed enough that a successful defence of any location or position



## French Army Acquisition Programmes

## **David Saw**

Emmanuel Macron won a second term in office in April, thereby becoming the first French president to be re-elected since Jacques Chirac in 2002. Back in 2017, after he was elected for the first time, President Macron instituted a Strategic Review that reported in October 2017, noting that the world had entered a period of "great turmoil." At that point, it is doubtful that anybody in the French security establishment anticipated what was to come. Certainly, COVID and now the war in Ukraine qualify as "great turmoil".

## **The Strategic Review**

Once the Strategic Review had been digested, the French Government recognised that it was necessary to work towards increasing defence expenditure. According to NATO figures, in 2017, French defence expenditure amounted to 1.78 per cent of GDP. One year later, in 2018 it had risen to 1.81 per cent. NATO figures acknowledge that as being (in real terms) a 3.61 per cent rise on expenditure in the previous year. Then in 2019, defence expenditure reached 1.82 per cent of GDP, a rise of 2.46 per cent according to NATO. In 2020, defence expenditure reached 2 per cent of GDP, the NATO target for defence expenditure in its member countries, a rise of 1.18 per cent on 2019 expenditure. The most recent NATO figures for 2021 -these figures are still estimates - has French defence expenditure at 1.95 per cent of GDP, but NATO credits that as a real rise in expenditure of 3.11 per cent. The point to remember with these numbers is that the GDP is not constant, and that the figures fluctuate year-on-year. Whereas defence expenditure is set as a part of the government's budget, and it is the decision of the government whether the size of defence expenditure tracks national economic performance, or more simply reflects governmental budgetary priorities at the time in question. A point to note is that France, like the majority of European countries, had to significantly increase its public expenditure in response to COVID. This was happening at the same time as European economies were contracting due to the pandemic, meaning government expenditure was necessary to sustain the economy. Despite what some governments might think, you cannot make money appear magically, and consequently you have



The JAGUAR will replace the AMX-10RC, the ERC-90 SAGAIE and the VAB with HOT anti-tank missiles in French Army service. To date, 20 JAGUAR vehicles have been delivered to the DGA, and 42 more were ordered in December 2020 and in May this year, 88 more were ordered.

to reduce expenditure in other areas to achieve a balance in expenditure. France was not immune to all of this and a number of procurement programmes were delayed as a money saving measure, although defence expenditure has emerged relatively unscathed from the COVID crisis.

The process of economic recovery post-COVID continues and efforts are being made to get procurement programmes that were delayed back on track. Earlier in this article, we mentioned that the French Strategic Review of 2017 predicted a period of "great turmoil," and what has taken place in Ukraine since the Russian invasion and the impact on the European security order have come as a shock to the French political and military establishment.

## Re-assessing Defence Strategy

This has led to the start of a process where France will have to re-assess its defence and strategic priorities. France, and in particular President Macron, had undertaken great diplomatic efforts to persuade Russia not to pursue military action against Ukraine; unfortunately these were unsuccessful. The French Government was profoundly shocked by the Russian invasion, as was made clear by President Macron in his address to the French nation on 2 March: "War in Europe is no longer limited to our history books and our textbooks. It is here now, right before our eyes. Democracy is no longer viewed as an undisputed system. It has been called into question right before our eyes. Our freedom and the freedom of our children are no longer a given. Now more than ever, they require courage and the willingness to fight for them at all times. We must meet history's sudden return to tragedy with historic decisions."

## **French Priorities**

The speech also outlined French responses post-invasion: "Therefore, our country will increase investments in our defence that were decided upon in 2017." Macron then stated that, "We can no longer depend on others to defend us, be it on land, at sea, under the sea, in the air, in space or in cyberspace. To this end, our European defence must step up." Thus, the foundations were laid for increased investment in defence in France. Now that President Macron has been elected for a second term, we could see a new European dimension to French defence expenditure as Macron is a proponent of a European military force. On the other hand, France will have National Assembly elections in June, and which side of the political spectrum wins the parliamentary majority will have a decisive impact on French defence spending plans and priorities.

Another factor to be considered, especially as far as l'Armée de Terre (French Army) ac-

## NAVIGATE WITH CONFIDENCE



## Our NavHub<sup>™</sup>-200M is the first M-Code-based vehicular navigation solution available internationally

Ground forces need to trust that the signals they receive in a fast-moving, hostile environment are accurate and actionable. That's why we've adopted M-Code as the right GPS receiver to support Assured PNT requirements, and why we've made our non-ITAR NavHub<sup>™</sup>-200M solution available to order now. When it comes to thwarting GPS spoofing and jamming threats, the sooner you can ensure your signal is M-Code secure, the better.



collinsaerospace.com/defense

NavHub<sup>™</sup>-200M is M-Code ready.





The Véhicule blindé multi-rôles (VBMR) GRIFFON, multi-role armoured vehicle, will be a key element of the French Army SCORPION programme. By the end of 2021, 339 vehicles had been delivered, with the DGA due to receive 113 vehicles in 2022. As of May 2022, the DGA had placed orders for a total of 892 GRIFFONs and 54 MEPACs, the mortar carrier versions of the vehicle.

quisition programmes are concerned, is that there is tremendous competition between the three services for funding. For example, the Marine nationale has the Porte-avions de nouvelle génération (PANG), the new aircraft carrier, and the SUFFREN SSN class being built by Naval Group, with one boat in service and five more to be delivered by the end of the decade. For the l'Armée de l'Air et de l'Espace, the major programme is the système de combat aérien du futur (SCAF) or Future Combat Air System (FCAS), a joint effort between France, Germany and Spain to new develop a next generation replacement for the RAFALE and other in-service systems. These air force and naval programmes are huge and consume vast amounts of money, meaning that the French Army has to be very clever and creative in how it puts forward its procurement priorities.

## **SCORPION and CAESAR**

In February 2018, the 'Loi de Programmation Militaire 2019-2025' (LPM) was released, amongst other things this covers the procurement plan for the period in question. This LPM contains a comprehensive defence modernisation plan and also reflects a consistent French strategic objective, which is to sustain the French defence industry to meet French military operational requirements via the delivery of new systems and the long-term support of existing equipment.

As far as the French Army is concerned, one the key programmes within the LPM is the SCORPION programme, that sees the introduction of three new wheeled armoured vehicle types in the form of the Engin Blindé de Reconnaissance et de Combat (EBRC) JAGUAR, armoured reconnaissance and combat vehicle, and the Véhi-

AIRSPACE SECURITY TO THE POWER OF THREE



### EFFECTIVE PROTECTION AGAINST DRONES - WHEN IT REALLY MATTERS

MISSION PROVEN AT EVENTS SUCH AS:

- + G7-Summit Elmau, June 2015
- State Visit of the U.S. President Hanover, April 2016
- + G20-Summit Hamburg, July 2017
- + ILA Berlin Air Show, April 2018
- "Tag der Deutschen Einheit" Berlin,
  October 2018
  NATO "HPEX 2019" Lithuania, May 2019
- + Protection of multiple sport events 2021

## GUARDIEN

Countering drones

A cooperation of ESG, Diehl Defence and Rohde & Schwarz www.guardion.eu cule blindé multi-rôles (VBMR) GRIFFON, multi-role armoured vehicle, the Véhicule Blindés Multi-Rôles léger (VBMR) SERVAL, light multi-role armoured vehicle, and the upgrade programme for the LECLERC tank to the LECLERC XLR configuration.

The JAGUAR is due to replace the AMX-10RC and the ERC-90 SAGAIE, both wheeled reconnaissance platforms and the version of the VAB APC that mounts the HOT missile systems as an anti-tank system. The AMX-10RC was equipped with a 105 mm F2 L/47 medium pressure gun, while the SAGAIE was equipped with a 90 mm F4 smoothbore gun. The armament fit of the JAGUAR consists of a 40 mm CTA cannon, two MBDA Missile moyenne portée (MMP) anti-tank missiles and an Arguus HORNET remote weapon station (RWS) with a 7.62x51 mm machine gun. The MMP missile system is the replacement for the MILAN and JAVELIN in French Army service, with first deliveries at the end of 2017.

### **GRIFFON and SERVAL**

The GRIFFON and the SERVAL will eventually replace the rest of the VAB fleet. Originally, some 4,000 VAB vehicles were acquired in some 30 different variants. Critically, SCOR-PION is more than a vehicle programme, it is



In May, the DGA took delivery of the first batch of the Véhicule Blindés Multi-Rôles léger (VBMR) SERVAL light multi-role armoured vehicle. 70 SERVALs are to be delivered this year. The first tranche was placed by the DGA in December 2020, covering 364 vehicles.

### also a digitisation programme, as all vehicles will be fitted with SICS combat information system and the CONTACT radio, allowing all elements of a French Army Groupement tactique interarms (GTIA), combined arms tactical group, to have a full tactical picture.

The current situation of the SCORPION programme is as follows: the Direction générale de l'armement (DGA) ordered 319 GRIFFON and 20 JAGUAR vehicles in April 2017; in September 2020, came the second order from the DGA for 271 GRIFFON and



42 JAGUAR units. In December 2020, the DGA ordered the first tranche of 364 SER-VAL vehicles (with first deliveries made in May this year). Then in June 2021, the DGA ordered the first 50 upgraded LECLERC tanks. According to the DGA, at the end of 2021 a total of 339 GRIFFON and 20 JAG-UAR vehicles had been delivered.

The latest orders from the DGA announced in May covers 302 GRIFFON and 88 JAGUAR vehicles. In addition, an order was placed for a variant of the GRIFFON. the Mortier embarqué pour l'appui au contact (MEPAC), which mounts a Thales 120 mm 2R2M mortar; the DGA has ordered 54 MEPAC units. DGA figures state that in 2022, they will take delivery of 113 GRIFFONs, 18 JAGUARs, 70 SERVALs and one upgraded LECLERC. According to the DGA, by 2030 they will have received 1,872 GRIFFONs, including 54 MEPACs, 300 JAGUARs, 978 SERVALs and 200 upgraded LECLERC MBTs. The LECLERC will remain in service until replaced by the Main Ground Combat System (MGCS) from the mid-2030s onwards.

The future of the French Army's artillery will be based on the Nexter CAESAR 155/52 mm system, with 76 CAESAR systems currently in service. In February, Nexter announced that they had received a contract from the DGA for the development of the CAESAR 6X6 Mark II New Generation (NG), with the contract covering a four-year demonstration and gualification phase. In 2024, the CAESAR Mark II will enter production. At this point, the DGA will have the option to either order 109 new CAESAR Mark II systems or order 33 new CAESAR Mark IIs and upgrade the existing 76 CAESAR systems to the new standard. Deliveries will continue through to 2031. Since this contract was announced, France has supplied an initial batch of CAESAR systems (thought to be less than ten) to Ukraine. As the French Army force objective is 109 CAESAR systems, more CAESAR Mark IIs are likely to be ordered.

### **Ongoing Procurement**

In recent years, the French Army has taken steps to modernise its small arms inventory. The most significant of these programmes was the 'Arme individuelle futur' (AIF), an assault rifle in 5.56x45 mm calibre to replace the existing FAMAS system. Heckler & Koch (HK) was announced as the preferred contractor in September 2016 and first deliveries were made to the DGA in May 2017. In total, 117,000 HK416F units were ordered, with some 93,000 for the French Army and the remainder for the Air Force and the Navy.

In March this year, the DGA announced that 2,000 HK416F rifles had been delivered in the first three months of 2022, with 1,000 rifles delivered in early March. This brought total HK416F deliveries to 59,340 rifles since May 2017, more than half of the total originally ordered in 2016. The DGA stated that a total of 12,000 HK416F rifles would be delivered in 2022.

In March 2019, the DGA issued tenders for a programme known as the Pistolet semiautomatique (PSA), a semi-automatic pistol in 9x19 mm (NATO) to replace the existing PAMAC 50 and PAMAS G1 pistols. In December 2019, the DGA awarded Glock a €44M contract for 74,596 Glock 17 Generation 5 pistols; the pistol is known as the Glock-17 FR in France. Ammunition for the new pistols will be acquired from Sellier & Bellot from the Czech Republic, with UTM providing training devices.

First deliveries of the pistols took place at the end of 2019 and more recently in March, the DGA announced the receipt of 15,000 more pistols, bringing the total



## EXCLUSIVE **REVEAL**

### **REVOLUTIONARY VSHORAD TACTICAL APPROACH:**



BATTLEFIELD ANTI-AIRCRAFT NON-LETHAL (VSHORAD) SYSTEM



Join us in Hall 6, Booth K 197.

number received to more than 60,000, with a further tranche of 14,000 to be delivered before the end of the year. In total, 80 per cent of the pistols will go to the French Army, with the rest to the other services

In December 2019, the DGA announced the acquisition of a new Fusil de précision semiautomatique (FPSA), or semi-automatic sniper rifle to replace the FR-F2 system acquired in the 1980s. The weapon selected was the FN SCAR-H PR in 7.62x51 mm, with precision ammunition coming from MEN in Germany. Other companies involved in the programme include OIP Sensor Systems and Telefunken-Racoms. In April, the DGA ordered a final batch of 655 SCAR-H PR rifles and when these are delivered in December this year, the FPSA contract will be complete.

Finally, mention should be made of a long-awaited major acquisition programme that is in its early stages; this is a programme to replace the French Army's logistic vehicle fleet. In total, 9,400 trucks are to be acquired with the programme value estimated at €3Bn, making this one of the most significant military truck opportunities to appear in Europe for the foreseeable future.



Firing the CAESAR 155/52 mm artillery system. The French Army had 76 CAESAR systems in service (some have since been delivered to Ukraine). The DGA has awarded Nexter a contract for the development of the CAESAR 6X6 Mark II New Generation (NG), and by 2031, all French Army guns will be Mark II standard.

## TENCATE Multi-light<sup>™</sup>

**WE CAN PROVIDE LARGE QUANTITIES OF HARD BODY ARMOUR PLATES IN SHORT TIME CONTACT US FOR MORE INFORMATION** 





**ADVANCED ARMOUR** 

www.tencateadvancedarmour.com advancedarmour@tencatearmour.com

## WE DESIGN AND PRODUCE TURBOJET ENGINES



## **PBS TJ80-120**

WORLD'S BEST THRUST-TO-WEIGHT RATIO UAV ENGINE IN ITS CATEGORY

Prvni brnenska strojirna Velka Bites, a. s. Czech Republic | EU | www.pbs.cz | engines@pbs.cz





## The Future of War is Unmanned Aircraft Systems and Loitering Munitions

## Dominating the Battlespace with Persistent and Pervasive Precision Fires

## John Antal

n October 2020, Azerbaijani TB2 Unmanned Combat Aerial Vehicles (UCAV), HAROP, and ORBITER Loitering Munitions (LMs) annihilated eight Armenian howitzers that were dug into protected firing positions. The howitzers were destroyed in a single strike that lasted mere minutes. Unmanned Aerial Systems (UAS), and especially UCAVs like the BAYRAKTAR TB2 and Loitering Munitions (LMs), such as the Israeli made HAROP, furnished Azerbaijan with a decisive advantage over their Armenian opponents. Azerbaijan repeated these attacks against artillery, armour, command and control facilities, and troop positions throughout the Second Nagorno-Karabakh War and won a decisive victory in 44 days.

Nearly two years later, in April 2022, as eight Russian 122mm D-30 howitzers blasted away at a Ukrainian town in the Kherson region, a Ukrainian BAYRAKTAR TB2 flew into striking range. Unseen by the Russian gunners, and unidentified by air defence units that were protecting them, the TB2 laser-designated a Russian howitzer and dispatched a missile. Miles away, safe from enemy fire, a Ukrainian drone operator "flew" the TB2 to a higher altitude to get a better view of the strike. Watching his screen, the TB2's high-performance EO/IR gimbaled sensor suite streamed real-time video of the missile's progress to the controller. Within seconds, the Russian howitzer erupted in flames and the Ukrainian drone pilot cheered. The drone operator then con-

## Author

John Antal is a defence analyst and correspondent who has served as a member of the US Army Science Board. He retired from the US Army after 30-years in uniform. John has appeared on radio, podcast, and television shows to discuss military topics and is the author of 16 books and hundreds of magazine articles on military and leadership subjects.



*The BAYRAKTAR TB2 is a combat proven Unmanned Combat Aerial Vehicle (UCAV) that provides reconnaissance and precision strike.* 

tinued to fly the TB2 to destroy three more howitzers. After expending all its missiles, the TB2 operator then designated the remaining Russian guns for artillery fire. Within a few minutes, the entire Russian artillery battery was out of action.

## Unmanned Combat Aerial Vehicles and Loitering Munitions

UCAVs are more versatile than LMs as they can perform reconnaissance, designate targets with on-board lasers, and act as robotic missile and bomb launch platforms. An example of the latest generation UCAV is the US PREDATOR C AVENGER. The AVENGER is one of the most capable UCAVs in the world; it is also one of the most expensive. At an estimated unit cost between US\$70-150M (exact costs are classified), the AVENGER can fly at 460mph, at a maximum altitude of 50,000ft, remain airborne for up to 18 hours, and has hard points for six Hellfire missiles or other bombs. AVENGERs typify the weapon of choice for penetrating and defeating enemy anti-access and area denial (A2/AD) defensive zones, a prerequisite to attaining air dominance.

In comparison, the BAYRAKTAR TB2, produced by Turkish firm Baykar, offers a less

expensive choice for reconnaissance and precision attack. Each TB2 costs between US\$3M to US\$10M, a bargain when compared to the cost of an AVENGER. The TB2 is slow and not very stealthy, but it continues to make headlines in the on-going Russian-Ukrainian War. Ukraine purchased approximately 20-30 TB2s prior to the invasion and has employed them successfully against the Russian Army. The current version of the TB2 used by the Ukraine Defence Forces employs a direct line-of-sight radio link. The Russian Army's advanced Electronic Warfare (EW) systems should have been able to jam this radio control and then sweep the sky clear of the TB2s with their layered air defence systems, but neither jamming nor air defence has stopped the TB2s from successful engagements. This implies that Russian Counter-UAS (CUAS) and EW jamming is not optimised to defend against this threat. Several reports credit TB2s with destroying the PANTSIR-S1 air defence system, a weapon that was specifically designed to defeat aircraft, helicopters, precision munitions, cruise missiles and UAVs. The PANTSIR's phased array radar is ineffective at identifying slow-moving threats like the TB2. The TB2 may also have played a role in defending against Russian naval forces as multiple, independent reports purport that the recent hoto: General Atomics



The General Atomics Aeronautical Systems PREDATOR C AVENGER is a next generation, multi-mission, jet-powered unmanned aircraft system (UAS).

sinking of the Russian missile ship Moskva involved a missile and drone attack that included the use of at least one Ukrainian TB2. LMs are "smart missiles," equipped with explosive warheads and guidance suites that loiter over an area, search for targets, and then strike. The US firm AeroVironment refers to their LMs as "loitering missiles." A capable and cost-effective means for precision attack, LMs are becoming a key weapon system in the modern, multidomain battlespace. In any military engagement, timing is vital, and LMs deliver a "loiter, sense and strike" ability that can reduce targeting time from minutes to seconds. Unlike traditional aircraft, most LMs require little-or-no-runway and most launch from rails or can take off vertically.

We set standard with FONET

now watch what we do with

īvīk 2

DNET

Some LMs, such as the Israel Aerospace Industries (IAI)-made HAROP launch from truck-mounted firing boxes, much like a multiple rocket launcher. The HAROP can loiter over a target area for six hours (land version), or nine hours (sea version), and carries a high-explosive fragmentation warhead comparable to a standard NATO 155-mm howitzer projectile. If the HAROP cannot identify a suitable target, it shifts to a subsequent priority or, if no target is observed, it will automatically return to a designated landing point for retrieval and reuse. Currently, there are a wide variety of LMs, from short-range versions such as the American-made SWITCHBLADE, to the longer range HAROP. Because of their low cost when compared to the price of their targets, LMs are a cost-effective means of delivering persistent, precision strikes.

## Adapting to the New Reality of Drone Warfare

Eventually, opponents will adapt, and it will become increasingly difficult for the current version of the TB2 to operate in the contested battlespace. To address this, BAYRAK-TAR has created an updated TB2S version that is controlled by a satellite link, similar to the more expensive US-made PREDATORs. The cost of the TB2 will be higher, but its increased capability will allow it to operate against more advanced EW systems. In addition, BAYRAKTAR is developing a new TB3 variant. This next generation system will take off and land on shorter runways, can be deployed on aircraft carriers, has folding wings for placement on ships, and can carry six missiles, two more than the TB2. Like its predecessor, the TB3 will conduct reconnaissance, surveillance, intelligence, and attack missions. According to the BAYRAKTAR website, the TB3 will have a satellite control system that provides both Line-Of-Sight (LOS) and Beyond-Line-Of-Sight (BLOS)

Designed to support command, control, communications, computers, cyber-defense, and combat systems integrations.

Complete system integration on a wide range of platforms.

Scalable and modular to support C2 framework system deployment from small units to battalion level and higher.



**ONET Wik2** - Tactical Vehicle Integration Platform

0000

communications capabilities mimicking the more expensive US and NATO UCAVs. This will permit the control station for the TB3 operator to be located anywhere on earth as long as a satellite connection is maintained. Baykar reports that the BAYRAKTAR TB3 may be available as soon as 2023.

Human pilots fly the current generation of UCAVs and LMs via a data-transmission link, but soon automated and artificial intelligence systems will replace the need for a human operator. The role of the human operator will shift from actively controlling the system to commanding the system. Commanding the system will entail activating it to fly and strike targets inside a designated strike zone according to preset targeting priorities. The system will automatically execute its pre-programmed mission, but a human may still be in the loop to intervene and call off or switch the point of attack. This shift from "control" to "command" will become possible as drone manufacturers create smarter systems. The Elbit Systems SkyStriker, for instance, is a fully autonomous LM that can locate, acquire, and strike operatordesignated targets on its own. If desired, systems like these could hunt with mini-



The SWITCHBLADE 600 Loitering Munition (LM), produced by the US company AeroVironment, weighs 50 lbs. (22.7 kg), is deployed via the launch tube in which it is transported, and has 40 minutes of flight time with a warhead that can defeat both armour and personnel.

mal human interaction inside a designated battlespace. Western nations are keen to keep a human in the loop, but Russia and China may not be so circumspect.

The future of war includes the domination of the battlespace by persistent and pervasive precision fires, even if only for decisive moments. As unmanned systems become faster, smarter, and more lethal, LMs and UCAVs will deliver the means to accomplish this goal. UCAVs and LMs are forcemultipliers that will transform the methods of warfare. It is realistic to envision that, in the near term, every mortar platoon, reconnaissance, and manoeuvre organisation will have LM units, and artillery organizations will contain LM batteries and UCAV squadrons. This does not mean that the tank is dead, as tanks provide the means for offensive manoeuvre, something drones cannot, but tanks will only survive and win if they adopt capabilities that adapt to the new battlespace. Nations with the ability to recognise this, and prepare accordingly, will gain a tremendous tactical and strategic advantage.



## **SCORPION Update**

## **Christina Mackenzie**

The French SCORPION programme aims at achieving battlefield superiority over a hybrid peer or near-peer enemy. So how close is SCORPION now to meeting the 2030 objectives and will there be any modifications following lessons learned from the war in Ukraine?

France's SCORPION programme to replace and modernise by 2030 the close combat capabilities of the army, centred on new vehicles which can operate collaboratively using a single combat information system, is on schedule with the first vehicles delivered and training underway.

The six projects incorporated in SCORPION (which stands for Synergie du COntact Renforcée par la Polyvalence de l'InfovalorisatiON) are designed to contribute to "dominating a classic or hybrid enemy that is protected, aggressive and has new combat technology at its disposal," according to the French Armed Forces Ministry. The six are:

- 1,872 GRIFFON multi-role armoured vehicles of which 339 have been delivered to date; another 113 will be delivered in 2022.
- 978 SERVAL light armoured vehicles of which 70 will be delivered in 2022.
- 300 JAGUAR armoured reconnaissance and combat vehicles of which 20 were delivered in 2021 and 18 are scheduled for delivery in 2022;
- Renovation of 200 Leclerc battle tanks, the first of which will be delivered in 2022;
- The SICS (Système d'information et de combat SCORPION) communications system to ensure tactical coordination in collaborative combat. Developer Bull began deliveries in 2019.

## <u>Author</u>

### **Christina Mackenzie**

After working as the European Parliament reporter for AP in Brussels and then on the English Desk for AFP in Paris, Christina was appointed European Editor for Flight International before holding the same job for almost a decade with Defense Technology International (DTI). When that folded, she edited a website specialised in land forces before launching her own bilingual website, Wombat: Women in Combat in 2018 to profile women in the military and defence industries.



Another 113 GRIFFON vehicles are scheduled for deliveries in 2022.

• The operations preparation system. So how close is SCORPION now, in mid 2022, to meeting the 2030 objectives and will there be any modifications following lessons learned from the war in Ukraine?

## **Three Vehicle Types**

The three vehicle types share many features. GRIFFON and JAGUAR both carry the HORNET remotely-controlled turret, made by Arguus, a key element of SCOR-PION's collaborative combat capabilities as any HORNET will be able to react to a threat detected by another SCORPION vehicle and engage it. HORNET is fitted with a smoke launcher ring, independent from the weapon axis, that carries eight smoke grenade launchers. When the vehicle is illuminated by a laser rangefinder or a beam rider the smoke protection engages automatically or manually hiding the vehicle from the anti-tank missile whilst allowing the vehicle's gunner to keep their weapon trained on the target.

This, together with anti-missile slat (bar, cage or standoff) armour kits, were

deemed sufficient to protect the SCORPION vehicles. However, a former French army general, very familiar with the SCORPION programme, says a lesson being learned from the war in Ukraine is that only an active protection system, such as Israel's tried and tested Trophy countermeasure system, is really effective. There are no immediate plans, however, to equip the SCORPION vehicles with active protection systems even if in 2021 Germany procured Trophy for some of its Leopard 2 main battle tanks. Work started on SCORPION in 2005 at the defence ministry's procurement arm, the Délégation générale de l'armement (DGA), working in close collaboration with the chief of staff of the armed forces and the chief of staff of the army to decide exactly what the army's requirements were, analyse the costs, make the capability choices and establish a realistic delivery schedule. Lt-Colonel Joffrey (last name withheld), the JAGUAR programme officer at the army's technical centre (STAT) where every piece of army equipment is tested prior to being

approved, explained that starting in 2009 the army considered all sorts of different

## **SCARABEE** The first hybrid light armoured vehicle.

MADE IN FRANCE

## HYBRID DRIVE MOBILITY FIREPOWER

**SCARABEE** is the first protected hybrid vehicle in its category. A true technological powerhouse, this light armoured vehicle is designed for tackling every type of mission. Its hybrid drive combined with its exceptional mobility enables stealthy and silent movement. Thanks to its rear-wheel independent steering and its two levels of ground clearance, it shows a high level of agility in every situation. **SCARABEE** is ready for high-intensity operations.



ARMAMENT & TECHNOLOGY

versions always keeping in mind that the future vehicle needed to be adaptable to different missions, be highly mobile, be well protected and be aggressive. Also in the loop was its coherence with other vehicles, its support and maintenance and, of course, the overall cost. Meanwhile the DGA was investigating mature technologies, performances and constraints. The programme was launched in December

2014 when the DGA notified Nexter Systems, Arquus and Thales, who have formed a temporary joint venture specifically for SCORPION, that they had won the market to develop and produce 1,722 GRIFFONs and 248 JAGUARS. In March 2015, Nexter Systems received notification that it would renovate the Leclerc main battle tank. Contracts for the first 319 GRIFFON and 20 JAG-UARs were signed in April 2017 with Nexter Systems, Arquus and Thales, and in September 2020 came a follow-up contract for a further 271 GRIFFONs and 42 JAGUARS.

### **The GRIFFON**

Meanwhile, in July 2018 France's military programme law (2019-2025) added 150 GRIFFONs and 52 JAGUARs to SCORPION taking the total to 1,872 and 300 respectively. The first 364 SERVALs from Nexter and Texelis were ordered by the DGA in December 2020 and six months later, in June 2021, the order was signed for the first 50 Leclerc tank renovations.

This year, the DGA will sign the production contract for 356 GRIFFONs, of which 54 are in a MEPAC configuration (equipped with a mortar for close support) and 88 JAGUARs. So by the end of 2022, 946 of the 1,872 GRIFFONs, 150 of the 300 JAGUARs and 364 of the 978 SERVALs will have been ordered. That is remarkable for



With a 500 HP engine, the JAGUAR reaches a top speed of 90 km/h.

highly complex vehicles that were still on the drawing board eight years ago.

The SERVAL is the smallest and last of the three vehicles to be developed. With an empty weight of 15 tonnes(17 tonnes maximum combat weight), the 4×4 SERVAL has a top speed of 90 km/h and a range of 600 km. Designed to transport a driver and nine soldiers equipped with the Félin combat system (clothing, equipment and weapons), SERVAL will be produced in four versions: patrol, intelligence and reconnaissance, communications, and electronic warfare. Nexter says the SERVAL will have the same equipment as the GRIFFON but because it is significantly smaller it is a "real technological challenge" to get it all to fit. The 24.5 tonne GRIFFON VTT front-line troop transporter version was qualified by the DGA on 24 June 2019 and the army started receiving the first vehicles a week later. Since then eight of the 10 versions have been gualified (TK) They all share the same vehicle hull with a system of kits and different sensors to adapt each vehicle to its mission. This also helps with maintenance and logistics as equipment is common to all versions.

Nexter was responsible for developing and is producing the vehicle hull, the ballistic

oto: Se



A total of 978 SERVALs are on order in the scope of the SCORPION effort.

protection, the NRBC (nuclear, radiological, biological and chemical) protection and the interior. The company also handles final assembly.

Arquus was responsible for developing and is producing everything to do with the mobility (engine, transmission, suspension, steering, brakes etc.), electricity generating systems, testing and gun turrets. Arquus is also responsible for managing all the spare parts from the three companies in the temporary joint venture and ensuring that the army has them in time and in hand.

Thales was responsible for developing and is producing the vetronics, the communication systems, the perimetric vision systems, the self-protection systems and the navigation system.

The 10 major sub-contractors include Hutchinson SNC for the run-flat tyres, Quiri and the SAFE group for the suspension, Scoma for the steering arms, Tra-C Industrie for the motor mount, IRTS for the vetronic glass, Saint-Gobain Sully for the glass, Elno for the inter-phone system, Metravib for the acoustics location system and Safran for the observation and targeting system.

### The JAGUAR

The 20 tonne JAGUAR (25 tonnes maximum combat weight) is a  $6 \times 6$  wheeled vehicle, 3m wide, 2.8m high, 7.1m long, (7.8m including the gun), designed to gather intelligence in complex environments such as urban or mountainous zones, as close as possible to the enemy without being spotted. So it needed to be mobile (it has a 500 Hp engine and automatic gearbox and has a top road speed of 90 km/h), discreet, agile, well protected, well armed and able to see far both day and night.

It has been designed around a "survival cell" to give the three person crew (pilot, gunner and tank commander) as much protection as possible in high threat situations (mines and improvised explosive devices) with particular attention paid to give the vehicle the ability to move despite being damaged. The first and last axles are steering axles so as to increase the vehicle's manoeuvrability whilst it can change the height of suspensions and the pressure in the tyres to adapt to all kinds of terrain.

JAGUAR has a manned turret with a 40mm gun, which can fire in rapid bursts. Unusually for a vehicle like this, the turret is stabilised so it can fire on the go with the objective remaining precisely targeted irrespective of the movements of the vehicle hull. In addition to the HORNET turret, it has a pod with two medium range missiles with a range of 4 km.

Different kits are available that can be put in place by the crew on site allowing the vehicle to be adapted to different operational situations.

Seven of the same subcontractors are working on the JAGUAR as on the GRIFFON (Scoma, Saint-Gobain Sully or IRTS are not) but in addition MBDA is providing the medium-range missile and CTA International the 40mm gun.

JAGUAR was first qualified at the end of November 2021, a second qualification will take place this autumn and the final qualification will be given at the end of 2023. It will eventually replace three of France's armoured vehicles: the VAB Mephisto equipped with the HOT anti-tank missile, the AMX10RC and the Sagaie.

## **Game-Changing Technology**

The SCORPION project will not stop in 2030. It will evolve to take on board future game changing technology, such as robots, firing beyond direct line of sight, reduced lethality weapons, and active protection.

Colonel Damien Sandeau, the army's SCORPION programme officer, said in February 2022 that a "SCORPIONised" brigade should be ready for deployment by the end of 2023 and two more brigades by the end of 2025. "It's important that there's no capability break during this transformation," Sandeau said, so each regiment will first transform two brigades then, two or three years later, another two in order to "maintain operational cohesion." The first two to be transformed will be the 1er Régiment Étranger de Cavalerie and the Régiment d'Infanterie Chars de Marine (RICM). "Each will have 30 JAGUARs for its daily training," Sandeau explained.

SCORPION, with all its components, will federate and connect the vehicles and soldiers of the joint tactical group, to give rise to "information enhanced collaborative combat" or, to give it its French name "combat collaboratif infovalorisé".

The Armed Forces Ministry explains that all the data collected by the numerous sensors on the vehicles - such as detecting laser beams, a mobile target, snipers – will be digitally treated aboard each vehicle to become useable combat information. This information will then immediately be shared between all the members of the joint tactical group "enabling the right decisions to be taken concerning the threat, allowing orders to be given, manoeuvres to be initiated and targets destroyed with an important operational advantage gained by speed," the Armed Forces Ministry writes in a document published in February 2022. In 2019, SCORPION became an international project when Belgium decided to procure 382 GRIFFONs and 60 JAGUARs to be delivered between 2025 and 2030. These will be identical to the French ones and thus totally inter-operational and compatible with those of the French Army.

## **CV90** Wins in Slovakia

## Martin Smisek

n late May 2022, an evaluation committee of the Slovak Ministry of Defence selected the CV90 MkIV as the new platform to replace the obsolete BVP-1 and BVP-2 series of vehicles in the inventory of the Slovak Army. This decision still needs tobe confirmed by the Slovak Government by 30 June 2022. Slovakia intends to buy 152 armoured tracked vehicles in seven variants (including 110 infantry fighting vehicles) in the first stage of the acquisition which should be followed by the purchase of an additional 71 vehicles in seven versions (including 20 units of 120 mm self-propelled mortars) during the second phase.

## <u>Author</u>

Martin Smisek is a Czech freelance journalist specialising in Czech armament programmes and Czech and Slovak military history since WW II. Bratislava received a total of five bids from four countries by the 31 January 2022 deadline. German company Rheinmetall Landsysteme offered the LYNX KF41 through the Hungarian Government. The next bidder was the ASCOD manufactured by General Dynamics European Land Systems and provided through the Spanish Government. Sweden participated with two variants of the CV90 MkIV (CV 9030 IV and CV 9035 IV) produced by BAE Hägglunds. The last contender was Polish BORSUK offered by Polska Grupa Zbrojeniowa.

The CV90 MkIV most closely met the requirements of the Slovak Army. The Swedish offer also provided the best price (€1.669Bn for 152 vehicles of the CV9030 IV series), as well as the most extensive industrial cooperation: the final assembly of 131 vehicles at ZTS-ŠPECIÁL and complete manufacture of 116 turrets at KOVAL SYSTEMS along with the subsystem deliveries from EVPÚ (mechatron-



CV90 MkIV (CV9030 IV) during evaluations undertaken by the VTSÚ in the testing range at Záhorie in May 2022.

ics), Aliter Technologies (ICT), Ray Service (electronics), NEWAYS SLOVAKIA (electronics) and Virtual Reality Media (simulators).

The current schedule expects the delivery of the first nine CV90 MkIVs in the infantry fighting vehicle variant in 2025. The shipments of the remaining 143 vehicles should follow between 2026 and 2028.

## Precision Strike – A Techniology in its Infancy

J. C. Menon

Russia's invasion of Ukraine has provided invaluable insights about the operational requirements of employing missiles in a major war. The conflict has turned into one of the largest testing grounds for ballistic and cruise missiles in modern warfare, as Moscow successfully conducted a trial fire of its SARMAT intercontinental ballistic missile (ICBM).

On April 20, President Vladimir Putin was shown on television being told by the military, a SARMAT missile had been launched from Plesetsk in Russia's northwest and hit targets with precision in the Kamchatka peninsula in the Far East. Precision strike is the ability to sense and strike targets at range with sufficient accuracy for a high probability of a mission kill. It is a capability that allow commanders the capacity to influence the battle space at enormous range across the land, air and sea. Despite several successful operations, precision strike remains in the early stages of development as a potential war-fighting

## **Smart Bombs since Vietnam**

regime.

Ever since so-called smart bombs debuted in the Vietnam War, precision weapons have been an expected part of modern warfare. The US-led coalition also demonstrated the power of this capability in the Gulf War and the Iraq War, when precisionguided munitions played an outsized role in eliminating high value targets such as command centres and armoured convoys. In the ongoing conflict, Russia's missile strategy has involved the use of ballistic strikes -the ISKANDER and TOCHKA-M, cruise launches with KALIBR, hypersonic strikes with KINZHAL, and coastal defence systems attacking ground targets with the BASTION and BAL systems.

In comparison, US forces in Iraq relied only on cruise strikes, using the TOMAHAWK BGM-109 and AGM-86 Conventional Air Launched Cruise Missile (CALCM). The US Government Accountability Office or GAO reviewed the performance of two cruise missiles during the 1991 Operation Desert Storm, focusing on the missiles' advantages over tactical aircraft; and potential impact on future tactical weapons system requirements. The GAO found that both the Navy's TOMAHAWK land attack missile and the Air Force's CALCAM contributed to the success of U.S. com-



The Russian ISKANDER-M SRBM system

bat operations during Desert Storm, due to their high success rates of hitting their intended targets, though some problems with the TOMAHAWK included its limitations in its range, mission planning time, lethality, and difficulties in the desert terrain. The GAO also noted that the CALCM warhead and guidance limited the types of targets it could successfully attack. The Navy has funded programmes to address the TOMAHAWK's limitations and the Air Force has since improved the CALCM variants. The GAO agreed that cruise missiles could be used in more conditions than tactical aircraft systems, as it required no additional resources, and could strike targets without risking loss of aircraft or crewmembers.

## Importance of Precision Strike

The importance of a precision strike regime is being underlined by militaries world over, and its growth is accelerating due to improvements in the reach, accuracy and versatility of conventional missiles. The US Navy and Air Force are moving aggressively to expand the overall lethality of their platforms and to increase both the range and precision targeting of their missiles. The Army and Marine Corps have recognised the need to get into the long-range precision strike business, both to support ground forces but, perhaps even more importantly, to support the Joint Force by targeting enemy ships, infrastructure, air and missile defences, and long-range weapons. The United States has been building a new long-range precision missile after the Trump administration in 2019 unilaterally withdrew the United States from the 1987 INF Treaty, which committed it and the other signatory, Russia, to getting rid of all nuclear and conventional groundlaunched ballistic and cruise missiles with ranges of 500 to 5,500 kilometres (310 to 3,417 miles).

Tactical missile designers at Lockheed Martin are building some of the first US Army long-range Precision Strike Missile (PrSM) systems to destroy enemy targets as far away as over 500 miles. "This new surface-to-surface weapon system will



The KINZHAL hypersonic missile on a MiG-31K during a fly-over at the 2018 Moscow Victory Day Parade

deliver enhanced capabilities to attack, neutralise, suppress and destroy targets using missile-delivered indirect fires out to 499 plus kilometres," according to a company spokesperson. Last October, the Lockheed Martin's PrSM completed its longest flight to date, exceeding the maximum threshold, with the US Army at Vandenberg Space Force Base, California. It marked the fifth consecutive successful flight test for the missile. According to

Lockheed Martin, the maximum range of the missile is 499 kilometres and the latest flight test surpasses the range agreed to between the United States and Russia. The PrSM, which should enter service in 2023, will be a surface-to-surface, all weather, precision-strike guided missile fired from the M270A1 Multiple Launch Rocket System (MLRS) and the M142 High Mobility Artillery Rocket System (HIMARS). Under a US\$20M contract from the US Army, the long-range PrSM will replace non-insensitive and cluster munition versions of the Army MGM-140 Army Tactical Missile System (ATACMS). By 2025, the US Army will be able to use PrSM to attack and destroy moving enemy ships operating offshore at ranges out to about 310 miles. While the weapon primarily has surface-to-surface applications for use against enemy air defences, troop fortifications, and armoured vehicle columns, the PrSM is being configured with an advanced targeting multi-mode seeker to include maritime strike.

Meanwhile, Smart munitions experts at the Raytheon Co. are also moving forward with a US Navy programme to retrofit the venerable Block IV Tactical TOMAHAWK missiles for the anti-ship role with a new sensor system to enable the weapon to attack moving enemy vessels at sea. Under a US\$7.2M order, Raytheon is updating technical data package of the guidance test set, and upgrading existing units to support the MST additions -- including hardware and software. The Maritime Strike TOMAHAWK programme is planned for initial operational capability in 2022, with procurement of upgrade kits continuing into 2023.





Test-firing a BrahMos supersonic cruise missile as part of a service life extension programme, from the Integrated Test Range (ITR) in Balasore, Odisha on 21 May 2018.

### Hypersonic Among Modernisation Priority

The Long-Range Precision Fires (LRPF) is the US Army's number one modernisation priority. The reasons for this are simple as the US and its closest allies are outnumbered and out-ranged by Russian and Chinese long-range surface-tosurface strike capabilities. At the other end of the spectrum, advanced guidedweapons technology has become a prerequisite of a modern military inventory. Besides ballistic and cruise missiles, hypersonic weapons now form a central element of the most capable national militaries. The increasing adoption of such systems is in large part a function of their perceived military effectiveness.

Hypersonic weapons are specifically designed for increased survivability against modern ballistic missile defence systems. These missiles are capable of delivering conventional or nuclear payloads at ultra-high velocities over long ranges. Hypersonic missiles come in two variants. Hypersonic cruise missiles, or HCMs, are launched from platforms such as aircraft and ships and are powered by rockets or jets throughout their flight. Unpowered hypersonic boost-glide vehicles, or HGVs, are launched into the upper atmosphere on ballistic missiles, which then release them to zoom into their targets at low level at speeds of up to Mach 27. Countries are actively engaged in the development of hypersonic weapons capable of flight at speeds of Mach 5 and above.

## **US on the Forefront**

The United States recently successfully tested an unarmed prototype of a hypersonic missile. "This test builds on the

success we had with Flight Experiment 1, in which our C-HGB achieved sustained hypersonic glide at our target distances," said Vice Adm. Johnny R. Wolfe, Director, Navy's Strategic Systems Programs, which is the lead designer for the common hypersonic glide body (C-HGB). "In this test we put additional stresses on the system and it was able to handle them all, due to the phenomenal expertise of our top notch team of individuals from across government, industry and academia. Today we validated our design and are now ready to move to the next phase towards fielding a hypersonic strike capability.''

According to a Department of Defense spokesman, the DoD successfully tested the hypersonic glide body in a flight experiment conducted from the Pacific Missile Range Facility. The US Navy and US Army jointly executed the launch of the C-HGB, which flew at hypersonic speed to a designated impact point.

Hypersonic weapons, capable of flying at speeds greater than five times the speed of sound (Mach 5), are highly manoeuvrable and operate at varying altitudes. This provides the warfighter with an ability to strike targets hundreds and even thousands of miles away, in a matter of minutes, to defeat a wide range of high-value targets. "This test was a critical step in rapidly delivering operational hypersonic capabilities to our warfighters in support of the National Defense Strategy," said U.S. Army LTG L. Neil Thurgood, Director of Hypersonics, Directed Energy, Space and Rapid Acquisition, whose office is leading the Army's Long Range Hypersonic Weapon program and joint C-HGB production. "We successfully executed a mission consistent with how we can ap-



India in collaboration with Russia has developed the BRAHMOS cruise missile.

ply this capability in the future," he said. The C-HGB – when fully fielded – will comprise the weapon's conventional warhead, guidance system, cabling, and thermal protection shield. The Navy and Army are working closely with industry to develop the C-HGB with Navy as the lead designer, and Army as the lead for production. Each service will use the C-HGB, while developing individual weapon systems and launchers tailored for launch from sea or land. The similarities in hypersonic weapon design for sea and land variants provide economies of scale for future production.

### **Russia Has Seen it All**

Russia's has already put into service its first regiment of AVANGARD hypersonic missiles.

At the end of 2019, Russia had announced that the country's first hypersonic boost-glide vehicle had become operational. According to Strategic Missile Force Commander Colonel-General Sergei Karakayev, the first AVANGARD hypersonic missile systems entered combat duty in 2020 at the Dombarovsky missile division based in the Orenburg Region in the south Urals,

The AVANGARD is a strategic intercontinental ballistic missile system equipped with a hypersonic glide vehicle. According to sources, the breakthrough weapon was developed by the Research and Production Association of Machine-Building based in Reutov town near Moscow and it was tested from 2004 on. The glide vehicle is capable of flying at hypersonic speed in the dense layers of the atmosphere, manoeuvring by its flight path and its altitude and breaching any anti-missile defence. The ICBM is estimated to fly 27 times faster than the speed of sound. During the tests, the AVANGARD hit a practice target 6,000 kilometres away across Siberia at speeds up to Mach 27.

"This weapon of the future can penetrate both existing and any future missile defence systems," according to Putin at an annual Defense Ministry Board meeting. He projected Russia as the only country armed with hypersonic weapons, calling it "a unique situation in our contemporary history where they're trying to catch up. Not a single country possesses hypersonic weapons, let alone inter-continental hypersonic weapons. We already have the KINZHAL hypersonic missile systems in the field, and the PERESVET laser combat systems have already been deployed," Putin said.



A successful test-firing of the AKASH missile conducted by the Indian Army SaptaShakti Command

The latest ballistic missiles with the AVANGARD hypersonic glide vehicle (HGV) are being delivered to the Strategic Missile Forces. "This is a weapon of the future that can penetrate both existing and any future missile defence systems," Putin said.

"Work and test firing on other systems are underway, including the SARMAT boosted intercontinental ballistic missile; the TSIRKON ground- and sea-based hypersonic rockets; the POSEIDON unmanned underwater vehicle; and the BUREVESTNIK nuclear-armed cruise missile," he added.

The second design, KINZHAL (dagger), is claimed it can immediately destroy US nuclear bases in Europe. The stationary weapon is ideal for a prompt strike. It can be delivered by a high-speed carrier such as a fifth-generation fighter. The missile has a long-range and hit precision comparable to ISKANDER missiles. It has a claimed range of more than 2,000 kilometres, a speed of more than Mach 10, and an ability to perform evasive manoeuvres at every stage of flight carrying both conventional and nuclear warheads. Reports have since indicated that the KINZHAL missile has entered service and that up to 10 MiG-31s have been modified to carry the missiles. The 10 aircraft deployed on experimental combat duty in the Southern Military District, bordering Ukraine and the Black Sea.

The third and newest hypersonic weapons the Russians have claimed is 3M-22 TSIRKON anti-ship missile (ASM). The TSIRKON's estimated range is 500 kilometres at a low level and up to 750 kilometres at a semi-ballistic trajectory, but the stateowned media in Russia reports the range as 1,000 kilometres. It is a two-stage missile that uses solid fuel in the first stage and a scramjet motor in the second stage. The Russian Navy is also reportedly expediting test launches of the ASM from submarines and surface combatants.

## **China Not Far Behind**

China has been developing its hypersonic weapon capabilities with advancements in both HGVs and HCMs. DF-ZF, a hypersonic glide vehicle known in the US as the WU-14, has undergone more than a half dozen development tests between 2014 and 2016. Of the seven tests during this period using its Wu-14 (DF-ZF) hypersonic glide vehicle, six have been successful. And, China had already conducted eight test firings of the DONGFENG-ZF, all of which have been successful, and the troops have been actually equipped with this weapon.

The DF-ZF is launched during the last stage of a missile and can reach nearly Mach 10, as well as manoeuvre to avoid missile defences and zero in on targets. This weapon can be configured to carry a nuclear or conventional warhead and China claims it is precise enough to attack ships at sea. The DF-ZF is scheduled to be operational by the end of this year.

Beijing also recently showcased the DONG-FENG 17 (DF-17) hypersonic boost-glide missile. The DF-17 is the weapon that the U.S. intelligence community estimated in 2017 to become the first of its kind to see operational deployment. The DF-17 first appeared in public in Beijing during a military parade celebrating the 70th anniversary of the founding of Communist China. The DF-17 is a two-stage weapon with a rocket booster and a high-speed gliding warhead. The DF-17 reportedly can strike targets over a distance of nearly a thousand miles. Its speed and flat trajectory could complicate interception attempts. Traditional ballistic missiles such as the DF-15 and DF-16 arc higher than the DF-17 does, making them easier to destroy mid-flight. China first tested the DF-17 in 2013 and rushed the weapon into service.

### India Too Goes Hyper

India also hase active hypersonics development programmes. India has been developing a range of cruise missiles and baltechnology will have multiple civilian applications too. For instance, it can be used for launching satellites.

Besides the HSTDV, the DRDO also conducted the test firing of the indigenously developed nuclear capable hypersonic missile SHAURYA with a strike range of around 1,000 km. SHAURYA, which is the land variant of India's K-15 missile, has a strike range of 700 km to 1000 km and is capable of carrying payloads of 200 kg to 1000 kg. India is also developing a second generation BrahMos-II missile is collaboration with Russia. This devastating projectile will hurtle towards its target at 2.5 km/s (9,250 km/h; 5,750 mph; or eight times faster than the speed of sound, enough to evade any air defence system in the world. It is expected to have a range of 600 km.



The Dongfeng-17 on parade in Beijing, October 1 2019

listic missiles to meet its security challenges under the Integrated Guided Missile Development Programme. These include the PRITHVI and AGNI missiles as well as the anti-tank NAG and surface-to-air AKASH. India in collaboration with Russia has developed the BRAHMOS cruise missile.

In late 2020, India successfully test-fired a hypersonic technology demonstrator vehicle (HSTDV). According to its makers - the Defence Research and Development Organisation (DRDO) - the test saw the scramjet-powered vehicle sustain Mach 6 during the course of its 22-second flight at an altitude of 30 km. It has a range of uses, including missiles of the future, and energy-efficient, low cost and reusable satellite-launch vehicle. The HSTDV cruise vehicle is mounted on a solid rocket motor, which will take it to a required altitude, and once it attains certain Mach numbers for speed, the cruise vehicle will be ejected out of the launch vehicle. The scramjet engine gets ignited automatically later. Besides its utility for long-range cruise missiles of the future, the dual-use

## France, First in Europe

France is joining the hypersonic weapons club with its Project V-MaX (Experimental Manoeuvring Vehicle); it aims to create a hypersonic glider with a speed of more than 3,700 miles per hour, or Mach 5. France could be the first European nation to develop its own hypersonic weapons. The effort appears to be aimed at developing a strategic nuclear weapon, with Paris recently awarding a contract to modify a proposed air-launched supersonic cruise missile. Under the V-MaX project being led by ArianeGroup – a joint venture between Airbus and France's Safran – the air-to-surface ASN4G missile, which will replace the medium-range ASMP, could possibly be configured to travel at hypersonic speeds. The ASMP, or Air-Sol Moyenne Portée, has an estimated speed of Mach 3 and a range of 300 miles.

Late last year, the France and the UK finalised their working mechanism for the new Complex Weapons Innovation Technology Partnership (CW ITP). MBDA was awarded a contract by the France's Direction Générale de l'Armement (DGA) and the UK's Defence Science and Technology Laboratory (Dstl) to lead the CW ITP. The new four-year contract follows on from the work of the Materials and Components for Missiles Innovation Technology Partnership (MCM ITP) over the last 13 years to continue developing generation-after-next missile technology.

The CW ITP's new framework will see it focus on five enduring technical areas (ETAs) - Materials, Structures & Electronics; Mission Systems & Algorithms; Seekers; Propulsion; and Lethality - identified as unique and critical to the field of complex weapons. A renewed group of French and UK companies, split equally across the two countries, will lead these ETAs. Ed Dodwell, the Head of CW ITP, said: "The importance of CW ITP's cross defence collaboration is its facility to match up the evolution of ideas with their exploitation. Technology on its own, without a concept for use becomes redundant. Concepts that never materialise beyond that are opportunities missed. CW ITP addresses this by having the best experts, working together, linking up the technology push of innovation with the market pull of complex weapons."

CW ITP will have an annual budget of €12M – 50 per cent from Dstl/ DGA and 50 per cent from industry – to fund up to 30 projects every two years. These research activities will focus on developing technologies with a low readiness level. The development funding provided by CW ITP in these areas will help sustain France and the UK's industrial and scientific base.

CW ITP will also introduce greater collaboration across these areas through 'Dynamic Challenges' that will look at technologies with applications across them, as well as any new potential technology areas. It will also look to fund more disruptive innovation'through short, three to six month, technology projects that whilst at the smaller end of funding, carry a high risk of not being successful but high reward if they are. Additionally, CW ITP has increased the funding to research activities of French and UK SME's and academia through efficiency savings on costs of managing the projects. Éric Béranger, CEO of MBDA, said: "I am delighted that a new of era of the Innovation Technology Partnership is beginning with this contract. MCM ITP was an excellent example of Anglo-French cooperation, and the CW ITP will no doubt continue in this endeavour, showcasing that our countries remain committed to working together on future defence technologies." MBDA has also been working with On-

era, the French research agency for civil

and military technology on a program for a fourth generation air-launched, nuclear-tipped missile, with the project name ASN4G. The planned hypersonic, scramjet air-launched nuclear missile would fit on a planned next generation fighter, replacing the supersonic ASMP-A atomic weapon mounted the RAFALE fighters. The air-to-surface missile has a range of 500 kilometres (311 miles) and flies at Mach 3. It carries a thermonuclear warhead with a yield of 300 kilotons. The second testfiring of the missile in less than two years was conducted in March this year, paving the way for its serial production and subsequent commissioning in the French Air Force, Navy, and Space Force.

## **Japan Plays Safe**

Japan also aims to have a hypersonic weapon ready for testing by 2025, presumably with the North Korean nuclear missile threat and Chinese aircraft carriers in mind. Japan has outlined its research and development road map for its home-grown standoff hypersonic weapons, confirming that it is seeking an incremental growth in capability and providing more details about the kinds of threats it is targeting with this new class of weapon. Japan's defence ministry is developing what it calls a "hypervelocity gliding projectile," or HVGP, for deployment on island bases starting in 2026. In a document published on the website of the Procurement, Technology and Logistics Agency, the Japanese government announced that in the near future two classes of hypersonic systems will be deployed - a hypersonic cruise missile (HCM) and an ultra-fast planning warhead (FPW). HCM is supposed to be equipped with a hypersonic ramjet engine; it will look like an ordinary rocket, but fly at a much higher speed and have a long flight range. The super-fast planning warhead will be equipped with a solid propellant rocket engine that can raise the warhead of the product to a great height, and then the warhead will be planned to the target intended for destruction, maintaining high speed immediately before the warhead is undermined. The agency also provided more detailed information on the types of warheads that will be equipped with the super-fast planning warhead. Among them will be warheads designed to destroy both surface and ground targets. It is assumed that one of the warheads will be armour-piercing, designed specifically to penetrate into the spaces below the deck of an aircraft carrier, while the version for ground targets will use a warhead designed to hit area targets. Tokyo plans to produce early versions of hypersonic weapons from 2024 to 2028. It is expected that they will go into service in the early 2030s.

The agency expects both systems to provide satellite navigation. An inertial navigation system is supposed to be used as a backup. Japan plans to create a network of seven satellites to provide continuous positioning for its self-defence forces. This will allow Tokyo to provide continuous navigation data without relying on foreign satellites. "When combined with developments in command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR), the use of hypersonic weapons has the potential to drastically reduce the strike time against a broad target set. For those defending the targets, these systems compress the time available to adequately identify, assess, track and engage an incoming weapon," Douglas Barrie, Senior Fellow for Military Aerospace at IISS notes.

The growing reach, accuracy and versatility of conventional missiles are likely to create military advantage across the air, sea and land domains, and at all levels of warfighting.

The growth of the precision strike regime remains in its infancy, but it is likely to mature rapidly in the near future.

## Masthead

**European Security & Defence** Issue 06/2022, June 2022 ISSN 1617-7983 · www.euro-sd.com

### Published by

MITTLER	Mittler Report Verlag GmbH
REPORT	A company of the TAMM Media Group

Publisher and Managing Editor: Stephen Barnard (sb)

### Editor-in-Chief: Jürgen Hensel (jh)

Editorial Staff: Rolf Clement (rc, Political Affairs), Waldemar Geiger (wg, Infantry, Industry), Wolfgang Gelpke (wge), Gerhard Heiming (gwh, News, Land Forces), Rolf Hilmes (rh, Army Technology), Hans-Uwe Mergener (hum, Naval Forces)

Online Editor and Webmaster www.euro-sd.com: Jack Richardson (jr)

Copy Editor: Christian Kanig (ck)

### **Regional Correspondents**

Belgium/EU/NATO: Joris Verbeurgt (jv), Brazil: Roberto Guimarães de Carvalho (rgc), Denmark: J. Bo Leimand (jbl), France: David Saw (ds), Georgia: Beka Kiria (bk), India: Suman Sharma (ss), J C Menon (jcm) Israel: Tamir Eshel (te), Italy: Luca Peruzzi (lp), Japan: Shinichi Kiyotani (sky), **The Netherlands**: Jaime Karremann (jk), **Poland:** Grzegorz Sobczak (gs), **Portugal:** António Brás Monteiro (abm), Regional Correspondents, Russian Federation: Sergey Kirshin (sk), Yury Laskin (yl), Spain: Esteban Villarejo (ev), Taiwan, North & East Asia: JD Kitsch (jdk), Turkey: Korhan Özkilinc (kÖ), UK: Christopher Foss (cf), Tim Guest (tg), Ukraine: Alex Horobets (ah), Reuben F Johnson (rfj) USA: Sidney Dean (sd), Chet Nagle (cn)

### Lavout:

AnKo MedienDesign GmbH, Germany

Production: Lehmann Offsetdruck und Verlag GmbH 22848 Norderstedt, Germany

### Office Address:

Mittler Report Verlag GmbH Beethovenallee 21, 53173 Bonn, Germany Phone.: +49 228 35 00 870, Fax: +49 228 35 00 871 info@mittler-report.de, www.mittler-report.de

Managing Director: Peter Tamm

Authorised Signatories: Waldemar Geiger, Lars Hoffmann

### Advertising, Marketing and Business Development

Stephen Barnard Phone: +49 228 35 00 886, Mobile: +44 7984 033154 stephen.barnard@mittler-report.de Stephen Elliott Phone: +49 228 35 00 872, Mobile: +49 1590 173 0346

stephen.elliott@mittler-report.de Waldemar Geige

Phone: +49 228 35 00 887 waldemar.geiger@mittler-report.de

Dr. Andreas Himmelsbach Phone: +49 228 35 00 877 andreas.himmelsbach@mittler-report.de

Advertising Representative, Russia & CIS:

### Laguk Co., Yury Laskin, General Director

Krasnokholmskaya Nab., 11/15, 132, RF-109172 Moscow, Russian Federation Phone: +7-495-911-1340, Fax: +7-495-912-1260, Email: yury.laskin@mittler-report.de

Exhibition Management and Advertising Administration: Renate Herrmanns Advertising Accounting: Sabine Rump

### Subscription/Reader Service:

PressUp GmbH, PO Box 70 13 11, 22013 Hamburg, Germany Phone: +49 40 38 66 66-319, Fax: +49 40 386666-299 Email: mittler-report@pressup.de

European Security & Defence, © 2022 Mittler Report Verlag GmbH

The views expressed are not necessarily those of the editor or publisher. All rights reserved. No part of this publication may be reproduced without prior written permission of the publisher in Bonn.

Cover: The 4x4 category of dedicated armoured vehicles fills an important niche between larger and heavier armoured vehicles. Photo: Oshkosh Defense

Annual subscription rate: €82.50 incl. postage

Reduced annual subscription rate for distribution in Germany: €64.90 incl. postage

## Situational Awareness for the Dismounted Warfighter

## **Tamir Eshel**

Situational awareness in battle is a fundamental skill of living beings; animals and humans share similar sensory capabilities in different sensitivities - vision, hearing, smell, taste, and touch. These senses and instincts are also instrumental for the warfighter's development.

Nocturnal predators such as owls can see in the dark, wolves have superior hearing and smell, while humans maintain some capabilities in all five senses. The integration of these senses provides humans with the ability to know, plan and act first - these are the key elements of situational awareness. These elements are also essential for our survival as a species and as individuals.

These senses and instincts are also instrumental for the warfighter's development. Since they are based on natural insights, such capabilities can be acquired by any healthy human through military training that sharpens and focuses the human senses, instincts, and actions, thereby turning an ordinary human being into a fearless predator.

Through millennia of warfare, superior training was always the key to overpowering the enemy. In the Industrial Age of the 19th and 20th centuries, armies turned to war machines to destroy the enemy, earning an overmatch by decisive power at the point of contact – a trend that culminated with the introduction of nuclear weapons.

## In the Information Age

Today, in the Information Age of the 21st century, warfighters are turning to advanced information systems to augment their sensory capabilities, integrate these senses into knowledge, and build a situational picture to enable decisive actions to achieve advantage over the enemy by employing firepower more effectively and efficiently.

Here we review how traditional means are empowered by the new capabilities enabled by the Information Age.

## Location, Navigation, and Orientation

By recognising the landscape around them, animals have developed sharp in-



Tomahawk Robotics provides the elements for warfighters' situational awareness – personal communications, information displays, and remote controllers.



The tactical Virtual Assistant ensemble from SAIC employs a wearable shell (grey) and a powerful plug-in processing unit (on the right). The system interfaces with the user through AR goggles and supports speech-to-text functions.

stincts to orient themselves in the area in which they dwell. Humans, however, can understand the geography, plan movements, and gain an edge over the adversary by exploiting the landscape. For centuries, compasses and maps have been essential for orientation, planning, and navigation. Simple as they are, they still require the user's continuous attention, know-how, and practice to become effective and minimise errors. Skilled navigators can achieve a lot by instinct. but would need some help with maps, to be precise. The information age has introduced replacements to the compass and maps by using global navigation satellite systems (GNSS) that can pin the user's location on a digital map anywhere in the world. While this capability provides a tremendous advantage for leaders, as the system is based on weak signals from satellites, this vital service is prone to interference, jamming, and spoofing, making GNSS inherently susceptible to attack. Militaries worldwide are seeking alternatives to GNSS, enabling the warfighter and combat systems to operate in denied-GNSS environments using motion sensors, vision-based navigation,



IDF soldiers are experimenting with advanced wearable systems as part of the IDF's 'Edge of Tomorrow' programme. The weapon Smart-Eye sights used by team members were connected to Elbit Systems' Torch-X Dismounted, and E-Lynx personal radio which provided the networking, command, and control. Team leaders use AR goggles to communicate with team members using haptic signals through Trekace haptic sleeves.

## WILL-BURT'S CONCEALED ELEVATION SYSTEM

A rugged and precise mobile elevation platform that provides rapid deployment of a wide variety of sensors from a concealed position in a standard pickup truck bed. The compact design provides up to 24.7 ft<sup>3</sup>/.7 m<sup>3</sup> for the sensor payload with the tailgate in the closed position.

Available with an electro-mechanical or pneumatic elevation system, payload stability is assured with section keys and keyways that minimize rotational movement. Designed and Manufactured in the USA by The Will-Burt Company, the Concealed Elevation System will optimize the performance of sensors resulting in mission success.



The Will-Burt Company, headquartered in Orrville, Ohio, USA, is the world's premier manufacturer of Mobile telescoping masts, towers and pan and tilt positioners. We offer virtually every mobile payload elevation and integration solution for defense, government, first responders, cellular and mobile, broadcast, energy production and other markets. Will-Burt also offers contract manufacturing, metal fabrication, powder-coating, and rapid prototyping services. Will-Burt is an international company with offices and manufacturing in the USA, England, and Germany along with offices in Singapore and a joint venture in Turkey All Will-Burt Company manufacturing locations are backed by a certified ISO 9001:2015 Quality Management System. Incorporated in 1918, Will-Burt is 100% employee-owned and is classified as a small business.

## ARMAMENT & TECHNOLOGY



The N1 Nano drone from PDW is a hand-sized drone designed for indoor surveillance. It can breach windows and navigate in uncharted spaces. Using a low latency radio link, it can operate in zero light, restricted indoors and underground. The drone weighs 450 g and can fly missions of up to 10 minutes.

radiofrequency-based location finding, and various counter-countermeasures to harden GNSS and make it more reliable and trustworthy.

## **Mapping Systems**

Once one's own location is determined with a high degree of accuracy, mapping systems can provide virtually unlimited services to the warfighter. This includes setting a movement path based on terrain analysis and minimum exposure to the enemy, locating the optimal point of advantage that dominates an area, and sharing the locations of team members and friendly forces to coordinate actions while eliminating the risk of friendly fire. GNSS has been integrated into the modern soldiers' radios of the current generation, and their data is being exploited by blue-force tracking (BFT). Such services are based on wearable systems carried by everyone; these radios constantly report their location over the radio. Dismounted leaders and commanders at the tactical command posts take digital displays. They can view the locations of all troops carrying those radios without seeing them visually and plan their movements and orders accordingly. To overcome the inherent vulnerability of GNSS, some systems may use multiple locationbased systems, employing visual navigation and RF location to verify the GNSS

location. Once errors are suspected, the systems can ignore the GPS location and rely on other alternatives, despite lower accuracy.

Mapping friendly and hostile entities in the battlespace is another challenge relying on the human senses, one can relate to the most acute threats, but when facing an overwhelming force, an average person would flee rather than fight. The modern warfighter can remain calm under such circumstances by delegating the technical process of situation analysis to the information systems and making decisions and acting upon that data based on the machine's clear, relevant picture and recommendations. Such a system was recently demonstrated by SAIC, using the 'Tactical Virtual Assistant.' According to SAIC, this device brings computing power and capability to the tactical edge, where mission-critical information can be received, aggregated, and processed not to overwhelm the warfighters' cognitive capacity. Designed as a wearable AI-enabled, connected computing device, the tactical virtual assistant allows warfighters to assess, process, receive and communicate battlespace data wherever they are, in a connected or disconnected environment. The system supports Augmented Reality (AR) and voice-to-text messaging to provide an intuitive hands-free interface.

## 'Edge of Tomorrow'

The Israeli Defence Forces' 'Edge of Tomorrow' soldier systems' experimentation demonstration study has recently implemented similar capabilities. Under this experiment, IDF soldiers used AR sensing to gain situational awareness and targeting in a complex urban combat environment. The soldiers used the TORCH-X Dismounted system, a version of the IDF Digital Army Programme designed to empower the dismounted infantry team. The system integrates weapon reference sensors recording and relaying the weapon sights view of every soldier, enabling the soldiers to see targets behind corners and obstacles. Team members also use AR viewers to obtain an AR layer on top of their 'world view', providing essential signage such as fire locations and critical data obtained in real-time or from intelligence or higher command. In addition to visual and audible information, all team members also used haptic information sleeves developed by Trekace, applying vibrating haptic signals to inform each soldier of directions, movements, and events of interest. Leveraging haptic signalling (touch), the method employs communications means that overcome the cognitive overload created by audible and visual feeds, acting somewhat like a tap on the soldier, often used by soldiers in close combat.

## **A Realistic Situational Picture**

The realistic situational picture developed by the human senses is a 3D panoramic display based primarily on vision and audible sensing. However, this view is limited by line of sight, distance, and ambient noise. Using a bird's eye view provides many advantages by uncovering targets in woods or behind covers that would otherwise be hidden from sight. Such capabilities have recently become available by using mini-drones that can be carried and operated by a single soldier and deployed with the combat team to provide an elevated view of the warfighter's immediate surroundings. Some drones can carry small warheads, the size of a fragmentation grenade, to apply kinetic effects in real-time, based on the situational picture and targeting such drones provide.

Another type of situational awareness is required in an urban environment, indoors, and in underground spaces, where some human senses do not provide the whole picture. These environments require dedicated mapping techniques to augment situational understanding and capabilities derived from new dronebased sensors. Small drones equipped with cameras can quickly construct a 3D model of structures to improve the planning and execution of plans. Once the teams are inside buildings, different sensors are required to map the interior, find hostiles, and clear indoor spaces for troops' safe passage. These capabilities are enabled by miniature guadrotor drones designed specifically for these tasks. They are loaded with sensors, using low-light and thermal cameras for navigation and acoustic and laser radar (Lidar) for obstacle avoidance and mapping. Some drones can also carry small



The NINOX-40 Nano drone from Spear is launched from a canister on a 35-minute mission where it provides a bird's eye view for the warfighter at distances of up to 5 km.

explosive charges to deliver a kinetic attack when an opportunity arises.

Two types of missions are currently supported – autonomous drones that rely on 'human assistance', flown in 'First Person View' mode, where the operator controls the drone through 3D virtual reality goggles or a 2D tablet. These missions depend on a clear and stable communications link with the team. They would often operate very quickly and efficiently at short distances ahead of the lead element over the wall or behind the corner. Without a human in direct control, drones operating in fully autonomous missions are less dependent on communications links but often take much longer to perform their tasks. On their missions, the drones map indoors, detect humans and weapons and can identify armed persons. The product delivered on such a task provides a 3D visual map of the entire structure, separated by levels, rooms, and passages, providing the human element a clear picture of their mission's situation, risks, and advantages.

While the warfighters' situational awareness is still the collection of input from the human senses, new layers of data provided by modern sensors and information systems and interfaces enhance situational awareness, prioritise the most critical and essential signals and present the information in a clear, intuitive way.



## Franco-German Combat Aircraft Developments

## Giulia Tilenni

The unprecedented increase in German defence spending and the new impetus given to European defence might have positively influenced the Future Combat Air System (FCAS) programme. However, disagreements between the main contractors and changing political priorities are putting its whole completion at risk.

n 2017, France and Germany, later joined by Spain, agreed on the development of a cooperative Future Combat Air System (FCAS). The idea was to enter the race for the 6th generation fighter despite the lack of relevant experience in the development of 5th generation aircraft (such as the F-35). According to the original framework agreement, the first technological demonstrators were expected in 2026 for a final commissioning in the 2040 timeframe.

The first semester of 2019 marked a positive period for the programme, with the signature of the two year-long, €65M worth, Joint Concept Study in February and the official arrival of Spain some months after. However, progress became less smooth thereafter. Tensions arose between Paris and Berlin at the end of 2019 and in 2020, and the identification of the management of the COVID pandemic as their top priority, delayed the launch of the FCAS Demonstrator Phase1A to April 2021. This 18 month-long, €155M worth contract study is crucial, as it marks the beginning of the technology and development maturation for the New Generation Fighter (NGF), at the core of the FCAS system-of-systems. The agreement on Phase1A, developed by France and Germany only, came more than one year after the first NGF contract, signed in February 2020. To get back on track and in order to respect the new schedule for a first demonstrator in 2027 (Phase2), participating countries needed to rapidly find a deal on the Demonstrator Phase1B, to build up on the previous phase and mark the official debut of Spain in the programme. Intense negotiations led to the end of the disputes between Germany and France on

## <u>Author</u>

**Giulia Tilenni** is an international affairs analyst based in Paris, France.



French Defence Minister Parly and German Federal Defence Minister Kramp-Karrenbauer sign the contract for the Future Combat Air System (FCAS) demonstrators at the Hôtel de Brienne in Paris, France, February 2020.

intellectual property rights and allowed for an intergovernmental agreement in May 2021. Defence Ministers Florence Parly (France), Annegret Kramp-Karrenbauer (Germany), and Spanish Secretary of State for Defence Esperanza Casteleiro Lamazares, signed the contract on 31 August 2021. The parties established that each country would pledge €1.2Bn for this new phase, to be concluded in 2024. They also agreed on continuing their collaboration and launching Phase2, with investments up to €8.6Bn (or even more) until 2027, when this phase should be completed.

To kick off Phase1B properly, relevant companies and the French directorate general of armaments (Direction générale de l'armement, DGA) are required to sign a contract outlining its conditions and its detailed funding scheme. This contract was expected a few weeks after the first agreement, but the signature is still pending. The fact that Airbus has refused to sign so far is seriously putting the future of the whole project at risk, as France and Spain have recently announced.

## Industrial and Technological Considerations

The entire FCAS programme consists of several technological pillars (fighter, engine, combat cloud, remote carrier, missile system, sensors system and stealth), each one to be led by one of the three main contractors according to the "best athlete" principle. The initial agreement between participating nations assigned the lead of the first pillar (NGF programme) to the French Dassault Aviation, with Airbus Defence and Space as the main partner. The German company leads the remote carrier, combat cloud and stealth pillars. The Spanish Indra is the lead company on the sensor systems, while the European military engine team



The initial agreement between participating nations assigned the lead of the NGF programme to Dassault Aviation

(a 50/50 joint venture between the French company Safran and the German MTU) is in charge for the engine.

The management of intellectual property rights was at the core of the debate concerning the 1A Phase. Following the increased participation of Airbus in the programme due to Spain joining, Germany asked France for full access to all co-funded research. On its side, Dassault refused to share the know-how acquired during the development of RAFALE or the nEUROn demonstrators. To overcome disagreements, participating countries decided to list all intellectual property rights needed to be shared for the completion of cooperative projects. The issue of workload sharing seemed to be solved with the deal reached in May 2021. But Airbus is reported to be blocking the final signature of the contract for Phase1B as it seeks an equal role with Dassault in the NGF pillar, without making concessions in other pillars. This is a situation that Dassault's CEO Eric Trappier has extensively described in March, during the company's annual conference, and that was criticised some weeks later by the French and Spanish Ministers of Defence. CEO Trappier cited the example of flight sensors, a sensitive component in which Dassault is among the leaders in both the defence and the civilian market, and on which it is supposed to have the lead within the FCAS programme. The fact that the French company will be in charge of developing the EU-

ROMALE UAV flight controls confirms its leading role in this domain. Giving Airbus an equal role in the development of this technology is not in line with the existing agreements and is also not in Dassault's interest, he explained. Moreover, an equal workload sharing would create duplication and inefficiencies in the design phase, as the German company lacks experience in this domain. The A-400M programme, and the wrong choices concerning the use of flight controls, prove just how the issue of inefficiency may weaken a collaborative programme, the CEO stressed.

## **Different Pillars**

Due to partial overlap in contracts for the different pillars, additional delays on the NGF development might have an impact on other components, and thus on the entire programme. So far, the cooperation on the engine, led by EUMET in partnership with Spain's ITP Aero, a Rolls-Royce Group owned corporate entity, has been progressing well. Safran will be in charge of the design and integration on the NGF's engine, with ITP leading the development of some components, including the low-



Briefing at Dassault's design office in Saint Cloud, near Paris

pressure turbine and nozzle. MTU will lead on the engine service activities.

Last January, the DGA announced that the prototype engine derived from the Snecma/SafranM88 currently powering RAFALE fighters was successfully trialled on a test bench. So far, engineers have been working on how to cope with the increased temperatures generated by the higher trust. The test was carried out by using the heat-sensitive paint 'Thermocolor', which allows for the measurement of the temperature thanks to colour changes. Part of a broader national programme seeking to replace RAFALE's engines as well, the development of the testing technique took five years. Following the analysis of the first results, the prototype will pass "durability" tests, expected to last several months.

## The Role of New Governments

Being one of the most important European aeronautics projects of the century, the FCAS has a significant political impact on producing countries. An impact that will likely be stronger than initially expected, as defence spending is finally rising again after decades of decline. In addition to its economic and social impact, the FCAS will be a cornerstone not only for Franco-German defence cooperation, but also for German defence politics, which are already undergoing major changes in 2022, and for defence cooperation at the EU level.

Defence had not been at the top of the German political agenda in recent decades. For years, Berlin refused to allocate 2 per cent of its GDP to defence according to what NATO partners agreed to in 2014. The German Armed Forces are not underfunded per se, as military expenditure jumped from €32.5Bn in 2011 to over €50.3Bn in 2022. However, being one of the best funded militaries in the world, does not prevent them from serious inefficiencies, as highlighted in the 2022 Parliamentary annual report on the military. The findings of the rapporteur, MP Eva Högl, echoed the declarations of Army Inspector Lieutenant General Alfons Mais, who said the Army he led was "more or less bare." The inadequacy of the German Armed Forces has been well known for years, but the recent Russian invasion of Ukraine acted as a tipping point. Berlin was unable to follow other European countries in pledging materiel to avoid the negative impact on its own defence capabilities.

During an historic press conference held on 26 February, Chancellor Scholz made two important announcements, considered to be a U-turn in the country's traditional defence posture. On the one hand,



Computer rendering of the NGF



Germany authorised for the first time the export of lethal weapons to conflict zones. The delivery of seven Panzerhaubitze 2000 artillery systems was finally approved in May, under increasing international pressure to act. On the other hand, the Chancellor unveiled the launch of a new National Security Strategy, which includes a €100Bn modernisation fund for the armed forces and the rise of annual defence expenditure to 2 per cent of GDP. Improving troop preparedness and reinforcing participation in collective defence systems are at the core of the new strategy.

At first glance, this new posture seems excellent news for the FCAS programme. However, the revamped Russian assertiveness will likely push the German Government to rapidly fill its capability gaps rather than investing more to speed up joint development programmes. Indeed, the full list of capability gaps is quite long, and includes ammunition, heavy lift helicopters, air defence systems, submarines, frigates and minesweepers.

A preference for off-the-shelf systems will likely boost the procurement of US-made technologies. The formal request for the purchase of up to 35 Lockheed Martin F-35A aircraft, announced on 13 March, is a first step in this direction. Berlin needs to pick a gap-filler to replace its ageing TOR-NADO fleet, due to be phased out between 2025 and 2030, while waiting for the NGF to become operational in 2040. The previous government considered the Boeing F-18 as sufficient to ensure nuclear-sharing capabilities. This choice was also deemed more appropriate, as the purchase of the F-35 would have undermined the standardisation of European aerial defence to
be established with the FCAS programme. Regarding these considerations, newly-appointed German Defence Minister, Christine Lambrecht's announcement received mixed support, especially in France, where some see it as revealing a declining political willingness in the completion of the FCAS and of joint development programmes in general.

#### **The French Side**

On the French side, the re-election of President Macron secures continued interest in European cooperation, but also higher defence spending. According to the programme presented during the electoral campaign, President Macron is seeking an increase in the annual defence budget from the current figure of €40Bn to €50Bn in 2025, and to expand French participation to European defence funds. However, the composition of the new Parliament, still unknown at the time of writing, will impact on the pace and amount of defence investments. A victory of the newly-formed alliance of left-wing parties (Nouvelle Union Populaire écologiste et sociale) in June's legislative elections could well undermine the President's projects, as it will likely shift the country's political focus to other priorities, such as ecology and welfare.

#### **Final Remarks**

The Russian invasion of Ukraine, which brought war back to European soil after decades, marked a tipping point in defence policies within the EU. European countries have been discussing for years whether pooling and sharing was the best way to strengthen their defence capabilities despite limited defence budgets. During his first mandate, President Macron placed defence at the top of France's EU political agenda. The fact that war in Ukraine erupted during the French EU presidency created a favourable environment to advance this narrative, which had already received support under the Trump presidency. He has thus helped convince other EU states of the need to promptly pledge more funds to defence for increased strategic autonomy and armed forces' efficiency. Even if primarily driven by domestic considerations, the historic boost in German defence spending might finally give EU defence the real impetus that has been sought for decades. And FCAS is at the centre of this whole dynamic. In political terms, it might be among the first programmes to promote EU defence cooperation, and may even push it to the next level, considering the renewed political interest in gaining more independence. On industrial terms, it will likely represent the last opportunity to relaunch European know-how and competitiveness in the fighters' segment after years of underfunding. Governments and companies involved in the FCAS seem all too aware of its importance. During the annual press conference held in March, CEO Trappier identified 2022 as a crucial year for the future of the FCAS programme. In an interview with the French news channel BFM Business on 6 May, Airbus CEO Guillaume Faury confirmed that translating the initially agreed workload sharing into practice, to find a division that is satisfactory for all the relevant companies is "quite complex", yet necessary. He added that the programme was crucial to "maintain competitiveness in the long term".

However, changing political priorities and industrial considerations might still put the full development of the FCAS at risk. A scenario that might pave the way to the development of a fully French fighter jet, but also finally strengthen the ties with the US that it was supposed to break.

#### FUTURE COMBAT MISSION SYSTEM ENABLING AIR POWER IN NETWORKED OPERATIONS



CONNECTED SYSTEMS. COMBINED FORCES. JOINT INDUSTRIES.

VISIT US AT ILA 2022 AT THE FCAS CHALET

&esg



## Preparing the Alliance for Future CBRN Defence

#### The Joint CBRN Defence Capability Development Group

#### Frank Sabath, Paul Weaver-Smith and Joseph Kopcha

Chemical, Biological Radiological and Nuclear (CBRN) Defence requires an "all hazards" approach, including systems to prevent, protect and recover to keep the war fighters safe and prepared for CBRN hazards in various environments and missions.

A CBRN event can occur at any time, and will always require an appropriate and immediate response. The Joint CBRN Defence Capability Development Group supports the effective preparation of NATO nations for CBRN hazard response by developing standards, doctrine, and concepts. The Joint CBRN Capability Development Group also fosters and promotes CBRN related collaboration between scientific, military and industrial communities.

## CBRN Threats, Hazards and Risks

The Final Report of Long-Term Scientific Study (LTSS) on CBRN Defence conducted by NATO Science and Technology Organization (STO) states that over the last dec-

#### <u>Authors</u>

Professor Dr.-Ing. habil. Frank Sabath is the director of the Bundeswehr Research Institute for Protective Technologies and CBRN Protection (WIS) in Munster, Germany. He is also a senior lecturer at the faculty of electrical engineering and computer science of the Leibniz University Hannover, Hannover, Germany and has served as chairperson of the JCBRND-CDG since April 2017.

**Group Captain Paul Weaver-Smith** is a Royal Air Force Officer and has served as vice-chairperson of the JCBRND-CDG since June 2018.

Lieutenant Colonel Joseph (Jay) Kopcha is NATO CBRN Defence OPS, Standards & Concepts Officer at Supreme Headquarters Allied Powers Europe (SHAPE) and has served as secretary of the JCBRND-CDG since September 2018.



US Army soldiers conduct CBRN training at Kahuku Training Area, Hawaii on 20 August 2020.

ade, the controls and norms established by international treaties as the Biological and Toxin Weapons Convention (BTWC) and the Chemical Weapons Convention (CWC) have eroded and the threshold for use of Chemical, Biological, Radiological and Nuclear (CBRN) agents/materials has been decreased. The risk of a CBRN incident is no longer hypothetical, it is a realistic part of present security environment. The LTSS report lists several recent examples that emphasize this trend:

- the use of sarin, sulphur mustard and chlorine in the Syrian conflict since 2013,
- (2) the use of the nerve agent VX to assassinate Kim Jong-nam (Malaysia, 2017),
- (3) the attempted murder of Sergei Skripal and his daughter using a fourth generation nerve agent (Salisbury, United Kingdom, 2018),

- (4) the use of sulphur mustard by ISIS in Iraq,
- (5) two ricin plots which were intercepted in Germany and France in 2018, and
- (6) an airline plot with hydrogen sulphide which was intercepted in Sydney in 2017.

The current technological development, particular emerging and disruptive technologies like synthetic biology, biotechnology, nanomaterials, autonomous systems and artificial intelligence show potential to contribute to both increasing the risk of a CBRN incident as well as improving the defence from one.

The Salisbury event in 2018 demonstrated that the recovery from even a small size CBRN incident requires both civil and military CBRN defence capabilities to be used and for it to be successful it must be planned and executed as a whole of government task. In addition, some incidents may need the option of international assistance by Allies and or Partners.

#### The Joint CBRN Defence Capability Development Group

The Joint Chemical, Biological, Radiological and Nuclear Defence Capability Development Group (JCBRND-CDG) was established to support the development of capabilities fitting into implementing the three-pillar approach: Prevent, Protect and Recover under NATO's Comprehensive Strategic-Level Policy for Preventing the Proliferation of WMD and Defending against CBRN Threats. The Group is a permanent Joint Capability Development Group, reporting to the Military Committee Joint Standardization Board (MCJSB) and the Conference of National Armaments Directors (CNAD) NATO Army Armaments Group (NAAG).

The Group is composed of delegates from NATO member and partner nations, representatives of both delegated tasking authorities NAAG and MCJSB and the Group's leadership consisting of chairperson, vice-chairperson and secretary. Meetings of the JCBRND-CDG are attended by representatives of the International Staff (IS), International Military Staff (IMS), Strategic Commands (SC), Joint CBRN Defence Centre of Excellence (JCBRND COE), other NATO accredited Centres of Excellence as appropriate, NATO Standardization Office (NSO), and from other interested NATO bodies and commands. A noticeable special characteristic of the JCBRND-CDG is that its composition is joint services plus armament, i.e. delegates represent all military services as well as scientific areas needed for the development, testing and acquisition of CBRN defence equipment. As an immediate consequence in group's meetings CBRN staff officers, with experience in operations and military planning, scientists and engineer subject matter experts, who are often less familiar with military operations, must all work collaboratively to produce effective CBRN defence solutions. In other words, the JCBRND-CDG requires that its members consider all aspects of CBRN defence and think outside of their area of expertise. This sounds challenging but it is the key to the overall success of the group. Based on guidance from their delegated tasking authorities (MCJSB and NAAG), as well as other high-level policies and

conceptual sources, the JCBRND-CDG is

engaged in CBRN defence capability de-

velopment within, but not exclusively, the following focus areas:

- a) Doctrine and Terminology
- b) CBRN Knowledge Management
- c) Detection, Identification and Monitor-
- d) Hazard Management
- e) Physical Protection
- f) Training and Exercises
- g) Challenge Levels

The JCBRND-CDG also fosters information exchanges on CBRN defence where appropriate, and cooperative developments in related CBRN defence equipment. The Group acts as the focal point for information exchange on CBRN Defence in the NATO committee structure and maintains linkage to the NATO industrial, science and technology communities.

In addition the JCBRND-CDG provides, when required, CBRN defence advice to Allies, all relevant NATO organizations, bodies and military, as well as civil authorities, in particular the Committee on Proliferation in Defence Format, the Civil Emergency Planning Committee and the CBRN Medical Working Group.

#### Understanding CBRN Defence as a System

CBRN defence encompasses all military and civil measures that enable NATO and nations to prevent, protect the population, territories, infrastructures and forces against and assist in the recovery from CBRN incidents and their effects. The current NATO doctrine divides CBRN

defence into the three pillars that represent when an activity or event takes place: Prevent (pre-incident), Protect (at time of the incident) and Recover (post incident). Recent CBRN incidents and subsequent analysis proves that effective national CBRN defence is a whole government task, i.e. CBRN defence requires the combined involvement of military and civil capabilities and is located within a wider defence/government enterprise. Therefore, the JCBRND-CDG desires a more holistic approach that describes CBRN defence as a complex system consisting of five connected enabling components:

- a) Detection, Identification and Monitoring (DIM) capabilities include area reconnaissance and surveillance, sampling, characterization, analysis and identification of CBRN hazards.
- b) CBRN Knowledge Management (KM) aims to collect and manage CBRN-related information from one or several sources, along with the dissemination of raw and/or analysed information. It provides situation awareness to decision-makers, thus contributing to information superiority and timely decision-making.
- c) Physical Protection (PP) combines measures and equipment intended to enhance the survivability of personnel and materiel in a CBRN environment.
- d) Hazard Management (HM) is an enabling component where forces seek to avoid contamination, recover personnel, regenerate equipment and



restore infrastructure to maintain or re-establish operational tempo and effectiveness.

e) Medical Countermeasures (MEDCM) and Casualty Care include, among others, pharmaceuticals, biologies, vaccines designed to diminish the susceptibility of personnel to the lethal and damaging effects of CBRN substances, and to treat any effects arising from exposure to such hazards.

The enabling components are interconnected and depend on each other (Figure 2). For example, the capabilities to detect and identify CBRN threats by DIM capabilities require characteristics of known CBRN threats, which are collected and provided through KM and this in turn helps DIM capabilities specify how PP and HM capabilities must be tailored to be effective. The CBRN defence system is completed by Cross-cutting Functions (Figure 3), which support the Enabling Components. Essential Cross-cutting Functions are:

- An appropriate level of CBRN Expertise and manning in the military and civil command structure are essential for an immediate and successful CBRN incident response as well as recovery from it.
- ii) The preparation and maintenance of the operational picture at all levels requires an effective comprehensive Fusion of Information.
- iii) An effective Communication Information System (CIS) that incorporates specialist CBRN information require-



ments and services and provides risk management, planning and execution support. It needs to follow networkenabled principles and process information from the sensors through an automated warning and reporting system to the CBRN defence specialist network.

iv) Education and Training to support the adoption of common CBRN doctrine, training, tactics and procedures. The multinational and joint character of CBRN defence demands coherence and interoperability between national force contributions and civil capabilities.

The adoption of the system approach has enabled the JCBRND-CDG to identify and define the interconnections and dependencies between enabling components and cross-cutting functions. As an immediate result, the group understands CBRN defence as a system of equal important components (enabling components and cross-cutting functions). To be efficient all enabling components together with the cross-cutting functions need to be developed in a balanced way. For example, significant developments of DIM technologies can only be transferred into enhanced DIM capabilities if the CIS and KM systems are enabled to handle increased quality and quantity of data and represent this in a way appropriate for decision makers. The efficient usage of enabled capabilities by military forces and civil CBRN defence capabilities requires appropriate education and training.

#### JCBRND-CDG Contribution to Preparedness against CBRN Incidents

Recent CBRN incidents as well as CBRN exercises have demonstrated that recovery, for many nations, from even a small CBRN incident could require substantial civil and military CBRN defence coordination and capabilities. Given that short reaction times will inevitably be required, pre-crisis management, exercising and planning are essential for the efficiency, success and speed of recovery.

The response required to threats by criminal, terrorist or hybrid attack will require precrisis preparation so that the legal framework for activation of national and alliance military support, responsibilities of civil and military authorities and border crossing activities are properly considered and defined. For example, the support to a nation with a mobile bio-lab provided by an allied nation would have to take different national infection defence laws and regulations of the host nation, the supporting nation and any nation that is part of the delivery path into account. Without pre-crisis planning and coordination, timely support would be challenging.

The JCBRND-CDG supports NATO and partners in their preparation for the defence of a CBRN incident by developing and maintaining common terminology, including CBRN related terms and definitions. The group enhances interoperability by developing CBRN defence materiel and non-materiel standards, doctrine, and concepts of employment. The JCBRND-CDG, and its subpanels, cooperates with partner nations as well as with emerging civil planning groups and authorities to enable and support the mutual understanding of procedures.

In preparing the Alliance for future CBRN Defence challenges, the JCBRND-CDG always works closely with the NATO Science and Technology Organisation. The JCBRND-CDG monitors technological developments and provides assessments on emerging CBRN defence capabilities (our Technology Watch Keeper Task). In addi-



tion, the JCBRND-CDG maintains awareness on CBRN threats and challenges by encouraging the exchange of information and experiences between nations. NATO requires a Science informed and engaged team of experts to develop Joint CBRN defence systems that are fit for purpose, forward looking and capable of a timely response to emerging threats; this is what the JCBRND CDG does.

## **Product Feature: Bren-Tronics**

## New Generation Light Universal Charger from Bren-Tronics

Yesterday's soldier power solutions are now too heavy and not sufficiently efficient, that is why Bren-Tronics is constantly working hard to propose innovative light-weight solutions such as the combination of solar fast charging systems and the newest generation of universal chargers.

Fully developed in France, the Light Universal Charger (LUC®) is Bren-Tronics new generation charger that can charge any portable military battery using any energy source available in the field, vehicle, solar and battery, with 10-36VDC input voltage, as well as AC standard input. The LUC is a level 3 Smart Charging device using smart data communication protocols like SMBus, DQBus, single wire, to maximise charging efficiency while guaranteeing safety.

Thanks to its very light weight, around 600 grams, it can be carried out in a soldier backpack and can simultaneously charge

two batteries with a 150 W total output power. It uses NATO approved input/output connectors, allowing full interoperability with existing cables and battery adapters. Being able to charge various battery types, LUC provides ease of use and convenient logistic planning. It can be connected to PC/Tablet to monitor and store any battery health, state of charge and information. It is fitted with an offers OLED display with a friendly user interface to show all available information. Four push-buttons on the right allow scrolling through the menu; among options, the user can prioritise the batteries being recharged, should he wants one ready before the other. The charger firmware is easily upgradeable to cope with future batteries.

Like most Bren-Tronics products, the LUC underwent a rigorous military qualification and is rated IP67. It comes either in green or sand colour.

#### About Bren-Tronics, Inc.

Founded and in continual operation since 1973, Bren-Tronics, Inc. (Commack, NY) is a technology-based power/energy company with over 49 years' experience designing/ manufacturing rechargeable batteries, chargers, and complete power systems. Supporting worldwide customers power and energy solutions in any climate from watts to hundreds of kilowatts. Our Lithium-Ion battery systems are ideally suited for demanding directed energy applications (i.e. lasers) as well as hybrid front line renewable solutions.

Photo: Bren-Tronics

Bren-Tronics is the world leader in the design and production of military rechargeable batteries, chargers, and power systems, all designed and manufactured in our stateof-the-art facilities in New York.

Visit Bren-Tronics at www.bren-tronics.com EUROSATORY HALL 5A - H502

## **Markets and Developments in Vetronics**

#### **Tim Guest**

From optronic systems to C4I battle management solutions, modern military vehicles are awash with latest electronic equipment, sensors and devices. Effective vetronics brings it all together.

Many militaries around the world are embarking on widespread modernisation programmes to bring many current fleets of armoured land vehicles, both tracked and wheeled, up to date with latest systems, from optronic sensors, radar, communications, to battle management systems and more. These vehicle electronics will be critical if legacy and new land vehicle platforms are to be effective in the variety and sheer number of different roles they are to play within the scope of future, integrated, networkcentric warfare.

This article will look at vetronics, what it is, its projected military market and the kinds of systems involved, then hear from the director of the Vetronics Research Centre (VRC) in the UK about the VRC's work with the UK defence establishment and the strategic importance of that work.

#### Setting the Scene

Vehicle electronics, or vetronics, are all the electronic solutions onboard, as well as the electronic infrastructure that allows the integration of such a wide variety of systems aboard a vehicle. These might include C2, C3, C4 command, control and communications systems, radar and electronic warfare equipment, turret weapon systems, navigational and power systems, as well as the architecture that accompanies their effective networking within the vehicle. Optronics such as surveillance and situational awareness (SA) solutions using cameras and optical sensors also fall under this umbrella of systems all needing integration if the vehicle is to deliver optimum battlefield effectiveness and crew survivability.

Many upgrade-and-retrofit programmes include the modernisation, and/or first

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

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



Many upgrade-and-retrofit programmes include the modernisation, and/ or first installation, of vetronics systems on legacy vehicles improving survivability, interoperability and other performance parameters. Pictured: A Finnish CV90. Finland's CV90 fleet is being upgraded by BAE Systems, extending capabilities into 2030s.



Current vetronics technologies in sensors, actuators, countermeasures and computer processing techniques will deliver automatic as well as autonomous capabilities for unmanned systems. Pictured: Milrem Robotics THeMIS in Mali with Estonian forces.

installation, of such systems on legacy vehicles and these upgrades can, for example, improve, or, indeed, deliver interoperability that was not previously seen on a particular platform. Yet the major aim of modernising a vehicle's vetronics are to confer greater battlefield capabilities and reliability on a vehicle.

# FUTURE STARTS HERE 25 - 28 OCTOBER

**ISTANBUL EXPO CENTER** 

DEFENCE & AEROSPACE EXHIBITION

**Supported By** 









VAIVAU



AIR

PRESIDENCY OF THE REPUBLIC OF TÜRKİYE PRESIDENCY OF DEFENCE INDUSTRIES















CHAMBER

COMMERCE



REPUBLIC OF TÜRKİYE MINISTRY OF INTERIOR GENDARMERIE GENERAL COMMAND

REPUBLIC OF TÜRKİYE

3PACE

MINISTRY OF INTERIOR TURKISH NATIONAL POLICE

REPUBLIC OF TÜRKİYE MINISTRY OF INTERIOR TURKISH COAST GUARD COMMAND

REPUBLIC OF TÜRKİYE MINISTRY OF INTERIOR DISASTER AND EMERGENCY MANAGEMENT PRESIDENCY

REPUBLIC OF TÜRKİYE MINISTRY OF INDUSTRY AND TECHNOLOGY TURKISH SPACE AGENCY



OF INDUSTRY

THIS EXHIBITION IS ORGANIZED WITH THE AUDIT OF TOBB ( THE UNION OF CHAMBERS AND COMMODITY EXCHANGES OF TURKEY) IN ACCORDANCE WITH THE LAW NO.5174.



Elbit's Remote Controlled Weapon Station (RCWS) amongst other Elbit vetronics equipment and sensors aboard an Oshkosh JLTV M1280 general purpose vehicle, highlight the kinds of challenges faced in equipping vehicle platforms with numerous electronics devices to optimise their effectiveness.

#### **The Market for Vetronics**

The increasing need for vehicles such as tanks to gather intelligence and perform surveillance and reconnaissance tasks, while also performing their own core roles, is one of the factors driving the growth in the military vetronics market. Indeed, these are just some of the ways of analysing the market for vetronics explored in a recent research report, 'The Global Military Land Vehicle Electronics (Vetronics) Market and Technologies Forecast to 2028'. The report looks at variables in the market, such as focusing on improving frontline situational awareness and the increasing occurrences of asymmetric and network-centric warfare, which are having a major, though positive, impact on the military land vetronics market. The report suggests that increases in defence spending seen in Europe and elsewhere among allied nations, and also in emerging economies, as well as subsequent investments in the procurement of vetronics systems, are further boosting what growth there is in the market. With the digital battlefield now a force multiplier in the 21st century, the report highlights the market driver that land vehicles, having become interlinked nodes in the field with all-new tactical and logistical abilities, are being digitalised with an everincreasing range of advanced electronic systems, as outlined above, in order to make them lighter, faster, more effective and more survivable. The report states that the global military land vetronics market accounted for US\$3.64Bn in the year 2020 and it projects that it is anticipated to reach a value of around US\$6.01 billion by the year 2028. Market growth dynamics account for a CAGR of 5.73% during the forecast period, 2020-2028. Expected to dominate the global market is North America with a market value of US\$1.92Bn owing to the increasing R&D investment in this sector coupled with an infrastructure that supports the same. The early adoption of vetronics technology in North America is another factor that fuels its market growth, while Europe is expected to be the second-largest market with a value of US\$1.50Bn. And the APAC Region is expected to grow with the highest CA-GR of 6.17%.

According to the report authors, the launch of vehicle modernisation programmes by many nations around the world are drivers behind promising opportunities and growth in the military land vetronics market, yet factors such as strict regulations and consequent delays in procurement processes, hinder what growth there is to a certain extent. This report further drills down into where vetronics in relation to optronic solutions, communications networking, SA systems



The VRC has helped UK defence industry companies develop vetronics demonstrators and testbeds for future military vehicle designs.

and the core vetronics' architectures fit into existing legacy and new platform projects, whether modernising or on new production lines. It explores the integration and adoption of new technologies into the vetronics' picture such as: battery-powered electric vehicles, wheel motors, vetronics for autonomous driving, inter-vehicle and intra-vehicle comms and wider connectivity issues, artificial Intelligence, battery monitoring systems and unmanned systems and autonomous driving.

Also addressed in the research and analysis is the total global market by solutions projected to be fitted by 2028, including systems for latest fire control, electronic warfare and C4I, navigation, displays for a wide range of equipment, as well as monitoring and control sensors and power systems. And putting all this information into context, analysis also looks at vetronics' opportunities by region and vehicle types - unmanned, light protected, special purpose, AFVs, MBTs, SP artillery and more - with additional industry specifics relating to the products and vetronics' pedigrees of big-named players, such as BAE Systems, General Dynamics, Lockheed Martin, Navistar, Nexter, Norinco, Oshkosh, Rheinmetall, Textron and Thales.



Commanders' displays, night-vision, sighting systems and situational awareness optronics, as well as the communications and cabling ring architecture networking the systems in armoured fighting vehicles are all integrated through effective vetronics. Pictured: Inside the turret of an AS90 with the Royal Artillery.

## Challenges Critical to Vetronics

The Vetronics Research Centre (VRC) in the UK has been the only academic centre of excellence in the country conducting research and training in Vehicle Electronics aka vetronics since its inception in 2004. The centre is sponsored by the UK MoD and supported by DSTL, the Defence Science Technology Laboratory, and Defence Equipment and Support (DE&S). Its research in the field of future vetronics technologies and methodologies for land systems on behalf of the UK MoD has been conducted with the aim of disseminating and sharing results and information to government, academia, and defence industry players in the UK. The VRC has also helped defence industry companies develop demonstrators and testbeds for future military vehicle designs.

## **Product Feature: EVPÚ Defence**

## **Cost-Effective Cooled Thermal Imagers**

EVPÚ Defence has long been known and trusted as a specialist in the design, development and prodution of electro-optical systems for civil and military applications. Electro-optical systems are assembled, tested and serviced in the company's stateof-the-art labs which are equipped with special devices such as collimators, climate chamber and active black body.

This modern equipment combined with a strong and dedicated research staff has recently enabled EVPU Defence to make another addition to their product portfolio. The company now offers a range of high performing but competitively priced cooled thermal imaging cameras capable of detecting a NATO target at a distance of up to 24 km. Martin Vala, EVPU Defence's experienced optical specialist, offers some insight into the new product line:

"Since their launch, our cooled thermal imagers have registered a lot of worldwide interest for two main reasons: firstly, they offer an excellent price-performance ratio. Secondly, they don't contain any ITAR components so they are easy to export.

Although the majority of our thermal imaging cameras are sold encased in a ruggedised enclosure, we also offer one type of OEM cooled IR camera. It is called SUMO-C320 and it is capable of detecting a NATO target at up to 18 km, which makes it particularly suitable for middle range surveillance systems."

Does EVPU Defence provide any addditional services in connection with cameras? "Of course. We measure optical properties and perform the rectification of optical systems, simulate temperature tests and calibrate both cooled and uncooled cameras. We carry out functionality analyses and complete maintenance tasks. In addition, we are also able to replace detector coolers."



More information is available on **www.evpudefence.com.** You are also welcome to visit the EVPU Defence exhibition stand at no. K-557, Hall 5A, Eurosatory, Paris from 13-17th

June 2022.



## Viewpoint from New Delhi



## South Korea's Big Push to Join Quad

#### Suman Sharma

As the Indo-Pacific region gathers steam as the next battleground for world

powers, the newly sworn-in South Korean President Yoon Suk Yeol, has announced Seoul's willingness to join the Quadrilateral Security Dialogue, popularly known as the 'Quad'.

South Korean Major General Jung Hae-II had said at the recently concluded Raisina Dialogue – India's annual foreign policy flagship conference - that President Yoon is examining the possibility of joining the Quad, reiterating that Yoon was also vocal about this during his election campaign, where he mentioned that he did not expect South Korea to receive an invitation any time soon, but if approached, South Korea would "positively review joining".

#### **South Korea**

Conservative President Yoon has shown a willingness to adopt a foreign policy more closely aligned to the US, and joining the Quad represents a step in that direction. Yoon has pledged to move towards making this a reality.

While the White House has said that the US has no plans to invite South Korea to join Quad, US President Joe Biden's first visit to Seoul after assuming office in late May, followed by the Quad Leaders' Summit in Tokyo, will definitely see efforts to move forward.

ers' summit in Tokyo, will definitely see efforts to move forward. Seoul's relations with Beijing have been deteriorating in recent years, beginning in 2016 when the US, under former President Trump, announced a bolstering of South Korea's missile capability to counter North Korea's nuclear threat, a move which irked China, resulting in an economic blockade on Seoul. Several diplomatic feuds have since sprung up between Seoul and Beijing, over issues such as status of Taiwan, illegal fishing by Chinese vessels near South Korean waters, and even contradictions over the origins of certain food items like Kimchi. Soured relations with both North Korea and China appear to be driving Seoul closer towards the Quad. South Korea's clear benefits in this grouping can be encapsulated as: Cooperation with like-minded democracies on trade and infrastructure development; Becoming a voice in the regional security matrix; Gaining a platform to garner support against North Korea.

President Yoon has spoken about engaging with the Quad's working groups and recently met the Australian Ambassador to Seoul to request Canberra's support for Seoul's cooperation with these groups. While Seoul's experience gives it the right credentials and thereby makes it a worthy candidate for membership, however, Yoon will have to display discretion in his policies towards the Indo-Pacific. Seoul should most likely enhance its commitment to the "Quad Plus" framework, rather than trying to become a formal full member of the group. Seoul's goals via-à-vis the Quad will not just antagonise China, but also cause some discomfort for Japan, an integral and founding Quad member.

The Quad process is about its four members, and Japan may not like having South Korea as a full member since it will diminish Tokyo's stature as a core constituent power of the Quad, being the only State from East Asia, and most importantly, a US ally. Tokyo would much rather prefer South Korea as an extension of the Quad under the 'Quad Plus' rather than in the 'Quad' itself.

Dr. Jagannath Panda, Head of the Stockholm Centre for South Asian and Indo-Pacific Affairs at the Institute for Security and Development Policy (ISDP) says, "South Korea, under the Yoon administration will definitely have a positive framework towards the Indo-Pacific, moving away to an extent from Seoul's ambivalent approach towards the region. However, that will only bring more challenges for South Korea in times to come, with China's solidifying alliance with North Korea, and Russia. To South Korea, the security environment in Northeast Asia should be a priority and a pressing foreign policy challenge rather than Indo-Pacific security challenges."

#### The Quad

The Quad, comprising the US, Japan, India and Australia, was first envisaged in 2007 by former Japanese Prime Minister Shinzo Abe, but never really took off for about a decade, until it was revived in 2017. The grouping had its first in-person Summit in September 2021 in the US.

The Quad has often been criticised and called a 'mini-NATO 'by Beijing, fearing militarisation and alleged encirclement by China. Quad leaders have clarified about the grouping being non-military and in their first joint statement last year, spoke about the Quad's priorities being COVID-19 vaccines, cooperation in education, combating cyber threats, secure critical infrastructure, space and satellite data sharing, science and technology, climate crisis, a free and open Indo-Pacific region and clean energy resilient supply chains. While the Quad is not poised for any expansion, it has in the past invited representatives from South Korea, Vietnam and New Zealand for weekly meetings dealing with the COVID pandemic. This was conducted under the 'Quad Plus' format in 2020.

## Course Correction Fuzes and Modular Charges

#### **Tim Guest**

Speed in conducting a fire mission and accuracy of artillery rounds reaching their target can be battle-deciding factors; fuze type and the propelling charge used can make a big difference. This article takes a look at precision guidance kit (PGK) fuzes and modular charge systems, which both play their part in making sure accuracy is achieved and a fire mission is executed as swiftly as possible.

The more precise an artillery round can be in finding its target, the less rounds will be needed to destroy it, which will also be faster to achieve with collateral damage less likely to occur. And cost savings will be made in the process. One of the leading pioneers of PGK systems was Orbital ATK, acquired by Northrop Grumman in 2018. Now the Northrop Grumman M1156 PGK is part of the company's guided projectiles business.

#### **Improved Accuracy**

The PGK is a fuze that replaces conventional fuzes for artillery munitions, transforming them into GPS-based (Global Positioning System), near-precision-guided weapons to deliver more accurate fires. It is compatible with a number of standard HE and rocket-assisted projectiles.

On a gun position, following a call for fire from a forward observer, the PGK is planned into a fire mission in the command post/battery fire control centre based on the forward observer's target description and requirements. Orders are sent to the guns to install the PGK onto projectiles and fire mission target coordinates are relayed to the respective electronic fuze setters, which are applied to the PGK fuzes. Only then are the covers encasing the PGK canards removed prior to loading and firing. The course-correction fuze's built-in software allows it to acquire a GPS signal and, as the round follows its ballistic trajectory, that signal processes the round's current location and flight pattern and compares it to the target's coordinates. Based on that comparison, the PGK's canards/aerodynamic fins deploy from the fuze, increasing its aerodynamic performance and imparting small corrections to the ballistic trajectory of the round, guiding it along the final stages of its predetermined flight path to



Precision target accuracy can be achieved using PGKs and modular charge systems can improve ranges and fire mission times.



A PGK corrects the ballistic trajectory of a conventional round to improve its accuracy to as little as 30 m CEP. Pictured: four 155 mm rounds on a gun position fitted with PGK fuzes, Paktika Province, Afghanistan.

#### ARMAMENT & TECHNOLOGY

Photo: US DoD



Orders are sent to the guns to install the PGK onto projectiles and fire mission target coordinates are relayed to the respective electronic fuze setters, which are applied to the PGK fuzes.

deliver greater on-target accuracy. Using a PGK gives a conventional round a 30 m objective CEP compared to a conventionally-fuzed round's approx. 200 m CEP, and it also maintains a gun's performance capabilities to the extent that over 90% of its maximum achievable range can be expected. Power for the PGK is self-generating, so no batteries are required and its full, two-dimensional guidance capability is delivered with only one moving part. Detonation can be either delay, point detonation or proximity.

Last year, Northrop Grumman and Rheinmetall forged a strategic partnership for precision-guided enhanced range artillery ammunition based on the PGK. The companies formalised a 10-year strategic partnership agreement involving Rheinmetall's South African subsidiary, Rheinmetall Denel Munition, that will run until mid-2031. The two companies are now cooperating and will be throughout this period to offer forward-looking ammunition technology to the international market, including the US, to support future artillery operations. The partnership will focus, above all, on achieving an enhanced range 155 mm artillery round fitted with an integrated M1156 PGK, as well as on developing a new 155 mm projectile with an improved integrated propulsion system.

#### The M1156 PGK

In service with a number of armed forces, the M1156 PGK is an inexpensive means of enhancing the accuracy of existing types of artillery ammunition. In combination with Rheinmetall's V-LAP projectile, which is claimed to currently achieve the longest maximum range of any conventional artillery projectile, the M1156 PGK has already been proven in numerous combat operations, for long-range, precision-guided missions. The longest range ever attained by a conventional artillery projectile, according to Rheinmetall, currently stands at 76 kilometres, achieved in 2019 at Armscor's Alkantpan test range in South Africa (SA), with a non-NATO Joint Ballistics Memorandum of Understanding (JBMOU)-conforming 52-calibre gun using an RDM 155mm projectile. More than 12 militaries now use enhanced range Rheinmetall artillery ammunition from SA including the PGK. Testing of V-LAP projectile variants and the PGK in SA continued during H1 of 2021, with Rheinmetall and Northrop Grumman conducting further evaluations and demonstrations later last year, including at the US Army proving ground in Yuma, Arizona.

The US Army had an upgraded M1156E2/ A1 PGK produced last year, compatible with newer XM1128 HE and XM1113 RAPs and intended to achieve a 10-metre CEP accuracy at 30 km and 40 km, respectively, when fired from a 39-calibre barrel. This year, 2022, it is intended to enable a lower cost follow-on M1156E3/A2 to operate with the GPS-M satellite constellation. Plans are also in play for a Long-Range PGK (LR-PGK) that will enable enhanced accuracy with XM1113 projectiles out to 70 km when fired from 58-calibrre barrels – those expected to be in use as a result of the US Extended Range Cannon Artillery (ERCA) programme. The new fuzes will still be compatible with legacy projectiles.

Indeed, BAE Systems was actually awarded a contract in Q3 2020 to develop and manufacture LR-PGK fuzes compatible with ERCA 155 mm munitions and intended to enable artillery to achieve the long-range, 70 km+ precision strike requirements of the programme by 2023. The company states that with emerging signal-jamming capabilities on modern battlefields that threaten the effectiveness of existing PGKs, its LR-PGK technology meets current and future anti-jam requirements to defeat such threats. The LR-PGK is compatible with existing and future artillery shells and firing platforms, including M795, M1128, XM1113, and M549A1 standard projectiles, M109A6/ A7 SP Howitzers, M1299 Extended Range Cannon Artillery, as well as M777A2 lightweight towed howitzers. This LR-PGK combines enhanced GPS-based navigation with an innovative, roll-stabilised guidance unit and antenna array; its integrated technology, paired with a

proven, variable-deflection canard-control method, enables the fuze's advanced in-flight correction capabilities.

#### **Course Correction Mentions**

In a similar vein in Europe to the PGK is the SPACIDO system from Junghans/Nexter. Together with BAE Systems, Nexter previously cooperated on the European Correcting Fuze (ECF) project. SPACIDO is a GPS-free, 1D course correction fuze for 105 mm and 155 mm rounds, which, instead of GPS, relies on muzzle velocity radar on the guns for its instructions. One type of SPACIDO has multifunction modes (PD, PD Delay, Proximity and a time mode) for standard HE rounds and a second type of SPACIDO can be used with any NATO-standard rounds, including Bonus or SMARt projectiles. Velocity corrections are sent to the fuze from the muzzle velocity radar in the latter stage of the round's ballistic trajectory, the round having been deliberately fired to overshoot the target, only slightly, in order to enable a course correction command to be sent to the fuze, which initiates deployment of SPAC-



SPACIDO is a GPS-free, 1D course correction fuze for 105 mm and 155 mm rounds, which, instead of GPS, relies on muzzle velocity radar on the guns for its instructions



Projectiles and charge systems get some pretty rough treatment on the gun position and the IM nature of latest modular charges confers a new level of safety to the entire artillery ammunition resupply and fire mission phases.

IDO's airbrakes and the round adjusts its course and more accurately drops onto the target.

Worth mentioning before leaving the PGKrelated scene is Israel Aerospace Industries (IAI), which developed and produced its TopGun course-correction fuze for the Israel Defense Force (IDF) following a tender late 2017. It, too, is a GPS-based, 2D PGK and delivers corrections to the ballistic trajectory of standard 155 mm rounds that reduce dispersion in both range and deflection and deliver a 20 m CEP, at any range. The total projectile length when fitted with the TopGun fuze complies with NATO standards and effectively turns IDF's

current 155 mm munitions' inventory into guided and near-precision weaponry. This affordable fuze reduces the need for registration rounds, conferring confidence that fire for effect can be ordered and successfully carried out with a first round from all the guns in a battery. IAI intends development and use of TopGun to be expanded to other countries.

#### Modular Charges, **Faster Fire Missions**

Modular charges have been around for over 15 years and were first fired in anger in Iraq in 2007. Since then, several modu-

mage:



lar charge systems have been developed and entered service with a range of users. Rheinmetall Denel Munition's Tactical Modular Charge System for 155 mm rounds, for example, has been developed for use with all NATO standard 39 and 52-calibre guns and associated projectiles complying with the JBMOU. Its DM82A1 low zone and DM72/DM92 high zone modules are in service with more than 10 user countries, both NATO and non-NATO, and are undergoing gualification with other potential customers. In excess of 1.5 million Tactical Modular Charge modules have been produced and fielded to date, including on operational deployment. Using the modular charge increases achievable range to over 40 km using extended-range projectiles and its ignition booster design enables safe ignition and prevents pressure waves and negative differential pressures in all loading conditions and temperatures. The system also displays excellent Insensitive Munition (IM) characteristics, low barrel wear and has a low toxicity of ingredients that produce no combustion residues. Besides the proven interoperability in several gun systems, the Tactical Modular Charge System displays high durability under extreme environmental conditions.

System compatibility has been demonstrated on the following 39 cal. systems: FH70, M109, M777A2, AS90 including with a full



Modular charge systems increase achievable ranges with conventional and extended-range projectiles and also display excellent Insensitive Munition (IM) characteristics. Pictured: modular charge system for French Artillery CAESAR.

range of projectiles used by those systems including: US M107 family, UK L15 family, German DM family, South African Assegai family, Various Scandinavian Nammo projectiles, Turkish MOD274, Spanish ER02A1 family. Using five charge modules with an L15A1 round at 21 °C, the mean muzzle velocity expected when using the modular charge with a 39-cal. system is 810m/s.



The M777A2 is one of the 39 cal. artillery systems that has undergone tests and been proven compatible with Rheinmetall's Tactical Modular Charge System. Pictured: US Paratroopers engage ISIS militants with precise and strategically placed artillery fire in support of Iraqi and Peshmerga fighters in Mosul, Iraq, July 6, 2017.

For 52-cal. guns, compatibility has been demonstrated for the PzH 2000, CAE-SAR, FIRTINA, ARCHER, SIAC Howitzer, and KRAB, as well as with ammunition used by them, including US M107 family, UK L15 family, German DM family, South African Assegai family, French LU211, various Scandinavian Nammo projectiles, Turkish MOD274, Spanish ER02A1 family, Diehl/Leonardo VULCANO, and US EXCALIBUR (first used with first modular charges in Iraq in 2007). Using six charge modules with an L15A1 round at 21 °C, the mean muzzle velocity expected from a 52-cal. howitzer is 945m/s.

During the test firing at the Alkantpan proving ground in South Africa (mentioned earlier) at the end of 2019 and using the Tactical Modular Charge, three new maximum ranges were attained with different guns. A 52-cal. G6 howitzer hurled a shell 76 km, the longest range ever attained by a conventional 155mm artillery projectile. The 52-cal. main gun of the PzH2000 self-propelled howitzer achieved a range of 67 km, while a 39cal. field howitzer reached 54 km. Several hundred thousand Tactical Modular Charge modules were delivered last year to an unnamed international customer following a contract win in Q2 2020.

#### **Modular Charge Mentions**

Towards the end of last year, 2021, having finalised the qualification of its new modular charge for 155 mm artillery systems in May following development achieved in less than 18 months, Eurenco

#### ARMAMENT & TECHNOLOGY

Photo: Elbit



signed a deal with an undisclosed European customer for the delivery of over 200,000 of its new modular charges for 155 mm artillery. The company had already signed its first NATO customer for modular charges in September. Drawing on the expertise of both its Bergerac (France) and Karlskoga (Sweden) teams in the development, 3D printing of energetic materials was used for the first time on a robotised production line allowing large

series production of the modular charge system to be undertaken. Nexter had previously placed a major order with Eurenco for 70,000 modular charges in 2020 for its CAESAR 155 mm

SP artillery system, which were delivered last year to the French Army and meet NATO JBMOU standards, i.e. compatible with all 155mm artillery systems



*Rheinmetall's* 155mm V-LAP round with course correction fuze being fired in tests.



The Unified Charge Module (UCM) from Elbit enables automatic and semi-automatic guns to increase their firing rate and improves their accuracy by handling only a single type of modular charge with higher consistency of velocity and minimised barrel tear. UCM is JBMOU compliant.

that meet this standard. Two types of charge module, live and slow, replace traditional bagged charges and enable faster loading times, smaller logistics footprint, safer transport and handling and an overall improved rate of fire. Between one and six charge modules are required depending on the range required in a fire mission.

An excellent example of the importance of modular charges on a new weapon platform is their use with BAE Systems Bofors' new ARCHER FH77 BW L52 Self-Propelled Howitzer unveiled in 2019. The gun carries 20 x 155 mm projectiles in its fully-automatic magazine, which are loaded and fired with remote instructions from the crew from their armourprotected, remote-controlled weapon station. An additional 20 projectiles and respective charge modules are available onboard for reloading the magazine. Bagged charge systems would simply not work with this platform. ARCHER uses NATO modular charges or the Bofors Uniflex 2 modular charge system, which comprises two sizes of combustible modules, one full-size and one half-size module. Both are filled with the same IM, N-guanylurea-dinitramide (FOX-12 or GuDN), propellant. By using the modular charge system, the gun's multiple rounds simultaneous impact (MRSI) capability is improved and good range-overlap between the increments can be achieved.

## Shells, Bombs, Zeros and Ones

#### **Thomas Withington**

Tactical cyber warfare is now a reality on the battlefield. Its importance will only increase in the coming years as its potential is realised.

uring Russia's first intervention in Ukraine when she invaded and annexed the Crimea peninsula in February 2014, her armed forces eagerly used tactical cyberwarfare. Tactical cyberwarfare is specific branch the wider of cyberwarfare discipline. The US Army defines it as cyber operations performed at the Corps level and below. Strategic cyberwarfare attacks a country's Critical National Infrastructure (CNI). This includes a panoply of targets from domestic utility industries to political institutions, commerce and even the population. In wartime, this aims to degrade a country's war-making potential. In peacetime, it aims to protect the country performing the attack by keeping its opponents off balance. This can be achieved through political, social and/or economic dislocation and disorganisation.

Operational cyberwarfare is waged against an opponent's armed forces. It can occur shortly before war commences once a hostile force has deployed and war seems inevitable. Once battle begins, operational cyberattacks will continue. Operational cyberwarfare will be waged against the Command and Control (C2) apparatus of the red force. This might include attacks against hostile battle management systems. It may also include attacks against the CNI of the red force supporting that deployment. This may see cyberattacks against electricity utilities providing power to red force operational headquarters, for example. Red force government ministries assisting the war effort may also find themselves under cyberattack.

Tactical cyberwarfare concerns itself with cyberattack and defence at the tactical edge. This could see cyberattacks against red force platoon or squad battle management systems. These cyberattacks could extract useful intelligence from red force

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

**Thomas Withington** is an independent electronic warfare, radar and military communications specialist based in France.



The offices of Russia's Internet Research Agency in St. Petersburg. This organisation is tasked with waging cyber warfare against Russia's perceived enemies. It may also assist the tactical cyberwarfare efforts of the Russian Army.

computers and networks while inflicting damage or dislocation. Lines between these levels of cyberattack will often blur and they will most likely be performed concurrently.

#### First Time Around

Several incidences of tactical cyberwarfare by Russian cadres were recorded during the 2014 intervention. Key to this was the exploitation of cellphones used by Ukrainian forces. Open-source evidence suggests that Russian Communications Intelligence (COMINT) cadres exploited the Signalling System 7 (SS7) cellphone protocol. SS7 is used globally allowing one mobile phone user on one network to call another user on another network seamlessly. For example, a caller maybe on France's SFR network and they want to call someone else on Germany's T-Mobile network. SS7 ensures this can be done without the user ever noticing that they are talking to someone on another network. The protocol handles the information needed to move a call or text message from one user to another. It ensures that the person is correctly billed for this call or message, and enables roaming when the user's phone is on a foreign network.

An article by The Guardian newspaper in April 2016 showed the effects of a hacker accessing a network's SS7 protocols. Should they gain access, the hacker could steal reams of information on that network's subscribers. This can include details on their identity, where they are whenever their phone is switched on, text messages and calls. All of this can be done without anyone on the network being any the wiser. An article on the firstpoint-mg. com website said that this gives the hacker capabilities normally confined to signals intelligence agencies. All a hacker needs to get into an SS7 network is a computer using the Linux operating system. This will run the open source SS7 SDK software used to access the network. Once connected, the hacker can target subscribers while the network will assume that the hacker is a merely another node. It would not be surprising if hacking of this nature was performed

## Interview with Eva Stein, Managing Director, Hirtenberger Defence Europe GmbH

**ESD:** Please tell us about the history of Hirtenberger and how the company identifies itself now.

Stein: The company was established in Hirtenberg 162 years ago, so it has a very, very long history, through many ups and downs and different businesses, but always military businesses. We have a workforce of around 100 in Austria, and an administrative HQ in Hungary. At present the company is targeting a niche, which is the mortar market. We identify ourselves as a mortar company, meaning we provide the customer with full systems; we have a system approach offering complete solutions for the customer, not just weapons and ammunition but also all the services and support: ammunition, lifecycle management, communication, environmental testing, everything from training to end of life disposal. Our main manufacturing facility is in Austria in Hirtenberg and we have capabilities also in the UK in Middle Wallop. We do customer-specific development, something we are able to offer as mortar specialists: we focus on understanding the customer's needs and specifications, and based on that we can develop a targeted solution for the customer. That is our strength and that is what we are offering in the market: it's unique.

**ESD:** You are now under Hungarian MoD ownership, with Austrian roots. How does ownership by the Hungarian MoD work for you?

Stein: The impact on the company in Austria is very minor because the Hungarian owners consider the business as a business, not merely an investment - which is where I, as a business professional, play my part. They are keen that we return positive results, while we are maintaining our customer relationships and showing increasing profits and sales. The Hungarian MoD supports us in that the Hungarian Government has different connections from ours, as a business, and if we merge the two together that is a great opportunity to grow the company, especially in our main markets in Western Europe. That is still the current customer base of Hirtenberger, and the company name is Hirtenberger Defence Europe because the main target market is Europe - although of course we have customers in Asia and we even have customers as far afield as New Zealand. Being relatively free of export restrictions like ITAR is also useful.



**ESD:** We are seeing a lot of disruption to global supply chains as this year progresses; what is the situation for Hirtenberger?

**Stein:** The global supply chain nowadays is a challenge for all companies, not just because of the price increases and fluctuations, but also in lead times. We are currently faced with very long lead times and although we are taking measures to secure our supplies, providing long term forecasts, establishing long term contracts with our suppliers, booking capacity and so on, in some cases it is really a challenge for our suppliers to meet these agreements. And we are also looking for alternative sources in some areas, for example fuses, where we need products that fit the financial profile of the markets.

**ESD:** At DSA in Malaysia earlier this year you introduced your new Mortar Fire Control System: how are things developing on that and are there additional new developments?

**Stein:** We have many novelties which we've just started to present to the market! Our Mortar Fire Control System from New Zealand is fully developed but being continually and actively refined, renewed and developed further. We are also very proud of our digital aiming devices: across all calibres from 60mm Commando to 81 and 120mm weapons, we have digital solutions that enable our customer to use the weapon more efficiently, greatly improving accuracy and effect, and allowing the mortars to be included in any local fire control system or indirect fire plan. And with increased effectiveness comes better survivability through reduced time spent on a firing position.

**ESD:** Are your factories at full capacity at the moment?

**Stein:** Yes, our factory is working at full capacity, and that is our plan for next year – but well within two years we will be offering a new ammunition nature, with increased lethality. That is now in the final stage of development, and most probably will be manufactured in Hungary: we will be bringing it to market very soon.

**ESD:** So that is an important development... Stein: Yes, but I think we should emphasise our digital systems, because digitalisation is a very important direction for the company. Previously, Hirtenberger was based on two "legs" - the weapon and the ammunition, that was all, nothing else. But then we started to work on and exploit digitisation and digitalisation, leveraging the benefits of highest quality in design and manufacture, predictability, accurate information, to enhance the capabilities of our products in the field. This is important, and is complemented by our focus on services around our products portfolio. A key factor for our customers is what we can deliver on top of the product: full support during the full life cycle of the weapon and ammunition.

**ESD:** Ms Stein, thank you very much.

against Ukrainian cellphone networks by Russia's Internet Research Agency (IRA). Based in St. Petersburg, northwest Russia, the IRA is believed to perform cyber warfare on behalf of the Russian government.

#### Russia's Internet Research Agency

Subscriber information collected by hacking the SS7 protocols used by the Ukrainian cellphone networks was most probably transferred to Russian Army cyber warriors in the theatre of operations. Subscriber information could be used to target specific Ukrainian troops or their families. Open sources say these individuals were sent demoralising text messages. This included family members being told their partners or relatives had been killed in combat. Likewise, Ukrainian soldiers received text messages purportedly from their commanders relaying false or misleading information. Subscriber information obtained by SS7 hacking helped identify the position of Ukrainian troops based on their cellphone activity.

Russian Army Independent Electronic Warfare Brigades were believed responsible for this aspect of the electronic battle. Each of the Russia's Military Districts has at least one Independent EW Brigade. They provide electronic warfare at the operational level across the theatre of operations. Each EW brigade has a single RB-341V Leer-3 electronic warfare system. This consists of three Orlan-10 Uninhabited Aerial Vehicles (UAVs) and a single C2 vehicle. Cellphone networks are directly targeted by the RB-341V. The UAVs are equipped with a cellphone detection and electronic attack payload. Sources familiar with the RB-341V's capabilities say the system targets GSM-900 and GSM-1800 networks. These use wavebands of circa 876 megahertz/MHz to 960MHz, and 1.7102 gigahertz/GHz to 1.8798GHz respectively. The UAVs will jam local cellphone nodes within range and assume the role of those nodes. This allows the RB-341V's operators to effectively take control of any network within range of the UAVs. Once in control they can target cellphone users retrieving information, determining the location of the phones and their users and distributing false, misleading or demoralising traffic. Given the Orlan-10's maximum altitude of 16,404 feet (5,000 metres), each aircraft could cover an area of 266,582 square kilometres (102,928 square miles).

#### **Cyber Warriors**

Russian cyber warriors were also able to exploit specific operating systems used by the smartphones and tablets of Ukrainian



The logo of Russia's Fancy Bear cyberwarfare unit believed to be part of Russia's GRU military intelligence organisation. Fancy Bear is thought to have developed the X-Agent malware which infected the Ukrainian Army's Correction D-30 artillery fire control software.

troops. Fancy Bear is a Russian cyberwarfare group believed to be affiliated with the country's GRU military intelligence service according to American and British intelligence assessments. Cyber security firm CrowdStrike said that between 2014 and 2016 Fancy Bear infected Android devices used by Ukrainian troops with malware. Fancy Bear's malware was called X-Agent. In the wake of Russia's first invasion of Ukraine in 2014, the Ukrainian armed forces embarked on a modernisation of its materiel. This included the development of a new artillery fire control software called Correction D-30. The software was designed for tablets using the Android operating system. The aim was to reduce the targeting time for Ukrainian Army 2A18/D-30 122mm howitzers to under 15 seconds. X-Agent worked to infect tablets running the Correction D-30 software. Given that Correction D-30 was used for fire control the tablet would use the position of the troops to compute artillery fire control solutions. According to a 2018 article in the US Army's Infantry journal by Captain Stephanie J. Seward, up to 9,000 Ukrainian personnel may have inadvertently downloaded X-Agent.

X-Agent would infect the tablet and extract information on its tablet's location. By determining the tablet's location, Russian cyberwarriors would get a reasonably accurate indication of where an artillery unit was. This unit could then be targeted with counterbattery fire or air attack. X-Agent could also reveal which other devices this tablet was linked to. This would reveal Ukrainian chains of command to the Russian cyber warriors, the article continued.

How X-Agent infected the tablets prior to the conflict remains unknown. However, once the war was underway, it seems likely that Russian Army RB-341V systems could have performed this task. US Army analysis says that some malware had been delivered to Ukrainian soldiers' cellphones via pictures of their partners or families. X-Agent was highly flexible. The Infantry article asserts that it was also used at the strategic level. Notably to hack the Democratic Party National Convention in the United States before the 2016 US presidential election.

#### **Hacking Local Networks**

It would seem reasonable to assume that the process of hacking a local SS7 network in the Ukraine theatre would allow Russian cyberwarriors to determine the identities of Ukrainian troops based on their cellphones. Once their identity was known it may have been relatively easy to determine the soldier's social media presence. This could probably be done via a simple web search. Alternatively, obtaining information on that individual's phone via the SS7 hack may yield similar information. Once the individual's social media presence accessed, it may be quite easy to gather pictures of family members or partners. Likewise, the SS7 hack may also reveal the phone numbers and contact details of loved ones. Then, it would just be a matter of using the photographs as a means of inserting the malware. This was most probably done by using either an email, text or social media message purportedly sent be a loved one. Once Russian cyber warriors had access to the soldier's phone, they would be able to not only determine that soldier's presence based on their cellphone's location. They could also use this information to deliver malware along with false or demoralising text, email or messaging traffic.

Intriguingly, X-Agent may have been deployed since 2013, according to Crowd-Strike's assessment. This would indicate that preparations for Russia's invasion one year later were already well underway. X-Agent seems to have had an impact on the performance of Russian counterbattery fire. Figures produced by Henry Boyd of London's International Institute of Strategic Studies think tank estimated that up to 20 percent of Ukraine's artillery force may have been destroyed during hostilities from 2014 onwards. What was interesting about X-Agent was that it may not have been developed for solely tactical tasks. Adam Meyers, CrowdStrike's head of intelligence, says the malware was ostensibly a tool exploiting information held on smartphones. That it had a tactical benefit in terms of destroyed Ukrainian artillery cannot be ignored. X-Agent also makes clear the direction of travel for tactical cyber weapons.

#### **Mitigation**

At the most basic level, one way for a deployed manoeuvre force to practice good tactical cyber protection is to greatly restrict, or even prohibit, the use of civilian standard cellphones or tablets on the battlefield. It is noteworthy that the US Army's Integrated Tactical Network (ITN) equips soldiers with an Android tablet. The ITN is a tactical network for the manoeuvre force handling non-classified data and voice traffic. That said, these tablets are still being configured with highly robust militarygrade cyber protection.

The US Army stresses that tactical units at Corps level and below must be able to organically protect their own networks against cyberattack. If they do not possess these capabilities organically, they must have easy and ready access to them. Allied to this is the units' ability to perform realtime cyberattack prevention and detection. Responses to cyberattack should include deception, blocking the attack and/or denying access to targeted networks. 'Going analogue' should also be inculcated and reinforced through training. Troops must be comfortable fighting without digital assistance if the need arises. Reports prior to Russia's 2022 invasion of Ukraine say this was a skill the Ukrainian Army honed to an impressive level.

Troops must be made aware of exactly how dangerous it is to use their own wireless devices in theatre. X-Agent and its effects should concentrate minds. Ideally, individuals should always assume that their own devices can be hacked easily and can give away their position and other intelligence. Always assuming one's device has been compro-



A Ukrainian Army gunner is seen here standing next to a D-30 howitzer. Russia targeted artillery fire control systems with malware during her 2014 invasion. The malware targeted devices using the Android operating system.

mised, even when it has not, should help foster a tactical cyber protection mindset. Last but not least it is imperative to anticipate the attack. Capt. Seward's article offers salutary advice: When large-scale cyberattacks begin hitting civilian targets, tactical commanders should know that their units will soon be in the line of fire.

#### **Electronic Attacks**

At the tactical level, cyberattack will almost certainly be delivered via electronic attack. The Russian Army's use of the RB-341V Leer-3 system is instructive. Traditionally, electronic attack at the tactical edge against land forces has focused on the use of noise jamming against hostile radio networks. Electronic attacks may also include false or misleading radio traffic to confuse one's enemy. As warfare develops a third type of electronic attack must now be considered. These attacks are likely to carry malware. Therefore, cyber protection becomes part of the wider electromagnetic manoeuvre doctrine. This works to preserve one's own use of the electromagnetic spectrum while denying it to one's adversary. The aim is for blue forces to achieve Electromagnetic Supremacy and Superiority (E2S). This is the condition where the red force can only sporadically, or ideally cannot at all, interfere with the blue force's use of the spectrum. The perils of tactical cyberwarfare will only increase in the future. The advent of the Internet of Military Things (IOMT) will give an adversary scores more targets for cy-

berattack. The civilian Internet of Things sees the networking of devices beyond computers and communications systems to allow them to share data. The IOMT will mirror this in the military domain. Everything from ground surveillance radars to armoured vehicles, weapons and even soldiers will continually share data on their situation. Sensors in a soldier's uniform will share details of their heart rate and perspiration, for example. Sharing this information with a tactical battle management system will automatically alert a commander when their troops need rest. Likewise, armourers will be able to see exactly how much ammunition an infantry fighting vehicle is expending during a firefight. Such information will probably be shared in IP (Internet Protocol) form across 5G (fifth generation) wireless networks. The continued exchange of information across the battlefield will serve to enhance commanders' situational awareness, provided it is correctly managed. Nonetheless, these networks and the devices themselves create more potential entry points for cyberattack.

The events in Ukraine represent only the start of tactical cyberwarfare. Its use will only increase in the coming years. North Atlantic Treaty Organisation and allied nations must be ready to withstand cyberattacks at the tactical level. They must also ensure that they can harness tactical cyberwarfare for their own advantage. To do so will be an intrinsic part of winning and sustaining E2S on the battlefield.

## How the French Army Prepares for the Battles of Today and Tomorrow

#### Jean François Auran

#### French Army Operational Preparation (Prepa Ops)

Under the authority of the chef d'étatmajor de l'Armée de Terre (CEMAT), the objective of the Préparation Opérationnelle (Prepa Ops) is to prepare soldiers for the conflicts of today and tomorrow. The hypothèse d'un engagement majeur (HEM), which had anticipated the comeback of high-intensity conflicts, was confirmed by the outbreak of the conflict in Ukraine. Confronted with this new paradigm, operational preparation needs to be adapted.

The preparation of air-land forces is one of the CEMAT's prerogatives. The Commandant des Forces terrestres (COMFT) manages the land forces' operational engagement. The Commandement de l'entrainement et des écoles du combat interarmes (COM E2CIA) is in charge of the implementation. The unit's operational preparation is based on training at the individual and collective level in a combined joint or multinational environment.

#### **Recent History**

The preparation of units for combat has always been a permanent concern of the French General Staff. In the aftermath of the First Gulf War (1990-1991), the French forces decided to increase the realism of their operational training. The short land campaign had also demonstrated the lack of interoperability of French troops with their allies. In 1993, the Experimental Training Centre (CENTEX) was created in Mailly-le-Camp. The end of the Cold War, the reduction in the structures of the armed forces and the arrival of powerful computer resources put an end to important exercises in open terrain. At the end of the 1990s, a model was consolidated in which command posts (CP) were deployed in a reduced "command post exercise" (CPX) format.

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

**Jean François Auran** is a retired French Armed Forces officer and a Defence and Security Analyst.



Created on 1 July 2018 in Mourmelon-le-Grand, COME2CIA is positioned as a central player in implementing the SCORPION programme and preparing units for combat. It takes up the traditions of the 12th Light Armoured (School) Division characterised by the GRIFFON.

## COME2CIA, a Key Player in Operational Preparation

The COME2CIA was created on 1 July 2018, by the Commandement de la Préparation des Forces (CCPF) merger with the l'École du combat interarmes (ECIA). Its headquarters are in Mourmelon and Mailly-le-Camp in the Champagne-Ardenne region. Operational preparation is based on four speciality schools (infantry, artillery, cavalry, and engineers) for individual training and there are also eleven specialised training centres. Each year, the COME2CIA evaluates 56 per cent of land forces in its specialised training centres.

Operational preparation is organised on an annual basis which alternates the training, preparation, and projection every four months. All preparation phases end with unit certification, the ultimate step before deployment. In the aftermath of the 2015 terrorist attacks, the Army drastically reduced operational practice due to its commitment to the national territory. Despite the numerous missions, the Army seeks to preserve the preparation of the units. The 2030 operational ambition is based on a



The 5th Regiment of Dragoons constitutes the CENTAC's s opposing force. Equipped with LECLERC and VBCI, it is a reactive enemy that seeks to achieve its objectives.

resumption of operational practice with renewed training - a continuum and highguality training infrastructures.

#### **COME2CIA Specialised Training Centres**

The Army has several centres for unit preparation, close to Reims, near the First World War's battlefields. The Centre d'Appui et de Préparation au Combat Interarmes (CAPCIA-51st RI) provides and maintains the Mourmelon, Suippes and Moronvilliers camps, with an area of 32,000 hectares. It manages the Centre d'entraînement au tir interarmes (CETIA) and its multiple practical shooting ranges, including 'Symphonie', with more than 550 targets. Let us look at the distinct types of training and the associated centres.

#### **Combat Training**

The Sous groupement tactique interarmes (SGTIA), a reinforced company or squadron with engineer and artillery teams, is vital for the Army. Every month, for 15 days, several of them deploy to the Centre d'entraînement au combat (CENTAC/1e BC) in Mailly-le-Camp. They come to train in the fundamentals of combined arms combat and are evaluated using simulation systems, an opposing force (OPFOR), 3D assets,

and CENTAC analysts' experience. The first week focused on reminders and preparation through simulation.

The SGTIAs deployed in the field during the second week. The actions are under the control of the operational centre called 'Centaure' with the support of instrumented simulation. There are 40 observer-refereesadvisers (OAC) who follow the units in training as closely as possible. The shootings are simulated, and their effects are considered by the OACs, who ensure the realism of the combat and confirm destruction and losses. For each rotation, the SGTIA faced the units of the Fifth Dragoon regiment, which acts as an opposing force.

#### **FIBUA** Training

The training centre for fighting in built-up areas (FIBUA) (CENZUB/ 94th RI), created in 2006 in the Sissonne camp, trains French and allied units for urban area operations. The idea of its construction appeared after the war in Kosovo (1998-1999), which was marked by countless engagements in highly built-up areas. The centre has a permanent OPFOR which acts coherently during engagements. There are three training sites on the camp; the combat town of Jeoffrécourt, with an area of one hectare, is equipped with a complete instrumented simulation system and an industrial zone. There is also

a shooting complex in urban areas called CT ZUB, where specific live ammunition shots are conducted at platoon level. Each year, 22,000 soldiers, 10 per cent of whom are foreigners, train for action in urban areas, which has become a mandatory step before deployment on operations (OPEX).

#### **Command Post Training**

Because of the lack of training and control of command posts, the Army Staff created the Centre d'entrainement des postes de commandement (CEPC/3rd RA) in the 1990s. It has relied on various simulators but has been using the Simulation pour les Opérations des Unités interarmes et de la Logistique Terrestre (SOULT) system since 2015. The CEPC participates in the preparation before deployment and in evaluating brigade CPs with the support of qualified reservists. Senior officers and generals analyse the brigade's action and draw lessons for the Brigade Commander and the land forces.

#### Specialised Training and **Commando Skills**

To conduct this type of training, the Alpes-Pyrénées centre brings together the Centre National d'entrainement commando (CNEC/1st Choc) in Mont-



CTA international is a joint venture company between:

BAE SYSTEMS

Photo: Armée de Terre



Practising on-board weapons is one of the fundamentals of operational preparation. Simulation saves some costs, including for armour and artillery systems.

louis, the Groupement aguerrissement montagne (GAM) in Modane, the 17th Groupe d'artillerie (17th GA) in Biscarosse, as well as La Courtine and Larzac camps.

The COME2CIA also has the Provence pole, located on the Canjuers camp (Var), with 35,000 hectares. It is dedicated to shooting, at specific training courses (piloting and armoured shooting), to the final conditioning before operation projection and training on new equipment. As the centres are heavily used, the Army is recreating operational readiness facilities within the regiments. For operational training in the overseas departments and regions (DROM),

the French Army uses its presence in South America, the Indian Ocean, and the Pacific to develop regional cooperation and organise exercises. A partnership exists between Brazil and the armed forces in Guyana. We can cite the Croix-du-Sud exercise, regularly scheduled by the armed forces in New Caledonia (FANC) and the last edition, which involved ten countries. At a more modest level, Tagata Toa 22 is an exercise conducted from 25 April to 7 May 2022, by the Régiment d'Infanterie de Marine du Pacifique-Nouvelle Calédonie (RIMaP-NC) took place with the participation of detachments from Australia and New Zealand.

## The Future of Operational Preparation

Western countries' training systems have been adapted to the threat, even if the operations in Afghanistan have highlighted the need to adapt continuously. The land forces announced that they want to tighten operational preparation to respond to the likelihood of a high-intensity engagement. Therefore, the training will be more



CENTRE D'ENTRAINEMENT AUX ACTIONS EN ZONE URBAINE: 3 semaines de combat de haute intensité Contrôle d'un groupement tactique interarmes (1000 combattants) puis de sous-groupements tactiques (250 combattants)



The training centre for actions in urban areas (CENZUB) was opened in 2006 at the Sissonne camp for urban combat training for French and allied army units.

combined, with the participation of other Services. The traditional artillery live-firing are now combined with drone missions in a realistic electronic warfare environment. This prospect should not imply though any significant transformation for armed forces that have maintained high-end capabilities since the 1990s. The COME2CIA considers it is a question of completing the "service offer" by continuing the development of national camps and centres to dedicate them to a higher level (combined arms group) by integrating all the functions (logistics, intelligence, air mobility).

The integration of drones in operational preparation is key. To take a whole part in the SCORPION info valued combat, drones must be able to be integrated into peacetime training. Therefore, it is necessary to develop, facilitate and produce drones in large quantities and at low cost, in order to simplify their use in training. Above all, there is a need to develop tactical training, allowing UAV operators, in the same way as a tank driver, to work with it equipment such as in wartime.

#### The Return of Major Open Field Exercises

The return of major open field exercises is coming soon with ORION 2023. The exercise's Phase O3 will see the intervention of the national emergency level (ENU), with 5,000 soldiers and in phase O4, the engagement of a multinational division. The CEMA had indicated that the field exercise would be multi-environment, joint, combined at the divisional level and would involve 17,000 to 20,000 men. Two Landing Helicopter Docks, the CHARLES DE GAULLE aircraft carrier with 40 combat aircraft, will participate. Belgian, British, and American forces could also be involved.

## The Contribution of Simulation

By 2030, force preparation will be based on increased use of simulation. The interconnection of simulators will make it possible to reproduce and adapt the simulation system to the complexity and diversity of the operational situations which the Army must deal with. Simulation is only a tool, but its imprint on the working processes of the Army is increasingly visible. Its appropriation by all operational functions for combat preparation is the challenge that the Army must face by 2030.

Simulation is one of the preferred paths for the years to come. For many years, it has been used in artillery or missile firing,



Urban warfare training (AZUR in French) involves armour and engineer elements reinforcing infantry units.



Urban warfare training



The French Army has long used simulation to prepare for operational engagement. France uses SWORD software from MASA under the name SOULT. It entered active service in 2015 at the Command Post Training and Control Centre (CEPC) and in all the training organisations.



The training integrates the return of the biological and chemical nuclear threat even in French Guyana.



During the joint exercise TAGATA TOA 2022 in the Pacific, French Marines train with the Australians and New Zealanders and develop their know-how in an allied environment.



**CENTAC** makes it possible to create realistic training conditions with instrumented simulation, the presence of a coherent OPFOR and the action of the OAC who provide credibility to the engagements.

armoured vehicles, or at the staff level with the venerable US system, JANUS. The simulation present at the lowest level makes it possible to reduce costs and overcome climatic conditions. Tests are taking place to develop the self-training of divisional command posts directly with regiments through their networked SOULT tactical simulators.

Finally, the simulation and the quasi-permanent manoeuvre areas between the four national camps of Champagne-Picardie should allow the general commanding the combined arms brigade (BIA) to train some 5,000 combatants from his regiments and the signal units, intelligence, and logistics. The ground-breaking ceremony for the construction of a NATO division training platform took place in Mailly-le-Camp, some weeks ago.

To conclude, operational preparation requires constant adaptation to threats of all kinds, and the Army is fully aware of this. Over the past 25 years, it has led its organic professionalisation. At the same time, it fulfilled the operational contracts and acquired a solid combat experience against an asymmetric adversary through its external operations. The objective is now different. Therefore, it is a question of raising and hardening the level of training of the GTIA, the divisional system being the heart of the target, to increase the overall combat power of the Army and win the first battle, within a coalition, and in an urbanised space.

#### The Opposing Force (FORAD)

At the Mailly camp

The 5th Dragoon Regiment (5th RD) belongs to the 7th Armoured Brigade. The regiment is equipped with the following equipment:

- LECLERC and VBL tanks for the three armoured squadrons.
- VBCI for the two infantry companies.
  VAB GEN and PVP for the mixed engineering and artillery support company.
  VBL for the reconnaissance and inter-
- vention squadron.

The regiment participates in the tactical experiments of the SCORPION programme for the new command information systems or the renovated LECLERC tank.

#### At the Sissonne camp

The CENZUB-94th RI comprises staff and three companies; the 1st FORAD company is an elementary combined arms unit. It represents the diverse types of adversaries the teams are likely to face on overseas missions.



smm-hamburg.com /msd

international conference on maritime security and defence

## Secure your position 8-9 sept 2022 hamburg

#### **Protecting the Seven Seas**

Join this high-profile two-day conference with renowned speakers from academia, defence organisations, navies and the naval industry discussing a broad range of security and defence issues that accompany our industry's and navies' security transition – including artificial intelligence, future military and nonmilitary threats as well as global and regional maritime security.



Hamburg Messe + Congress



# "We are concerned about Russia's aggressive actions that violate the sovereignty of independent states"



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 on that occasion, we have divided the extensive interview into two parts; the first part appeared in the May issue.

**ESD:** In which missions within the EU and NATO are the Hungarian Defence Forces involved?

**Ruszin-Szendi:** In accordance with ministerial and defence policy guidelines, the level of ambition of the Hungarian Defence Forces' (HDF) operational role is 1,200 service members. The Hungarian Defence Forces are also represented in NATO, the European Union and some coalition military operations.

When it comes to NATO operations, from mid-October 2021, a Hungarian General has been leading the NATO KFOR operation for a period of one year. Assuming command of the largest current NATO operation is of enormous importance to Hungary, both militarily and politically. By awarding the command post of Operation KFOR for one year, NATO has recognised the HDF's efforts to date in the Western Balkans. During the Hungarian command period, it is extremely important to take advantage of national-economic and diplomatic opportunities, but not at the expense of the commander's duties, but by supporting and helping them. However, it is important to state that maintaining our national visibility and prominent role in the Western Balkans will remain a priority even after the Hungarian command period ends. With regard to the capabilities deployed in the area of operation, it should be noted that in the recent period, the HQ KFOR contingent has also been reinforced with reconnaissance elements, which greatly contributes to the commander's operational decisions. Hungary is currently the second largest contributor to the military operation in terms of nearly 1,000 troops. In addition to the KFOR command position, the KFOR Operational Reserve Battalion was also offered, which in 2022 is providing a standby role from the territory of Hungary.

In addition, the so-called NATO Advisory and Liaison Team (NALT) provides strong support for local defence capability development in the form of advice and mentoring, helping the legitimacy of local defence and security governing bodies such as the Department of Defence.

In Iraq, the HDF also have special (C-IED, EOD and medical) instructors in the NATO Mission Iraq. Due to the pandemic and the deteriorating security situation, they operated at a substantially reduced level of operations last year. The Hungarian Defence Forces contribute a maximum of 30 service members to the NATO mission in Iraq, but only 11 posts have been granted to fill the command of this particular NATO mission.

It should be emphasised that the backbone of our involvement in Iraq is provided by our MH Training Contingent, which contributes 133 service members to the so-called Operation Inherent Resolve (OIR) multinational coalition operation. With its military capabilities deployed on the Iraqi battlefield, Hungary will be prominent in the MAG-N organisation, which prepares the Peshmerga (Iraqi Kurdistan Defence Forces) for international protection, and at Bashur Air Base to protect its forces and assets. The goal of the US-led international coalition remains to limit the influence and activity of the DAESH / ISIS (Islamic State of Iraq and Syria) terrorist organisation to a minimum.

With regard to EU operations, since the conclusion of the Dayton Peace Agreement, Hungary has played an active role in international peacekeeping and security and police missions in Operation EU-FOR ALTHEA in Bosnia and Herzegovina. Also in Bosnia and Herzegovina, we are continuously providing four members of the NATO Command in Sarajevo, where Hungary fills the position of Chief of Staff. Participation in the EU Training Mission MALI, which aims to establish/develop the operational capabilities of the Malian armed forces, illustrates Hungary's active contribution to peace and international security.

As an extension of our role in Africa (in the Sahel), we plan to participate in the special operation TAKUBA battle group of the French-led international coalition BARKHANE, for which we deployed an advance staff in Mali in November 2021. Since 2015, the HDF has been participating in the planning tasks of the EU NAVFOR MED IRINI operation.

The role of the Hungarian Defence Forces in the unarmed, civilian-led Georgian Observer (EUMM GEORGIA) mission has been limited to five officers since 2009. They are responsible for monitoring the border guard units, military and internal forces in the mission's area of responsibility and for verifying compliance with the peace agreement and other agreements in force.

In addition to NATO and EU military operations, the Hungarian Defence Forces also participate in UN operations including UNIFIL in Lebanon since 2006, the United Nations Peacekeeping Mission in Cyprus (UNFICYP), and the UN Election Assistance Mission in Western Sahara (MINURSO) since May 2000. We participate in four NATO operations, four EU operations, four UN operations, two coalition operations, and four support positions with a total of 943 personnel.

**ESD:** For the first time, Hungary provides the Commander of the Kosovo Force KFOR. What tasks does this mission still have? **Ruszin-Szendi:** As the longest standing NATO operation, the Kosovo Force is present to ensure a safe and secure environment and the freedom of movement for all in Kosovo, and by ensuring this, it positively affects the overall security situation in the Western Balkans. Working



Since the middle of October 2021, a Hungarian, Major General Ferenc Kajári, has been in command of NATO's KFOR mission for the first time.



Hungary is keen to participate in regional cooperation initiatives, especially in the context of the national framework groups and the Visegrad countries.

together with various international organisations inside the country (UNMIK, EU-LEX, OSCE), outside the country (EUFOR ALTHEA, NHQ Sarajevo, MLO Belgrade, Serbian Armed Forces), and the local institutions in Kosovo, it is truly a complex military deployment that requires finesse, political affinity, but also strategic military prowess and firm and steady leadership. The Hungarian command period builds its success on the foundation laid down by the previous KFOR Force commanders, and the most important aspects are continuity, teamwork, and reliability.

As for the tasks, KFOR performs a number of activities both on the kinetic spectrum (such as road patrols) and the non-kinetic field (such as liaison and monitoring team activities, CIMIC projects, etc.). KFOR - and NATO in general - is very well received and accepted by the local communities, and it remains the most valued security provider in the region.

**ESD:** How does Hungary assess the security situation in Europe, especially the role of Russia?

**Ruszin-Szendi:** We are concerned about Russia's aggressive actions that violate the sovereignty of independent states seeking to join the Alliance, and which disregard international law. Unfortunately, in the short term, we see no sign that Russian foreign policy is changing and respecting the democratic choice of the former Soviet member states with regard to the future path they wish to take. At the same time, despite Russia's behaviour, the Alliance's 'dual approach' principle must remain in place, as it is in our interest that political dialogue with the Russian side be maintained under all circumstances. This is all the more true now, in the situation along Ukraine's eastern borders, where the parties concerned must put dialogue at the forefront. At the same time, despite Russian behaviour, we must acknowledge and treat as a fact that the Russian Federation is a key player in the international system, playing a dominant role in many global and regional security issues. We must also be aware, especially in the current situation that we cannot talk about the security of Europe without mentioning Russia. In addition, and despite the existing sanctions regime, it is still an important economic and trade partner for many European countries, especially in the field of energy.

**ESD:** Does Hungary feel threatened by Russia's expansionist policy?

**Ruszin-Szendi:** In our assessment, Hungary is not directly exposed to the threats from the East, but we understand and respect the Allies' perceptions of threats on the eastern wing of NATO, and from time to time, we make significant efforts to protect the Baltic airspace as a sign of solidarity with them. After 2019, the next Hungarian role will be repeated in 2022 and then again in 2025.

**ESD:** The EU and NATO are currently working on policy papers. Many are calling for a common European strategy. Do you see a chance for this in view of the often-divergent positions of EU members?

**Ruszin-Szendi:** Both the EU and NATO are indispensable actors for Europe's security. There is therefore no alternative to close, mutually beneficial and effective Euro-Atlantic cooperation and the security guarantees provided by NATO. The strengthening of the EU-US strategic partnership follow-



Deputy Commander of the Multinational Corps Northeast Major General Ulrich Hellebjerg and Major General Denis Tretinjak, Commander of the Multinational Division Centre in front of the Headquarters in Székesfehérvár

ing the inauguration of the new US administration and the strong commitment of the European Allies and the US to strengthening the transatlantic relationship and EU-NATO relations are welcome.

Both the EU and NATO are currently undergoing a process of reflection in order to adapt to an extremely rapidly changing security environment, to be able to deal with growing challenges and threats. In addition to the EU Strategic Compass, a new Strategic Concept is being developed in NATO. Although the two organisations have different missions and responsibilities, and thus the two reflection processes are not the same, mutual information, transparency, complementarity and the avoidance of duplication are important, and this is an overall requirement for Member States and Allies.

The development of the Strategic Compass is well under way and is scheduled for adoption in March. Despite their differing perceptions and sensitivities of threats, Member States can agree on an ambitious yet workable package of measures to strengthen the Common Security and Defence Policy in the medium term. It is in Hungary's fundamental interest to maintain the cohesion of the two organisations and to mutually reinforce and complement each other, which Hungary intends to strengthen as an active and credible contributor to Euro-Atlantic security.

**ESD:** Hungary is setting up a Multinational Division Headquarters with Croatia and Slovakia. What role should this centre play in NATO?

**Ruszin-Szendi:** In order to increase the security of the Central European region and the security of its citizens, the Government of Hungary and its regional partners decided to establish a Headquarters Multinational Division (Centre, HQ MND-C) in 2018, given that there was no permanent NATO command and control element in the region of the Carpathian Basin to lead the reinforcement and operations in the hinterland, as well as the Allied Command for Collective Defence and Crisis Management.

The Division Command was established as an international military organisation on 5 March 2020, and it is stationed in Székesfehérvár. In the meantime, eight Allied nations (Poland, Germany, Italy, Romania, Slovakia, Slovenia and Turkey) have announced their intention to join the organisation, which is made up of Croatia, Hungary and Slovakia as frame nations.

The HQ MND-C is a deployable tacticallevel command element that ensures the integration of NATO contingents and capabilities offered into a larger tactical higher unit. In order to contribute to the maintenance of allied and regional security, it is able to lead these formations in the full spectrum of ground operations.

At the division level, the Command is effectively involved in the planning, organisation and conduct of Allied operations, coordinating the preparation and training of forces offered by partner nations to synchronise joint capability development.

Another military-strategic goal is for the HQ MND-C to participate in larger formations on its own or with combat elements based on the German-led Framework Nations Concept (FNC).

By activating the HQ MND-C and establishing a new NATO headquarters, the countries of the region will make a major contribution to strengthening NATO and to the Alliance's deterrence and defence efforts in the region of the Carpathian Basin. In addition, the Division Command also provides a platform for asserting national interests and presenting the results of force development, as well as providing a valuable opportunity for one of the main pillars of modern warfare, the soldier, to gain experience.

**ESD:** The digitisation of the battlefield is a major topic in all armed forces. How far along is Hungary on this path?



After Zalaegerszeg, Rheinmetall is also setting up a plant in Kaposvár to build LYNX infantry fighting vehicles; around 100 combat vehicles are to be built here annually.





Hungary is successfully continuing the development of the HUNTACCIS (Hungarian Tactical Command and Control Information System) battle management system.

Ruszin-Szendi: The Digital Force Programme, as such, has posed and still poses a significant challenge to us. The army that wants to meet the requirements of this day and age cannot do without it at any level. We are working together on launching this complex programme in multiple forums and platforms, as well as with potential contractors. The evaluation of the bids of the various economic actors is underway, after which the full digitizstion of the armed forces will begin. It is still too early to talk about the details, but I can say that some digital systems are already being tested within the army to make NATO-compatible and interoperable info communication systems available.

Within the framework of the MIP (Multilateral Interoperability Programme) cooperation, we are successfully continuing the development of the Hungarian HUNTACCIS (Hungarian Tactical Command and Control Information System) combat management software system. Although the development of such a complex tactical software package is a constant task and we are continuously doing it together with Hungarian developers, the current capabilities of the software package are already remarkable. By 2021, the software had already "collected" accreditation certificates for CWIX (Coalition Warrior Interoperability Exercise) exercises for interoperability. This process will not stop this year either. The brigade and battalion-level version of the software system is ready for the CWIX22 exercise planned in Bydgoszcz, Poland, where it will be validated according to official NATO standards. I think this will be a significant step towards the recognition of the Hungarian-developed HUNTAC-CIS software by NATO. Given that we are planning to implement Hungarian digital leadership with this software, we place an important emphasis on the excellent knowledge and management of the teams. An important aspect of capability testing in 2022 and beyond will be the stable operation of the leadership management system based on HUNTACCIS combat command software.

Another important stage in the force digitisation process is the "Digital Soldier" project. As part of the project, more and more of our soldiers have new and up-to-date tactical equipment. In addition, as part of the design of in-

dividual equipment, the digital systems of soldiers are being developed and tested. The Hungarian Defence Forces announced this programme as part of the Defence and Armed Forces Development Programme, with the aim of preparing our soldiers in the best possible way in terms of both technological and human capabilities in the future, giving them the tactical superiority they need to dominate the battlefield, so that they can engage in successful combat activities. The programme itself includes the acquisition of technological equipment, as well as development and training ideas for the physical, cognitive and mental skills required for the operation of the equipment and professional work, without which such training of soldiers would not be possible.

For my part, I confess that the opportunities offered by technology can only be fully exploited by trained soldiers. A piece of state-of-the-art combat equipment is no more than a piece of iron if there is no one to operate and handle it.

### The interview was conducted by Rolf Clement.

## Swedish Army to Build-up Four Fully Equipped Brigades Lars Hoffmann

According to the Commander of the Swedish Army, Major General Karl Engelbrektson, the war in Ukraine underlines the importance of forces on the ground.

n response to the threat against his country, at a live demonstration of various shoulder-launched weapons from Swedish manufacturer Saab at the Swedish Armed Forces' Land Warfare Centre in Kvarn in May, Sweden's Army Commander told 300 participants that the Government had ordered him to build up a total of four Army brigades, a battle group on Gotland, as well as a divisional command.

"We are not threatening anyone," the general stressed. The point, he said, was to be able to defend Sweden's entire territory against a sophisticated adversary. Engelbrektson pointed out that when he joined the Army some decades ago, the Swedish Armed Forces had 36 brigades and a wartime strength of 850,000 soldiers.

Following the Russian invasion of Ukraine, two non-NATO countries, Finland and Sweden, are currently discussing joining the Alliance. The majority of the populations in both countries now seems to be in favour of joining, after such a step was considered highly unlikely just a few months ago. Observers assume that a political decision could be made soon. At the same time, Russia is threatening both countries with consequences should they join.

According to Engelbrektson, the Government's requirements virtually mean doubling the size of the Army within ten years. "For the first time in my career, I do not see money as the problem," the general said. In doing so, he said, the Government has even gone beyond the wishes of the military, which had originally asked for only three brigades, two battle groups and a divisional command.

#### **Protective Bubbles**

The restructuring of the forces is also about creating a command suitable to integrate allies. Moreover, the Anti-Access Aerial Denial (A2/AD) capacities of the brigades would also have to be created. According to the plans, these brigades should have their own artillery, air defence and engineers. This ranges from air defence with a range of about 70 km, to rocket artillery with ranges up to 150 and 300 km, Engelbrektson explained. In this context, he spoke of mobile "protective shields or protective bubbles" that the brigades should set up to defend themselves against an enemy. In each bubble, sensors should be optimally connected with effectors. One goal is to fight the armoured enemy "beyond the line of sight". According to Engelbrektson, it is important to procure new weapon systems with training and simulators together and to ensure that the simulators can reproduce real ballistic effects, Engelbrektson even if this sometimes meant equipping fewer weapon systems. This is because training and exercises are sometimes undervalued in the procurement process, he stressed.





The war in Ukraine underlines the importance of forces on the ground. Swedish Army soldiers on exercise.



Like Finland, Sweden is considering to join the NATO Alliance and apply for membership in the course of this year.

## The Importance of Camouflage

The general places importance on the topic of camouflage - both in terms of equipment and training. Those who camouflage better win the battle, because they can act faster in the so-called OODA loop - meaning a military decision loop in which information is processed and translated into concrete military actions - while the enemy is still hesitating. Apparently with an eye on Saab, the manufacturer of the multispectral Barracuda camouflage solutions, Engelbrektson demanded that the latest camouflage technology should not be openly displayed so as not to allow an opponent to draw conclusions about one's own capabilities. The general also sees a need to catch up in the use of drones. Sweden needs to make faster progress in this area.

Engelbrektson draws the conclusion from the Ukraine war that, in the end, it is the capacities of industry that matter in order to win. In Sweden, he says, there is close cooperation between the Army and the procurement agency FMV, which is informed precisely about the needs. Unfortunately, they now see that many of their own systems are now "combat proven".

## Combat Support Service of the French Land Forces

#### Jean François Auran

#### The Major Commitment Hypothesis (HEM) - the current concept and how to deal with it

Modern armies are highly dependent on their logistics due to their advanced mechanisation and the multiple resources needed to be brought to the front. The overseas operations in which France has been engaged for nearly 40 years have imposed a constant strain on those engaged with its operational logistics. L'hypothèse de l'engagement majeur (HEM) could change the situation due to more significant combat attrition and the increased masses and volumes required to be transported.

#### The Logistics Concept and Assets

Logistics is defined as the set of activities aimed at providing the forces, at the required time and place, with medical support, maintenance, energy support, combat support and supplies, all in a coordinated manner. Therefore, operational logistics consists of orchestrating the engagement of these capabilities and maintaining the unit's combat strength.

In the French Armed Forces, operational logistics is conducted at both the joint and strategic level by the logistics office of the Centre de planification et de conduite des opérations (CPCO/J4). The Centre du soutien des opérations et des acheminements (CSOA) oversees the implementation and relies on Armies and Joint services, which provide local expertise and resources.

The Joint Theatre Support Group is designed to receive and push forward all assets and resources at the operational level. We can find logistics units at the corps or division level, at subordinate levels with brigade (non-organic) and the combined arms battlegroup (combat train n°2 – TC2). The scope of the manoeuvre depends on the logistics section of the Army Corps or Divi-

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

**Jean François Auran** is a retired French Armed Forces officer and a Defence and Security Analyst.



The Force Logistics Command (COM LOG) is a divisional command subordinate to the Land Forces Command (CFT).Located in Lille, it represents a logistics force of more than 10,000 soldiers

sion level. Brigades and GTIA then conduct the logistical manoeuvre. In recent years, the French Army has changed its logistics and has decided to lighten the first echelon units in order to maintain mobility, flexibility, and speed in the manoeuvre. The aim is to find the right balance to meet the requirements of the tactical manoeuvre while having the right level of support.

#### Logistics is a Joint Responsibility

With the implementation in 2010 of measures related to the general review of public policies (RGPP), the imperatives of performance and rationalisation have caused a massive reduction in the support workforce, triggered a profound reorganisation, and an increase in dependence on external service providers. Since 2011, the defence bases and support groups have administratively and financially supported units of the three services. Therefore, the logistics organisation is based on joint services (SSA, SEO, SIMu) and joint directorates. The Army no longer has doctors, ammunition, or infrastructure engineers. The Joint Services make resources available, i.e., personnel and assets. The support organisation in functional chains with so many operators, sometimes with different logical approaches, constraints and imperatives, has made the support operation more complex. In the beginning, it affected the confidence of the combat units in the new system's effectiveness.

The French Army was reorganised in 2016 as part of the "Au contact" plan, which puts the divisional level at the centre of its organisation under the Land Forces Command (CFT) authority. The Army today has two divisions that constitute the SCORPION force. The 1st Division, whose headquarters is in Besançon, includes the 7th Armoured Brigade, 9th Marine Infantry Brigade, 27th Mountain Infantry Brigade and the Franco-German Brigade. The staff of the 3rd SCORPION division is based in Marseille and includes three brigades (light, medium, and heavy), namely the 11th Parachute Brigade, the 6th Light Armoured Brigade and the 2nd Armoured Brigade. With the organic elements of the land forces, this forms an operational force of 77,000 deployable women and men. The Army has two Corps-level HQs (RRC-Fr and Eurocorps), which form the highest tactical level of employment, and each possesses a powerful logistics division.

In the field of support, there are several command structures. The Structure intégrée du maintien en condition opérationnelle des matériels terrestres (SIMMT) and the Service de la maintenance industrielle terrestre (SMITer) are in charge on maintenance support policies and their implementation. The Force Logistics Command (COM-LOG) is the logistics command for the land forces. As the integrator of logistics functions, its mission is to coordinate and ensure the operational logistics preparation of the units for engagements. It is also responsible for optimising the use of the Army's road transport capabilities and logistics command structures.

#### LE COM-LOG, Support Integrator

The COM-LOG is a staff of around a hundred people based in Lille, as close as possible to the Land Forces Command to which it is subordinate. Under the authority of a Major General, it brings together 10,500 active and reserve women and men. COM-LOG controls a logistics force command post (PCFL) with 180 soldiers, based in Montlhéry to the south of Paris. This staff can arm national and NATO command structures like the PC SNF (French national support), PC GSIAT, and JLSG (Joint Logistics Support Group). It can also set up the Combined Joint Support Group (CJSG) as part of the Franco-British initiative.

The Lille staff work in close coordination with the Joint Support level. In terms of operations, employment is made available at the CSOA; the Centre des transports et transits de surface (CTTS), which is the organiser of transportation and operational transit by road, rail, and waterway. In the area of training, COM-LOG has the authority over the École du Train et de la logistique Opérationnelle (ETLO), five primary driving instruction centres (CIEC) and the Initial Training Centre of Military Rank (CFIM).

#### **The Regiments**

The COM-LOG has six transportation regiments, but cooperates extensively with other units that are not subordinate



The medical VAB is the primary emergency vehicle of the fighting units. Its replacement is under consideration with a GRIFFON vehicle base.

to it. Firstly, the 1st Parachute train regiment, which, under the command of the Parachute Brigade, provides support for projection and support by air. The 519th Transport Regiment (RT), under CSOA command, has the primary mission of arming the command structure and tactical action capabilities of a NATO-class seaport of debarkation (SPOD). It also equips the maritime transhipment component within a national or multinational commitment framework. Its teams participate in the loading and unloading of chartered vessels, ensuring the rotation of equipment in overseas operations.

Photo: Jean François Auran



The Logistics Multipurpose Carrier (PPLog), based on an Iveco truck, forms the backbone of the Army's tactical transport capability

The COM-LOG has five "multi-function" regiments including the 121st Régiment du Train (RT) of Montlhéry, whose mission is to supply units and arm the support zone of a Task Force. It consists of a supply squadron, two transport squadrons (including one reserve) and three road traffic squadrons (including one reserve unit). It provides the circulation and escort group (GCE) on a rotating basis with the other regiments. This temporary force also supports the movements of units as part of the Bastille Day parade in Paris.

The 503rd RT comprises 1,000 men and seven squadrons with circulation and escort, transport, supply, and armour transport capabilities. It can also support units during an amphibious operation. It contributes to operations by activating the Zone de Regroupement Principal (ZRP) of Miramas (close to Marseille).

The 511th Transport Regiment is located south-east of Dijon. It has five active units and one reserve company skilled in transportation, supply, road traffic and armoured mobility support. The unit specialises in supporting the 27th Mountain Infantry Brigade, with skills in this specific environment. The 515th RT takes part in land operations, and in the command and arming of a logistics support zone for the benefit of contact units. It has a specific ability in the amphibious field. The 516th RT, which is garrisoned near Toul, is seen as the reference point in the field of Heavy Equipment Transporters and provides training for all Army HET pilots within a specialised centre. It can also set up an armoured mobility support group (GAMB). The Army Medical Regiment (RMED) mission is to deploy, implement and protect



The handling capacities are essential to the force's logistics. The container has become crucial in military deployments. The Army has acquired forklifts that can carry heavy loads, move independently.

the operational medical units (UMO). These UMOs are the medical posts (PM) like the ARCS (antenne de réanimation et de chirurgie de sauvetage) and the MCV (module de chirurgie vitale) which is lighter than the ARCS. The regiment took part in the response against COVID by setting up the military resuscitation unit (EMR) in Mulhouse. Finally, the 14th régiment d'infanterie et de soutien logistique parachutiste, in Toulouse specialises in "combatant support" logistics. It has experts in water treatment, campaign bakery production, operational food management (combat rations), clothing, and ballistic protection gears.

#### **Major Equipment**

COM-LOG units have more than 2,400 major pieces of equipment necessary for transporting and handling resources. The regiments have nearly 400 Porteur Polyvalent Logistique (PPLOG), some of which are armoured. The PPLOG, built by lveco with the Alsatian company Soframe, has a payload of 16 tonnes. Interoperable with NATO equipment, it can transport a container, and with the trailer, the load increases to 30 tonnes. The vehicle has onboard armament and a system to integrate into the SCORPION C2 network. The armoured transport squadrons (ETB) have class 100 TRM700-100s capable of transporting the LECLERC tank. The new generation armoured vehicle carrier (PEB NG) will replace this already outdated equipment. Class 50 armoured vehicle carriers consist of SISU tractors and SRPC 50 trailers. Lowered platforms for GRIFFON vehicles have already

been delivered. The escort squadrons have around 60 Véhicule de l'avant blindé (VAB) and Petit véhicule protégé (PVP). The RMED has 40 VAB SANITAIREs, soon to be replaced by GRIFFONs. The regiments use 40 fuel tankers of the type Scania CCP 10 m3, which allows the supply of land vehicles and helicopters. In 2019, the Army took delivery of 24 multipurpose tactical and airtransportable 5m3 tanker trucks (CCPTA), which are flexible and versatile vehicles. The units are equipped with lifting assets (forklift and port handling). We can also mention the MANITOU MHT.X 10180, recently acquired.

#### **Exercises**

France's major contribution to NRF 2022 saw the mobilisation of its logisticians. Nearly 3,200 soldiers were deployed in Norway for the combined exercises BRILLIANT JUMP (BRJU22) and COLD RESPONSE 2022. The BRJU22 exercise constituted a major logistical challenge to deploy the leading elements of the NRF Entry Brigade, i.e., 2,000 men and 400 vehicles, in just five days. The operation was led by the PCFL, which worked with all national and NATO logistics actors. The ORION 23 exercise will also be a fullscale test of logistics capabilities. With a LIVEX involving 10,000 troops, the transportation and traffic control units will be fully engaged within a high-intensity logistics deployment. This exercise will be an opportunity to think, plan and then lead the movement of a large unit, expertise forgotten since the end of the large manoeuvres in open terrain.

## The Limits of Operational Logistics

Logistics in 2022 is evolving, and is taking into consideration the resurgence of the high-intensity warfare threat in Europe and lessons from ongoing conflicts. Several limitations have already appeared over the years. The size of major equipment and ammunition stocks needs to be reassessed. The use of reserve or civilian capabilities to complement or replace military assets also affects the autonomy of armies. In the context of a conflict in



Armoured vehicle carriers are assets of strategic value for land operations. The TRM 700-100 was designed to transport the AMX LECLERC tank. Its replacement is launched as part of the « programme flotte tactique et logistique terrestre ».



Road traffic units are essential to the manoeuvring of motorised units. Circulation and escort squadrons use the VAB armoured vehicles and small protected vehicles (PVP).

Europe, with a crucial resource requested by many actors, what will be the availability of these means? The reorientation towards a 360° intervention of French military units requires reorganisation and the creation of a new ZRP facing towards the East, which could be positioned in the Champagne camps. There are also many tactical developments to consider, including advances in electronic and cyber warfare and the emergence of drones and loitering ammunition. If drones are changing the organisation of the transport and civil logistics professions, they now pose a deadly threat to logistics units. There are multiple examples in Ukraine of convoys or supply areas decimated by drone strikes. They also revolutionise the acquisition of targets, facilitating indirect fire application on any significant concentration of vehicles or equipment. This threat must be considered in any studies being conducted. Global studies (capabilities and doctrine) are underway to measure the impact and adapt the concepts. The review of logistics concepts with the joint directorates has also been initiated.

#### **Preparing for the Future**

Logistics is changing under the umbrella of modernisation ("dronisation", robotisation, automation, predictive maintenance, etc.). Experiments are underway to use drones for medical evacuation purposes, 'mules' to lighten the load for combatants or develop autonomous convoys. Integrating all these innovative technologies takes time for a certain operational application at the military level. The acceleration of the digital logistics transformation is both essential and inevitable. The French Armed Forces have many Logistics Information Systems which feed into a global flow monitoring system, Système d'Information Logistique de suivi de la Ressource Inter-Armées (SILRIA). However, the update requires manual operations that creates delays. Therefore, there is a real need to combine all these tools and use systems capable of providing the state of consumption in near real-time and anticipating refills. The reinforcement of resources is essential, and new equipment will undoubtedly restore the freedom of action. The Land Logistics Tactical Fleet (FTLT) programme plans to deliver 10,000 trucks of several types over a period of 15 years. FTLT will evolve according to an incremental approach - "to adapt to the evolution of the capacity need, threat, fleet ageing in service, and innovative technologies. The contract will be inked in 2024, with deliveries expected from 2027.

The SCORPION system with new combat vehicles and a high-speed C2 network will influence logistics. Studies suggest the highly probable hypothesis of logistical discontinuity between the front and the rear. Mastery of discontinuity is an indicator of logistics maturity that distinguishes the best organisations, the only ones capable of achieving it. A SCORPION logistics doctrine is under development. The RETEX of the doctrinal experimentation (EXDO) SCORPION has confirmed the relevance of deploying a logistics echelon at the level of the combined arms brigade. According to the logisticians, this will have to be done in a way adapted to the tactical situation and not permanently.

To conclude, operational logistics will experience a revolution beyond what is foreseen by the combatant. It also appears that logistics is a key factor of power and operational superiority. Despite future technical developments, it still seems necessary to focus on the universal triptych of RAV/MEC/SAN, which constitutes the DNA of logistical support.



Modern logistics vehicles are exposed to classic strikes and new threats. New generation equipment will be better protected and, for some of them, controlled remotely. Here, an armoured fuel tanker truck (CaRaPACE) from the Service de l'Energie Opérationnelle (SEO)



## Hall 5 A, D398



13 - 17 JUNE 2022/PARIS





#### BERETTA DEFENSE TECHNOLOGIES IS THE STRATEGIC Alliance of **Beretta, Benelli, Sako and Steiner**

Combining decades of expertise, state-of-the-art machinery and extensive research and development capabilities, we offer one of the most complete offerings in the defense industry: from firearms, ammunition, optronics to tactical clothing.

We provide tailored solutions to enhance the mission success of Military and Law Enforcement operators through lethality, survivability, mobility, situational awareness, sustainability and training.