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# EODH SHOWCASES ASPIS HEAVY FOR THE FIRST TIME ON LEOPARD 2A4

By ELISABETH GOSSELIN-MALO

In the context of the 2022 edition of Eurosatory, the Greece-based company EODH presented its latest technologies in the field of protection of heavy main battle tanks (MBTs), armored fighting vehicles and light armored vehicles. More specifically, the spotlight was placed on its new heavy version of the Advanced Shielding Platform Integrated System (ASPIS) Modular NG-MBT installed on a Leopard 2A4 turret and showcased for the very first time at the exhibition. At its core, the ASPIS Heavy is designed as a complete hybrid and holistic solution as it combines both passive and active protection elements with ERA modules. These are located in the front arch of the vehicle to protect against modern threats such as tandem double warhead ATGMs and the new generation of long-rod APFSDS kinetic energy rounds. When speaking to EODH's President, Andreas Mitsis, he highlighted that the ASPIS' design "is such that it allows to respond to multiple hits, while after attacking the armor modules can be replaced in field conditions by the crew." A unique feature of the system is its use of stand-alone millimeter-wave radar sensors located on the roof tower of the vehicle, which when

*continue p 3*








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turned on, are capable of detecting almost all incoming threats (drones, loitering munitions, ATGM missiles) approaching the roof at high-elevation angles and triggering directed explosion charges. In addition, the battle-proven solution is said to have defeated the menace of mines, IEDs, guided artillery shell, rocket propelled grenade, and bomblets.

The ASPIS heavy was conceived to equip both future combat vehicles as well as existing MBTs in need to be modernized. In 2021, EODH signed an important partnership deal with KMW for the production of the armour sets for key programmes, such as the British BOXER 8x8. Currently, the ASPIS Heavy system is being considered as an alternative by the Greek Army to modernize its Leopard 2A4s and 1A5s and enhance shielding. With two decades of experience and combat-proven track record, EODH is continuously looking ahead to meet the future requirements of its wide-range of customers from the Middle East to Europe. The company is currently expanding its operations, building a new 5382 square feet production plant in Greece. While one of the key challenges the company has faced with the outbreak of the pandemic and a full-scale war in Europe, was that of dealing with important supply-chains delays, Andrea Mitsis says that, "the company was prepared as it has spent much of its efforts over the years to build-up and create strong partnerships with reliable and effective suppliers." Despite this, the minimum wait time currently for a piece to be manufactured is said to be over a year.

Also, on display at their Eurosatory stand, was the new High Mobility Armored Vehicle 4x4 'Hoplite.' The main objective behind the new design is to manufacture a basic platform with a maximum weight of 12 tons capable of carrying payloads up to 2 tons. The EODH booth further featured two mock-ups of light and medium combat vehicles equipped with the ASPIS Modular solution. Within the context of the ongoing Ukraine war, providing effective armored protection to ground forces has proven more important than ever as to face the fast-paced development of threats and complexity of ongoing and future scenarios of asymmetric warfare while providing maximum combat effectiveness and ensuring highest level of safety for ground forces. ■

# ANOTHER YEAR, ANOTHER SUCCESS

By JOSEPH ROUKOZ

And just like that, the 2022 edition of Eurosatory has come to an end! I would like to take the time to firstly thank COGES for their support and trusting us with the Show Daily, which covered what was yet another massive success both in terms of the record number of visitors who attended the event but also in the overall amount of exhibitors hosted from across the world. After 4 years of absence, and a burden-some pandemic, it was incredibly heart-warming to be able to see many familiar faces and friends in person again. Eurosatory is always a unique event - whether that be because it is the largest international defence and security exhibition in the world but also because it represents a true eco-system of innovation and research and development. Secondly, I would like to thank all of the incredible hard-working journalists without whom the daily production of the ShowDaily would not have been possible. A special thank you also to our industrial partners, both old and new, for their trust and partnership and the EDR team looks forward to working together again in the future in the context of other opportunities. This year, the show opened its doors and hosted over 1,800 exhibitors, over 57,000 visitors, 700 journalists, over 50 official delegations. Again, congratulations to all for another highly successful edition of Eurosatory and I look forward to the next one! ■

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# XTEND'S GRIFFON SPREADS ITS NET

By GILES EBBUTT

**HALL 6 - STAND J H 312**


XTEND is showcasing its range of tactical UAVs at Eurosatory, including the Wolverine, Griffon and Xtender systems.

Wolverine is a multi mission tactical aerial drone system that can carry a variety of payloads which are field swappable. These include the Dragoneye 2 dual EO/IR stabilised camera; signals intelligence devices; and either a claw or hook for pick up and drop tasks. These enable the drone to lift, carry and place payloads of up to 2.5 kgs and with an accuracy of less than 7.5 cms. Payloads can include kinetic effectors for use in the EOD and C-IED roles.

Wolverine has a speed of up to 45 mph with 30 minutes endurance and a maximum line of sight range of 7 kms.

The Griffon is a manportable counter UAS drone designed to defeat Group 1/2 COTS UAS and RCMA at ranges of up to 3 miles from the launch point. It has a maximum speed of 80mph. Once the Griffon has intercepted the target it deploys a net to incapacitate it and cause it to crash. If required a Wolverine with a claw can then be used to recover the target drone.

Xtender is a tactical indoor ISR drone designed as a wearable, lightweight system with a single hand, natural gesture-based controller, It enables accurate performance of remote multi-mission ISR tasks in extremely complex environments, particularly inside buildings, extending current payloads beyond the line of sight.

Xtender is able to enter a remote target site, perform reconnaissance and data collection tasks, and seamlessly exit, agnostic of any indoor-outdoor transition limitations and regardless of any GPS denied locations.

It has a maximum speed of 10mph, a maximum outdoor range of 2km, a flight endurance of 10 minutes and it can carry up to 150g of payload.

Using a common core and utilising AI and ML the drones are controlled with a single 6-DoF handstick with visualisation through a VR headset. ■

THE THALES PAVILION IS IN THE OUTSIDE AREA

**Thales has developed a new Tactical Engagement Analysis (TEA) system and revealed it at Eurosatory.**

# THALES REVEALS NEW TEA SET

By GILES EBBUTT

The TEA system is intended to support tactical training as it provides the opportunity to analyse actions and technique used by trainees without involving the use of any form of ammunition. It has been developed in conjunction with several different Special Forces units.

The heart of the system is a passive sensor module which is attached to a weapon on a standard Picatinny Rail. This contains a number of tracking and pointing sensors and a camera. The module can distinguish between the actions of cocking the weapon and firing it. The sensor module is agnostic to the weapon and it can be used either on a real weapon or on a surrogate.

Target dimensions are fed into the system before the exercise commences. For live participants for force-on-force training this is done by using an image. When the weapon is fired the sensor module takes an image of the target and the position of the firer is established using GPS if outdoor or by indoor sensors with an accuracy of up to 15-20 cms.

On firing all sensor data is transmitted to the exercise control centre, which is contained in a small transit case, where it is assessed by artificial intelligence in real time. By using the positional data, its knowledge of the target dimensions and ballistic data the system can calculate the range and the impact point.

The event record is injected into the timeline in the control system, and the weapon movement track, aiming point and impact point can be displayed on the exercise control screen. Results can also be shown on a handheld display for an observer/controller accompanying trainees.

This data can be combined with movement data and video footage from surveillance cameras to provide a complete picture of the tactical event for subsequent after action review. The system will record all data for individual training records.

The sensor module has two configurations for different target detection distances, 2-10m and 10-200m. According to a Thales representative this covers 95% of the required objectives for precision shooting. Communication is over WiFi but if this is not available commercial mobile networks can be used. If no communications are available all data is stored in the sensor module for subsequent download and analysis. A cloud-based version is in development.

The Thales representative noted that the advantage of the system is that it enables training to be conducted in any location, including public spaces, making it particularly useful for SF who wish to practice in specific facilities. It is complementary to the Thales Sagittarius indoor shooting training system, widely used by German and Netherlands forces, which is more suitable for marksmanship training. ■


# PROJETÉE POUR LES OPERATIONNELS

HALL 5A STAND B 330

Par JEAN-PIERRE HUSSON

Dédiée aux utilisations tactiques, forces armées et police, la série Tactix 7 est une nouvelle gamme de montre GPS de Garmin (France) qui, grâce à une nouvelle interface à cinq boutons et un écran tactile, offre des fonctions tactiques, d'entraînement, de performance et de navigation. Projeté pour affronter les conditions les plus extrêmes, la série Tactix 7, qui intègre à un boitier de 51 mm étanche jusqu'à 100 m une lampe torche LED à intensité réglable, est déclinée en trois versions : standard, Pro avec recharge solaire (environ 30% de plus d'autonomie) et Pro Ballistics avec calculateur de tir longue distance. Plusieurs fonctionnalités sont spécifiques aux Tactix 7 conçues dans l'optique d'une utilisation militaire, notamment le mode lunettes de vision nocturne du rétro éclairage, qui le rend compatible avec l'intensification de lumière sans saturer l'équipement de vision, le mode furtif permettant d'utiliser la Tactix 7 pour afficher toutes les données des capteurs sans enregistrer celles de localisation afin d'éviter de dévoiler des traces GPS ; le Kill Switch pour un effacement d'urgence de la mémoire ; le profil Jumpmaster permettant de configurer trois types de saut (HAHO, HALO et Static) et d'être guidé du point de largage vers l'objectif visé. ■

# OPERATIONS IN THE ARCTIC: ''TRAIN WHERE YOU ARE GOING TO FIGHT''

By MURIELLE DELAPORTE


Colonel (Ret) Dan Roper, AUSA's Director of National Security Studies and moderator of the panel started by emphasizing the ''widely different prospectives'' of the three speakers on a timely and strategic topic: ''in a rapidly changing geopolitical environment, nowhere is this more apparent than in the Arctic region, where very important evolutions are driving economic and political changes, and as a result security implications since all is interconnected''.

With climate change and new access roads in the region comes an increasing competition for strategic raw materials (the Arctic covers 13% of the world's oil reserve and 30% of gas reserves). Col. Roper stressed Beijing's Polar silk road and Moscow's establishment of the Arctic Joint Strategic Command in 2021, which is the 5th Military District of Russia: ''this does signal something and as current events show, when Russia signals something, one better pay attention to it. This is not rhetoric…''
Indeed with the Ukrainian war, ''the masks have come off'', as the Lt. Gen. Toivonen stressed, while recalling that Finland shares a 1,343 kilometer long border with Russia. The former Commander of the Finnish Army identified the factors allowing Finland to be able to fight in the Arctic, the first one being of course the terrain as the whole country encounters Arctic conditions a big part of the year.

Another major factor has to do with the nation's resilience: ''besides Santa Claus and 3 million saunas, the reason we survive lies in our excellent school system and conscript service, which generates 20,000 trained soldiers'', he said highlighting the fact that the most recent polls show that 80% of the Finnish population is willing to defend its country.
He then described the Finnish defense system - ''a mix of traditional territorial defense and new capabilities'' -, explaining that not only does one need to "train as you fight", but also to '' train where you are going to fight'', as troops and equipment must function in the extremely harsh conditions of that part of the world.

Maj. Gen. Givre explained why France has security interests in the latter as well, even though it is is not technically an Arctic country per se (except for ''Terre Adélie''). The government has just published its very first polar strategy and the ministry of the armed forces has a very clear roadmap in order to defend its interests while demonstrating ''political and strategic solidarity towards its EU and NATO allies in the region'', i.e. Finland, but also Sweden and Norway.
The French general also stressed that the Arctic represents an opportunity to challenge Russia, as it could be its "soft belly''. He described the French historic legacy in Northern Europe (e.g, the battle of Narvick in 1940) and the current dedicated cold weather/high altitude/ mountain troops. The 27th BIM (''Brigade d'infanterie de montagne'') is a multirole brigade ''engaged everywhere'', which also includes a specific mountain training school in Chamonix. The Alps also provides firing ranges for all calibres, a unique site in Western Europe.

As for Maj. Gen. Peter Andrysiak, he emphasized the fact that, in the United States, mountain and cold weather training had become a lost art in the past decades, because of the counter terrorism focus and the wars in Irak and Afghanistan. That skill atrophy has begun to be reversed since the summer of 2020 with a new Army strategy meant to resurrect the High North training which used to be common practice till the end of the 1990's.

He described the new "Arctic path'' to regain the ability to fight and win in the area through five lines of operations:

- Improve Arctic capability in terms of training and equipment.
- Compete globally, ''not only with Canada, but also with Japan, Korea, Finland, Sweden and Norway''.
- ''Defend the Far North in crisis and conflict''.
- ''Build Arctic Multi-Domain Operations''.
- And finally project power from the Arctic.

The US Deputy Commander of Army Europe and Africa agreed with his counterparts about the need to train where you might fight and stressed the need to build a ''year around ethos'', hence the establishment of a new combat training centre and the reactivation of an airborne division - the 11th Airborne Division - in Alaska.

Since the US Army cannot be converted as a whole for such a specific terrain, dedicated units are sent from Alaska to train already on a regular basis with their European counterparts, as was recently the case during the NATO exercise Swift Response.

The US Army general also agreed with the fact that targeted equipment is needed: it is necessary to design new equipment as ''the problem does not start below 32 degree Farenheit, the problem does start at 32''… ■

# OXLEY GROUP WINS BOXER CONTRACT

HALL 5A STAND D 811

By GILES EBBUTT

Oxley Group, a leading provider of vehicle lighting, announced the award of a contract for LED lighting on the British Army's new Boxer vehicles on Day 3 of Eurosatory.

The contract, which is worth GBP3.7M, is to provide internal lighting, directed lighting, search lights and IR lights on to Boxer vehicles until 2030, as part of the UK MOD's Mechanised Infantry Vehicle (MIV) programme. It has been jointly awarded by Rheinmetall BAE Systems Land (RBSL) and Rheinmetall Landsysteme (RLS). The Mechanised Infantry Vehicle (MIV) contract was announced in November 2019 between the UK MOD and ARTEC – a joint venture between RLS, Rheinmetall Defence Nederland B.V, and Krauss-Maffei Wegmann. The contract will deliver over 600 Boxer vehicles to the British Army.

A significant part of the Boxer contract is for Oxley's DC Combi Light for internal illumination. This is a low profile light weight LED unit which provides white light plus an integrated blackout mode. Night vision device friendly and built to military specifications it has been specifically designed to be integrated with the Boxer vehicle architecture.

Other lighting solutions to be supplied include the Gooseneck task light for tasks such as map reading and workstation illumination, and a large LED spotlight which will be provided for the UK Boxer ambulance variant.

Oxley is a world leading designer and manufacturer of high specification LED lighting, night vision solutions and electronic components. Its products are in use worldwide on aircraft, vehicle and naval platforms. The Oxley lighting range includes commercial off the shelf products for upgrade and new build programmes, and the company specialises in the design of full lighting solutions.

Oxley lighting solutions are installed in the UK's Foxhound and Ajax vehicles. An Oxley representative told the Show Daily that the company would be looking forward to further opportunities, both domestic and export, as a result of this contract. ■

# EXPODEFENSA, LE SALON DE RÉFÉRENCE EN AMÉRIQUE LATINE

Par JULIEN CHABROUT

Mauricio Vargas Linares, l'ambassadeur de Colombie en France, est heureux. "Je suis en première ligne pour témoigner du moment excellent que nous vivons dans les relations entre la France et la Colombie", s'est-il félicité. C'est dans ce contexte que se déroulera Expodefensa à Bogota du 27 au 29 novembre 2023. Ce salon de référence en Amérique latine, consacré à la défense et à la sécurité et co-organisé par COGES Events, a été présenté à Eurosatory mercredi par Charles Beaudouin, commissaire général d'Eurosatory, ainsi que par Gustavo Niño Furnieles, vice-ministre de la Défense de la Colombie.

Expodefensa permet à un large éventail d'acteurs allant des organismes publics aux opérateurs privés de présenter des solutions en matière de défense nationale, de sécurité intérieure ou de surveillance maritime. En 2021, lors de la précédente édition, 228 exposants de 25 pays avaient fait le déplacement, comme 62 délégations officielles de 24 pays. Au total, plus de 11 000 participants s'étaient rendus à ce salon.

"Nous ne voulons pas en faire un événement classique, mais un salon tenant compte des spécificités de la région afin de présenter des solutions adaptées à la demande régionale", a déclaré Charles Beaudouin. Pour lui, le poids économique de la Colombie dans la région, son industrie dynamique, sa position géostratégique ou encore le fait que ce pays soit le premier partenaire de l'OTAN en Amérique latine en font un Etat incontournable. Mauricio Vargas Linares a évoqué le rôle de la Colombie dans la guerre en Ukraine : "C'est le premier pays de l'Amérique latine ayant répondu présent et ayant accompagné l'Europe et les Etats-Unis dans leurs efforts de guerre". ■

# LA DGA ET L'ONERA DÉVOILENT UNE TECHNOLOGIE CAPABLE DE DÉCAMOUFLER

Par JEAN-PIERRE HUSSON


Présenté sur son espace « SCORPION la suite », la DGA dévoile une technologie qui devrait constituer un futur système d'observation très performant. Son avantage : pouvoir « décamoufler » les cibles terrestres, véhicules ou fantassins. Ce projet nommé DIMHS est réalisé en cotraitance ONERA (le centre français de recherche aérospatiale) et OPTROLEAD. Il a pour objectif de démontrer l'apport de l'imagerie multi/hyperspectrale par rapport aux techniques conventionnelles.

Plusieurs campagnes de mesures ont déjà eu sur de nombreux véhicules militaires et dans des environnements différents. Financé par la DGA, ce projet de science et technologie vise à mieux détecter les cibles, réduire considérablement les fausses alarmes et permettre de « décamoufler » des menaces grâce à l'imagerie hyperspectrale. Ce futur système d'observation pourrait être embarqué soit à bord des véhicules terrestres ou d'aéronefs en mode air-sol. Il est basé sur l'expertise reconnue de l'ONERA dans les systèmes optiques spectraux embarqués au service de la défense française, notamment avec le programme SYSIPHE (SYstème Spectro-Imageur de mesure des Propriétés Hyperspectrales Embarqué) opérationnel depuis 2013, délivrant des images hyperspectrales aéroportées, du domaine visible jusqu'à l'infrarouge thermique. ■

# HAUTE PRÉCISION GARANTIE

Par JEAN-PIERRE HUSSON

HALL 6 STAND F 720

Fruit de l'héritage issu de sa première version mondialement connue, l'Ultima Ratio nouvelle génération de PGM Précision (France), dont le principe de démontage rapide du canon est conservé, se caractérise par toute une série d'améliorations, tant au niveau de l'ergonomie et du confort de tir que de la praticité. Dotée d'un outil de démontage de culasse intégré, la crosse, repliable sur la droite, est pourvue d'un appui-joue réglable en hauteur, tout comme l'est le talon de crosse, et d'une béquille amovible, pliante et ajustable en hauteur. Le bipied amovible, avec frein de dévers et hauteur réglables, peut être replié vers l'avant et l'arrière en fonction du montage, soit devant le chargeur de dix coups à double pile, soit en position avancée sous la cage enveloppant une partie du canon flottant de qualité match. L'arme peut être équipée d'un rail Picatinny standard avec différentes inclinations ou long monobloc incliné à 20 MOA, qui sont complétés de rails latéraux M-Lok. Quatre longueurs de canons sont proposées : Commando de 550 et 470 mm et Intervention 600 et 510 mm, plus Intégral silencieux de 410 mm, respectivement avec profil flûté, refroidisseur et manchonné. Disponible en plusieurs calibres, dont celui de référence le .308 Winchester ou 7,62 x 51 mm standard OTAN, l'Ultima Ratio nouvelle génération dispose d'une détente réglable, double bossette, qualité match et d'une sureté manuelle, qui en position basse bloque le percuteur et le déverrouillage de la culasse. ■

# DEKA040OTM, UN TERMINAL SATCOM « ON THE MOVE »

Par JEAN-MICHEL GUHL

**HALL 5A - STAND D317**

Réalisé par la société Actia Télécom de Dinard, le DEKA040OTM est un terminal Satcom mobile en bande Ka MIL-STD-188-164C particulièrement compact et rustique d'acquisition automatique qui permet de recevoir comme d'émettre en temps réel sur une large bande hertzienne à partir d'un véhicule en mouvement. Récemment retenu par l'armée de terre égyptienne pour équiper quelques uns de ses véhicules de reconnaissance de patrouille dans le désert, ce terminal satellite autorise indifféremment la transmission vocale ou d'images vidéo sur bandes de fréquences de 29 à 31GHz (Tx) et 19.2 à 21.2 GHz (Rx).

L'ensemble mécanique avec son radome pèse 55g auquel s'ajoute un boîtier électronique interne qui fonctionne sur le circuit électrique de 24 v (18-36 VDC) de tout véhicule 4x4 circulant de 0 à 120 km/h. ■

# TRENTON SYSTEMS: FROM SERVER TO EDGE

Par MURIELLE DELAPORTE

**HALL 5A STAND DC 511**

Trenton Systems is an OEM of high-performance computing solutions located in Georgia, USA, that has become a trusted computing innovator for many military prime contractors around the globe. Its core competencies include designing, manufacturing, assembling, testing, and supporting ruggedized computing solutions for the aerospace and defense industry that can operate across climate-controlled and austere environments. In-house engineers are able to customize down to the chip/BIOS level across a product line of CMOSS-aligned SFF mission computers and rugged rack mount servers.

### A TIGHT GRIP ON THE SUPPLY CHAIN

With a tight grip on the supply chain, Trenton Systems is able to engineer around supply chain parts issues successfully while providing multi-layer cybersecurity across the hardware, firmware, and software that can be integrated into customers' broad system cyber solutions. Products are part of dozens of major weapons programs and are installed on platforms including ISR aircraft, ground combat vehicles, and submarine/surface ships.

### FROM SERVER TO EDGE (BAM TO TAC)

**BAM:** A family of ruggedized, secure, AI-powered rack mount servers equipped with Intel Xeon Scalable Processors for high-performance edge computing and inferencing to deliver actionable insights at the strategic, tactical, and operational levels. Stay vigilant to counter rising cyber threats with multi-layer security technologies to provide secure, real-time decision-making capabilities well ahead of a crisis. Ultra-ruggedized and stress-tested, BAM servers support high-performance edge computing in harsh environments rife with temperature and humidity fluctuations, shock, and vibration.

**TAC:** A family of ruggedized, secure, SWaP-C optimized small form factor mission computers designed in a fanless, sealed enclosure with the latest in embedded computing technology for various applications across the modern cyber battlespace. Run fast, predicable workloads in real-time with Intel Xeon D 1700 CPUs to improve performance at the tactical edge. With their sealed, ruggedized design, TAC mission systems are certified to stringent military standards, effectively resisting rain, dust, dirt, and debris while operating under extreme conditions. ■

# NEXTER ARROWTECH: KATANA 155 MM GUIDED MUNITION DEVELOPMENT CLOSE TO THE END

By VALERIO DEL GRANDE

By year end Nexter Arrowtech will finalise the development of its Katana 155 mm guided munition, which was announced in 2018. The 45.6 kg round is 1,000 mm long, hence compatible with all 52 calibre western artillery systems, and can reach 45 km in the Base Bleed configuration. It carries around 6 kg of insensitive explosive, around 2 kg less compared to the Nexter LU 211 standard ammo but around 30% more than equivalent guided munition available on the market. Guidance is provided by an IMU/GNSS inertial-satellite suite, the circular error probable being under 10 meters. Three series of tests have already been carried out, the last one in January this year. A further firing campaign is scheduled before year-end and will see the system working on closed-loop, which means the munition will demonstrate its capability to hit with the required accuracy the target which grids were inserted in the system. This will bring the Katana to TRL 6. Nexter Arrowtech will then wait for a first contract before pushing further this programme, which was mostly developed on company funds.

The Katana round is proposed on the export market, a number of potential customers having already lined up showing considerable interest; fully ITAR-free, it is also modular which gives room for the local production of some subsystems. When a first contract will be bagged Nexter Arrowtech will start qualification and industrialisation processes. ■

EXT PE6B D200

# BREN-TRONICS SHOWCASES ITS NEWEST GENERATION OF UNIVERSAL CHARGER

HALL 5A STAND H 502

By VALERIO DEL GRANDE

When Bren-Tronics first introduced the lithium ion electrochemistry for military batteries back in 1995, the question of the charging solution occurred. Instead of designing one charger per battery type, or upon customer demand, the company took the lead on designing chargers per operational usage (vehicle mounted, soldier portable, and maintenance) and not per battery type. The same charger was able to support all types of chemistry (NiCd, NiMh, Li-Ion), battery voltage and form factor. As of today, more than 70 different types of military battery packs are supported by Bren-Tronics Universal Chargers.

The Bren-Tronics Advanced Battery Charger (ABC Charger) is a portable battery charging solution that offers next-generation improvements in size, weight and efficiency, while providing selectable power, faster charging times, increased environmental survivability, and other significant innovations.

The charger accepts multiple power inputs including universal AC (90-264 Vac), wide range DC (11-36 Vdc, 46A), power from solar panels, fuel cells, etc. In order to comply with IATA regulations, the charger is also be able to discharge to less than 30% state of charge most used batteries automatically, such as BB-2590/U, through a specific discharger adapter.

In the meantime, a specific discharger for BB-2590/U has been developed. An indicator shows the discharge status and a fully charged battery can rapidly be discharged to 30% state of charge.

As an example, the BTC-70100 can charge eight BB-2590/U batteries from 0% to full in less than 3 hours, and 16 Conformal BB-2525/U batteries in less than 3.5 hours.

With these new generation chargers, Bren-Tronics continues to lead the way in cutting edge operational improvements to power the modern war fighter. ■

# TDW TO RESURRECT ROAD-SIDE ANTI-TANK WEAPONS

HALL 6 STAND J 567

By MARC CHASSILLAN


With the war in Ukraine, armies are reconsidering weapons that were put aside after the collapse of the Berlin wall. Amongst them, road-side mines are identified as cheap and effective system that can create chaos at low cost. The German Bundeswehr has delivered PARM (Panzerabwehrrichtmine) automated anti-tank weapons to Ukraine. Those mines were taken from the German stocks. The German company TDW is resuming the promotion of PARM and intend to develop new versions. PARM consists in a projectile with a warhead which is effective at distances up to 40 meters. A tripod carries the launcher. It is triggered by a fibre optical cable laid on the ground. When an AFV or a tank rolls over the fibre, it triggers the PARM and the projectile hits the target which is destroyed by the shaped charge. The warhead is effective against ERA. Thanks to its small size PARM is difficult to detect. TDW is developing new target detection devices and aim at replacing the fibre by a combination of acoustic and passive infrared sensors. A specific timed electric discharge device ensures that the PARM is compliant to international humanitarian laws.

TDW is a renown company in the field of warhead for ATGM and torpedoes, developing and delivering smart multiple effects solutions. ■

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BAE SYSTEMS

# COMBAT-PROVEN: AN OVERVIEW OF POLISH DEFENSE INDUSTRIES AND AN INVITATION TO COOPERATION

HALL 5A STAND A 207

Par MURIELLE DELAPORTE

Co-organized by the Ministry of Economic Development and Technology of Poland and WB Group, a presentation of the major Polish defense industries was offered during Eurosatory under the following title: ''New Challenges of European Security - Polish Defense Industry: Potential and Invitation To Cooperation''.

Leaders of five key organizations – WB Group, HSW, Luwaba, Lukasiewicz and PCO – described their historic legacy and their range of research and products in the context of the new deal and high intensity warfare environment being triggered in Europe by the Ukrainian war. Traditional partners with Kiev, some of the equipment displayed are currently and increasingly becoming combat-proven in the fields of Ukraine.

The CEO of the WB Group was the first speaker highlighting the speed with which the Polish industrial sector is growing and undergoing a fast modernization. The company - "the most important player in Polish defense industry both for the Polish MoD and for export'' - was created twenty-five years ago and focuses mostly on C4ISR systems.

The presentation explained in detail the wide range of offers aiming at integrating the force as much as possible. In the C2 domain, Fonet Digital Communication platform - a full ''combat management suit", Topaz Integrate Combat Management System, but also the U-Gate Dismounted observation and command system were for example described. With twenty years of experience in artillery system and as the leader in UAV technology, the company is indeed able to provide the right equipment for current collaborative combat conditions - high value target strikes ; targeting data sharing ; logistics (e.g. ''shortage of ammunition''), etc -.

The CEO of HSW (PGZ) then reminded the audience about the importance of artillery, ''the God of War'', as highlighted in Ukraine, and the fact that HSW has been a leader in this field since 1938. Their 155mm self-propelled howitzer KRAB currently fights along Ukrainian troops.

The company counts 1,000 employees, among which 300 engineers and 150 researchers, and can test and manufacture the equipment it designed in 8,000 square meters modern facilities equipped with top of the line robotized welding.

Another pioneer in Polish defense industries, Lubawa S.A. was founded in 1951 and enjoys today cutting-edge facilities as well, which includes in house material testing laboratories, a ballistic testing facility, a vulcanization chamber, etc. It specializes among other things in individual protection equipment: its two-part new generation explosion-proof and fragment-proof protective suit (EOD NG) is for example unique in its design and efficiency. Its modular bulletproof vest MKO 2.0 is used at the border with Belarus and its end-users ''include the President of Poland''. Camouflage is another field where Lubawa excels with a very comprehensive selection for fixed and mobile assets.

The next presentation focused on the Robotics research institute Lukasiewicz (PIAP): it exists since 1965 and counts 300 staff members. In 1999 it became a major tool to protect police and security forces against terrorism. Its range of research and products goes from special vehicle (EOD) and protection (CBRNE accessories to be integrated) to mobile robots and automated systems. As pointed out by the PIAP representative, what is being proposed is ''not just a robot, but a full counter-terrorism solution''...

The last company which was presented at length was PCO (also part of PGZ), the leading producer in Poland of opto-electronic devices for night vision, thermal imaging and laser technology. It was created 46 years ago and counts 650 employees. It has been equipping Polish armed forces and police, while ''the lessons learned from Ukrainian users are very positive''. The range of offer is here too very wide ranging from ground forces to aviators' night vision goggles and including a laser warning system destined for detection of vehicles and military objects' radiation from impulse range-finders or laser illuminators (i.e. the laser warning system SSP-1 OBRA 3). The company can also repair and overhaul similar equipment whether manufactured by PCO or not.

Since this article unfortunately cannot list it all, here are two ways to respond to this very comprehensive invitation to cooperate:

1) At Eurosatory : the Polish exhibition is located in hall 5A A, stand 207 and includes 12 companies from the Polish Armaments Group, including Mesko SA, Fabryka Broni "Łucznik" - Radom sp. Z oo, ZM "Tarnów" SA, PCO SA, Maskpol SA, ROSOMAK SA, PIT-RADWAR SA, OBRUM sp. Z oo, BZE Belma SA, Zakłady Chemiczne "Nitro-Chem" SA, Zakłady Metalowe Dezamet SA and Mesko SA.

2) Online : for more detailed information www.wbgroup.pl/en/ ; www.hsw.pl/ ; https://piap.lukasiewicz.gov.pl/en/ ; https://pcosa.com.pl/en/ ■


# LAUNCH CUSTOMER ANNOUNCED FOR STEADICOPTER BLACK EAGLE 50H

HALL 6 STAND J H 492

By VALERIO DEL GRANDE

Steadicopter of Israel announced it bagged a first order from an undisclosed customer for its Black Eagle 50H, the hybrid propulsion version of its well-known all-electric Black Eagle 50E. The major advantage of the hybrid version is obviously endurance that is increased from 4 to 5 hours, 3.5 hours in hovering. The Black Eagle 50H is also bigger, its main rotor having a 2.8 m diameter versus 2.16 m of the E model, MTOW being also higher, 50 versus 35 kg. This brings with it a more than doubled payload that jumps from 5 to 12 kg, considerably increasing flexibility as it can now accept multiple payloads.
Flight performances remain similar, with a cruising speed of 45 knots, maximum speed being 70 knots, the Black Eagle 50H being able to operate in winds up to 25 knots.

The Black Eagle 50H is proposed to military and security forces as well as to civilian organisations, such as search and rescue, cyber, intelligence, offshore rigs, and high-end naval missions. ■

# OPHIR OPTRONICS: A NATO-BASED COUNTER-UAV SOLUTION (AMONG OTHER THINGS...)

By MURIELLE DELAPORTE

HALL 6 STAND G492


**An MKS Instruments company, Ophir Optronics Solutions LTD designs and manufactures high performance infrared (IR) thermal lenses and optical elements for Short-Wave, Mid-Wave and Long-Wave Infrared imaging (SWIR, MWIR & LWIR).**

Created in 1976, the Israeli company counts 800 employees all over the worldwide and 7 manufacturing sites. With the raging war in Ukraine, the interest has been growing within NATO and the facility which has been established in Romania eight years ago is in the process of tripling in size. ''Ophir is therefore in a position to provide a NATO-based supply chain solution''.

Ophir has indeed become the leading provider worldwide for major defense and homeland security OEMs: ''we have been building a vast experience in high performance/ high precision in optical solutions, and specifically in infrared. We offer high end component assemblies, the main application being thermal imaging, high resolution as well as night vision'', explains Dr. Kobi Lasri, general manager of Ophir Optronics Solutions and Spectra-Physics Lasers.

Applications are land, airborne and naval and include long-range security and surveillance, UAV and counter-UAV technologies, missiles, etc.: ''because we are vertically-integrated and invest a lot not only in research, but also in production capabilities, we are a unique one-stop-shop that provides the full solution from a customized design to final assembly of in-house made components ''.
Tailored to the defense market, the offered solutions are meant to resist to harsh conditions, whether extreme temperatures, sand, sea corrosion, shocks, and so on. Coating is key in this case. ''Optics is like an art and you have to choose the right coating''. Integrating increasingly advanced components has also been a constant concern in order to face the evolving demand, such as thermal imaging from distance up to 30 kilometers. ''What we can enable is disrupting, as we offer high resolution capabilities which can be airborne, or solution for high-powered laser, or missile and counter-missile technology ...''.

The 3 major areas of applications and innovations presented at Eurosatory are the following:

**1.** Long-range zoom lenses for surveillance in any condition possible, by day and night and from any platform.

**2.** Low SWaP (Size, Weight and Power) for airborne or handheld light weight applications, with still a 10 km range and high precision: "we can go as low as 270 grams in terms of weight so it can be easily carried by a drone''.

**3.** And last but not least: counter-UAV. ''Counter-UAV applications are in growing demand (...) UAVs can be automatically detected, tracked and intercepted with different technologies'', says Dr. Lasri. ''You can see them long-distance and detect one drone or a swarm of drones via heat and high-resolution lens''. ■

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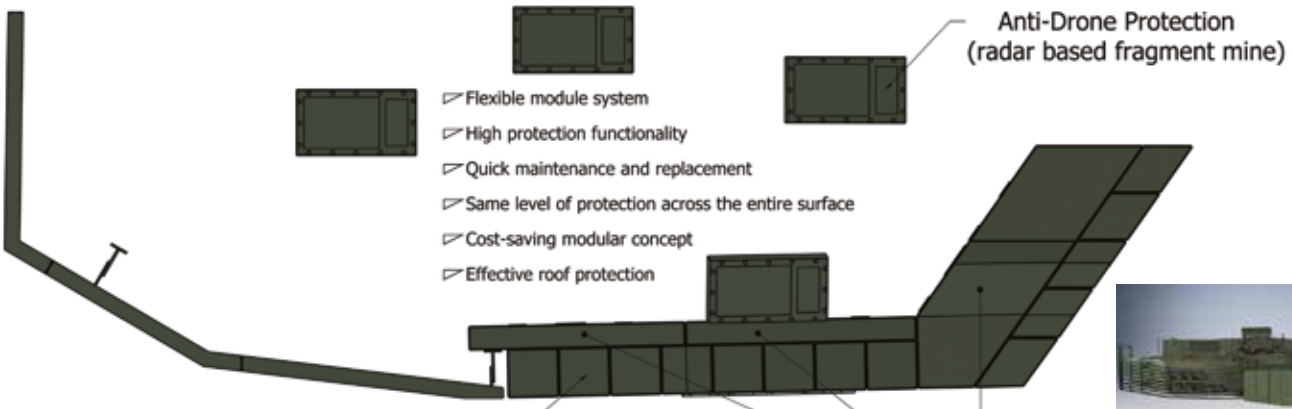


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**C'est en honneur des délégations et représentants des nations africaines venues à Eurosatory cette année qu'une présentation de la prochaine édition de Shield Africa, salon international de la sécurité et de la défense, a eu lieu mardi 14 juin dans le Hall d'honneur du Salon.**

# SHIELD AFRICA S'APPRÊTE À FÊTER SES DIX ANS

**Par MURIELLE DELAPORTE**

Créé en 2013 pour mettre en relations les Etats africains et les industriels de l'armement, Shield Africa est parrainé par le ministère de l'Intérieur et de la Sécurité de Côte d'Ivoire, dont les représentants étaient parmi l'auditoire.

*« Plateforme de collaboration et d'échange destinée à renforcer la sécurisation des Etats »*, Shield Africa propose *« des solutions adaptées aux défis sécuritaires qui entravent le développement du Continent »*, a expliqué en introduction l'organisatrice du salon en Côte d'Ivoire. *« En dépit de la crise Covid, nous avons réussi à rassembler 96 exposants internationaux, 2800 participants, 93 délégations de 31 pays, plus de 750 participants aux conférences et 63 journalistes. »*

Intégrant les domaines terrestre, maritime, aérien et spatial et *« évènement de référence en Afrique subsahélienne »*, Shield Africa fêtera son dixième anniversaire lors de sa prochaine édition qui aura lieu du 6 au 8 juin 2023 au parc d'exposition d'Abidjan. La thématique choisi pour l'occasion est *« L'espace, nouvel enjeu de sécurité pour l'Afrique»*, de façon à *« prendre en compte la géolocalisation, la navigation, les télécommunications et la surveillance des grands espaces maritimes et terrestres »*.

Charles Beaudouin a rappelé que la vocation du Coges, dont il est le directeur, n'était pas seulement de réunir des exposants et des visiteurs , mais aussi de *« dessiner les tendances afin de contribuer à leur meilleure prise en compte dans la sécurité des citoyens et de l'environnement »*.

*« L'Afrique n'a pas attendu le Coges pour lancer son ambition spatiale : pas moins de 50 satellites africains sont déjà en orbite. Nous nous devons de fédérer le milieu industriel comme nous le pouvons et nous avons choisi cette année de nous associer à deux agences spatiales africaines : l'agence gabonaise d'observation spatiale et la « Kenya space agency »*, a-t-il précisé.

Loin d'une transposition d'un salon d'un continent à l'autre, il s'agit de répondre précisement aux attentes des Etats africains : *« la protection des grands parcs africains, réserves très importantes de faune, de flore et de minerais, et qui sont parfois en proie au terrorisme et au banditisme »* entre ainsi dans les préoccupations sécuritaires des décideurs des pays africains, auxquels Shield Africa souhaite contribuer à apporter des réponses concrètes.

*« L'espace, permettant l'observation sur très grande surface, des communications sécurisées à longue distance et la navigation, est essentiel pour participer à la protection des grandes zones et s'ajoute à l'offre des moyens modernes de sécurité et de défense que nous souhaitons proposer »*, a conclu le directeur du Coges. ■

# LA NOUVELLE TECHNOLOGIE AU SERVICE DES SOLDATS DU FEU

LIEUTENANT JULIEN, OFFICIER AU SEIN DE L'ARMÉE DE TERRE

**Le garde-pompe d'hier est bien différent du soldat du feu d'aujourd'hui. Au fur et à mesure de son existence, il a su s'adapter pour faire face à un changement et une kyrielle de nouveaux risques.**

Qu'ils soient sapeurs-pompiers civils ou militaires, leur point commun est le même partout en France : l'art d'éteindre des incendies. Pour ce faire, des systèmes et des outils astucieux pour assurer les sauvetages leur sont dévoués. Le sapeur-pompier a évolué dans les époques connaissant un voyage de modernité et d'innovation, parfois bouleversant, pour pouvoir répondre aux enjeux d'aujourd'hui et de demain.

**RETOUR SUR L'HISTOIRE DU POMPIER D'HIER ET D'AUJOURD'HUI**

Des pompes à bras au robot « Colossus », l'innovation au service du soldat du feu ne cesse d'évoluer en étant gage de performance sur intervention. Avant de mettre en lumière la nouvelle modernité des sapeurs-pompiers, remontons le temps pour revenir sur quelques grandes innovations permettant de comprendre les évolutions.

En 1716, Louis XV nomme François Du Mouriez, appelé plus communément Du Périer, directeur général des pompes de la ville de Paris. Ce dernier sera par la suite le directeur de la compagnie des gardes-pompes du Roi. Considéré comme le premier pompier professionnel, il mettra en œuvre le premier système mobile de pompe à bras muni de tuyaux qui sera lui-même ravitaillé par des seaux d'eau. Ces pompes, fonctionnant avec des pistons, fournissent plus de 5 bars en sortie de lance.

Quelques années plus tard, alors qu'un bataillon de sapeurs-pompiers de la ville de Paris voit le jour, faisant suite à l'incendie de l'ambassade d'Autriche, le chef de bataillon Paulin va apporter une nouvelle image à ce corps. En effet, l'amélioration du matériel et la réorganisation de la lutte contre le feu vont devenir ses priorités. Il invente un système d'appareil respiratoire, composé d'une cagoule en cuir afin de progresser plus facilement dans les incendies. En parallèle, il perfectionne les échelles à crochets en réduisant leur poids pour en faciliter la maniabilité. Cet outil est devenu indispensable sur les incendies et conservé, depuis, au sein de l'ensemble des engins pompes de la Brigade de Sapeurs-Pompiers de Paris (BSPP), du Bataillon de Marins-Pompiers de Marseille (BMPM), ainsi que des Services Départementaux d'Incendie et de Secours (SDIS). Alors que, partout en France, les communes mettent difficilement en œuvre des services d'incendie composés principalement de villageois, le bataillon parisien va devenir la vitrine de marque du pays en étant leader sur l'organisation des secours en France. L'amélioration du matériel se poursuit d'année en année. En 1872, les habitants parisiens peuvent voir apparaître des pompes à vapeur à traction hippomobile. Un gain de temps considérable pour se rendre sur les lieux de l'intervention, d'autant plus que ces pompes seront désormais maintenues sous pression directement à la caserne.

Quelques années plus tard, un personnage majeur va voir le jour. Il s'agit d'Arthur Krebs. Ce jeune ingénieur automobile va rejoindre le régiment comme commandant major-ingénieur aux sapeurs-pompiers de Paris. Il conçoit une innovation inédite, celle d'un fourgon d'incendie électrique. En 1899, sort des ateliers le premier engin pompe, offrant une autonomie

de presque cinq heures pour une traction de six hommes et une centaine de kilogrammes de matériel. Un an plus tard, en 1900, cette innovation va rayonner à l'Exposition Universelle de Paris. Elle placera cette unité sur le podium des compagnies de sapeurs-pompiers de France, d'Europe et d'Amérique. S'ensuit une multitude de changements : instauration de la couleur rouge vermillon sur les véhicules d'incendie rapportée de Londres dès 1885, adoption d'un nouveau casque de protection, acquisition d'échelles de plus de 25 mètres… Pour appuyer sa recherche et le développement de ses projets, le commandant major-ingénieur Krebs va disposer d'un groupe d'étude municipal présidé directement par le Préfet de police de la ville de Paris. En parallèle, la ville modernise ses systèmes de transmission avec des avertisseurs sonores des plus récents, ainsi que ses bouches à incendie. Désormais, le prix Krebs récompense chaque année l'ingéniosité des sapeurs-pompiers de Paris. En effet, des dispositifs de fiches d'idées nouvelles permettent à chaque soldat de contribuer activement à la modernisation de cette unité.

Au début des années 1900, de nouvelles réflexions se tournent vers la sécurité de l'homme. Les appareils respiratoires sont à nouveau étudiés par Mandet, permettant de donner une autonomie plus importante en remplaçant les tuyaux d'air par une bouteille comprimée de 150 bars. Dans le même temps, le comité de perfectionnement valide les projets de Vanginot en rajoutant un avertisseur sonore pour prévenir le porteur de l'appareil respiratoire lorsqu'il ne lui reste plus que quelques minutes d'air. Après-guerre, et forte d'une expérience acquise sur les champs de bataille, une réorganisation des secours est mise en œuvre. Les missions des soldats du feu s'élargissent avec notamment l'apparition des premières ambulances. En 1985, un engin unique au monde voit le jour : le Premier Secours Évacuation. Cette innovation révolutionnaire permettra aux sapeurs-pompiers de Paris d'avoir un engin polyvalent aussi bien dans les missions de sauvetage, d'incendie mais également de secours à personne en constante augmentation. Sur interventions, les nouveaux matériaux d'isolation dans les habitations favorisent les phénomènes thermiques et l'intensité des incendies. La conception du casque F1 de la société Gallet, en test dans les années 1980 au sein de la BSPP, vient radicalement changer la sécurité des intervenants. A la fin des années 2000, ce casque équipe l'ensemble des sapeurs-pompiers de France ainsi que plusieurs dizaines de pays. En adéquation parfaite avec les nouveaux risques, les innovations n'ont jamais cessé de répondre à de grandes ruptures et évolutions sociétales.

**ANTICIPER LES RISQUES DE DEMAIN**

Le monde d'aujourd'hui change à un rythme effréné et crée de nouvelles dynamiques, de nouveaux enjeux, de nouvelles ruptures et incertitudes. Un changement de paradigme est en cours au sein de nos villes françaises. La compréhension des nouveaux défis est donc fondamentale pour pouvoir répondre à une nouvelle demande. Pour ce faire, une prospective stratégique doit être mise en place et permettra de proposer des sources de réflexion pour le commandement avec des actions concrètes pour les professionnels de l'urgence et cela en transformant les vulnérabilités en opportunités opérationnelles. Nos dirigeants travaillent à des villes durables, capables de faire face aux risques technologiques et naturels mais également cybers en construisant toujours plus haut, et creusant toujours plus bas, innovant dans les matériaux et les isolations, dans l'approvisionnement énergétique des espaces urbains ou encore en proposant des transports avec des nouvelles énergies, le tout de façon connectée.

Pour faire face à cela, les services d'incendie et de secours français disposent tous d'un bureau de prévention afin de mettre en œuvre la réglementation incendie sur les nouvelles constructions et les établissements recevant du public. Ces « ingénieurs » du feu effectuent des contrôles sur le terrain, suivent et conseillent les maîtres d'œuvre au travers de nombreux moyens de prévention de lutte contre l'incendie. Malgré cela, en 2020, les sapeurs-pompiers ont effectué près de 4 290 700 interventions en France, soit 11 755 interventions par jour, représentant une intervention toutes les 6,5 secondes. Il est donc important de placer l'innovation au cœur des services d'incendie et de secours afin d'apporter plus d'efficacité et de sécurité là où l'homme ne peut pas, ou difficilement, accéder de par la typologie du danger. L'innovation et le secteur R&D ne s'arrêtent pas aux frontières de la France

en matière de technologie pour combattre les incendies. En effet, certains pays comme la Suisse ou les États-Unis sont parvenus à créer, en version prototypée pour le moment, un casque de réalité augmentée permettant de distinguer les flux thermiques via une vision réelle et une vision infrarouge.

Pour éviter de mettre en danger les sapeurs-pompiers, plusieurs innovations ont vu le jour. Toutefois, il ne s'agit pas de remplacer le travail de l'homme, mais bien de faciliter ce dernier :

■ **innover directement de « l'intérieur » :** carrefour Technique et Innovation au Congrès de la Fédération Nationale des Sapeurs-Pompiers de France (FNSPF), prix de l'innovation de l'association Atraksis, prix Krebs, colloque de sciences appliquées organisé par le laboratoire central de la Préfecture de police de Paris et la BSPP ; toutes ces initiatives permettent de développer des synergies innovantes venant directement des soldats du feu pour faire face à leurs problématiques du quotidien. Ces échanges sont primordiaux et permettent de dialoguer sur l'art des sciences et préparer au mieux l'avenir ;

■ **les drones :** afin d'appuyer les unités au sol, la plupart des soldats du feu utilisent des drones pour de multiples missions : délimitation des secteurs d'intervention, recherche de victimes, reconnaissance dans des zones représentant un risque important ou inaccessibles (NRBC, zone inondable, industrielle…). Le coût et le délai de mise en œuvre sont de réels avantages comparés au survol d'un hélicoptère. Même si des obstacles demeurent dans l'utilisation de drones, comme l'autonomie des batteries, la limite en surcharge d'éléments et détecteurs embarqués, la réglementation lors des survols en présence d'autres aéronefs ou encore les vents violents, les industriels développent en permanence de nouveaux systèmes pour exploiter au mieux les multitudes de données ;

■ **les lances à incendie :** outil essentiel et emblématique du sapeur-pompier, elles n'auront cessé d'évoluer durant les dernières années. Les travaux scientifiques et la connaissance de plus en plus poussée du feu et des phénomènes thermiques permettent désormais d'éteindre des incendies en réduisant de façon importante le débit d'eau tout en améliorant les capacités de réduction des gaz chauds et d'atténuation des rayonnements. La société française ZELUP a développé une nouvelle lance à brumisation diphasique permettant de créer un brouillard obtenu en divisant les gouttes d'eau et en diminuant de manière significative les contraintes énergétiques de l'incendie. Ainsi, elle répond à des enjeux économiques et environnementaux. Sa consommation passe à 90


litres/minute contre 500 litres/minute pour les lances actuelles ;

■ **les robots :** pesant plus de 500 kg, le robot « Colossus » ne passe pas inaperçu et s'illustre sur des interventions de grande ampleur, par exemple des feux à caractère industriel, des tunnels, une reconnaissance en zone hostile, l'incendie à Notre-Dame de Paris, le brancardage sur de longues distances… Équipé d'une lance et d'une caméra thermique, il s'adapte parfaitement à de nombreuses missions. D'autres robots ont vu le jour, comme une innovation, dans le SDIS 13, d'un robot équipé d'un ventilateur brumisateur grande puissance, outil idéal pour appuyer les sapeurs-pompiers lors d'un fort rayonnement ;

■ **l'évolution de la formation :** l'intégration du numérique, le traitement des données sur intervention, la modélisation de l'environnement d'opération ou encore la gestion des secours font l'objet d'une attention particulière au quotidien. De nombreuses sociétés ont développé des logiciels pour rendre plus efficients les services d'incendie et de secours. C'est le cas par exemple du système NexSis qui se déploie progressivement partout en France, permettant une interconnexion entre les services de secours (pompiers, police, SAMU), hiérarchisant les alertes et permettant une meilleure répartition entre les centres de secours. De plus, la transmission de photos et de vidéos viendra coupler le renseignement concernant les apports opérationnels tactiques. En centre de formation, les rétroprojecteurs laissent doucement la place à des interfaces visuelles à réalité augmentée permettant d'immerger l'utilisateur dans un environnement des plus réels et ainsi de plonger l'apprenant dans des entraînements des plus efficaces. Dans les Ardennes, le premier centre d'entraînement dédié aux forces d'interventions vient de voir le jour. Ce centre, aux nombreuses zones techniques, est un laboratoire d'essais qui vise à mettre en pratique les nouveaux matériels des industriels mais également des services d'incendie et de secours, afin de pouvoir s'entraîner aux risques technologiques, secours routier, travaux en hauteur, sauvetage et déblaiement…

Même si le nombre d'interventions pour des incendies n'augmente guère, la nature de celles-ci change profondément au regard de l'évolution des risques des infrastructures et des matériaux de construction auxquels sont confrontés quotidiennement les sapeurs-pompiers. L'innovation est au cœur des préoccupations. Toutefois, ces matériels ne sont pas destinés à remplacer les soldats du feu mais bien à leur faciliter le travail et à les sécuriser. Lutter contre les incendies est et restera un métier d'Homme, pour reprendre une citation d'Albert Einstein : *« L'homme et sa sécurité doivent constituer la première préoccupation de toute aventure technologique. »* ■

*A pictorial representation of the future land battlefield according to French Army studies. © French Army*

# FRANCE: TITAN, ONE STEP FURTHER

By MARC CHASSILLAN

**Whilst the French Scorpion programme is on tracks with the consortium Nexter-Thales-Arquus delivering Griffon, Jaguar, Serval and Nexter delivering soon the first modernised Leclerc MBTs, the *Armée de Terre* (French land forces) is preparing the next step through the Titan study. Titan is not a programme, not even an armament operation like Scorpion. It is a capability study process intended to prepare for the renewal of the decision component, or heavy force in a more prosaic vocabulary. The materialization of Titan as new, in-service hardware will take place between 2030 and 2050.**

*The logo of the Titan programme. © French Army*


## WHY TITAN?

**The M2MC** (*Multi-Milieux, Multi-Champs* that can be translated as multi-environment, multi-fields or multi-domain) battlefield is part of a "competition-contestation-confrontation" continuum that replaces the classic "peace-crisis-war". This means that, according to the French Chief of Staff general Burkhardt, we are entering a period of great instability since peace in the classic sense of the term has already disappeared. Sub-threshold aggressions, which some of our competitors have made a specialty of, Russia, China, Iran, North Korea to name but a few, can quickly degenerate once western governments make decisions based on manipulated, erroneous or incomplete information. The return of cover-up and decoy, troll factories and obedient media are participating in this infowar, crucial to breaking the will of the enemy. France has finally woken up and Madame Parly, the French minister of defence, recently introduced "*la lutte informatique d'influence*" L2I (or computer-aided struggle for influence). L2I will be implemented by COMCYBER, the French Cyber Defence Command.

However, these aforementioned competitors all have comprehensive, powerful, and numerous military resources. The French Army, one of the most capable expeditionary armies in the world, is not equipped today to face them over time and in any terrain. Titan must propose the technological and organizational paths that will lead


*A graphic description of the Titan concept. © French Army*

to a new level of capability. The MoD has therefore launched the Titan approach which brings together several working groups formed by senior officers and engineers from Army staff and DGA, the Directorate General of Armaments. From the threat assessment, major geopolitical inputs, lessons learned from current conflicts and the future trends in technologies, these working groups carry out operational research, tactical simulations, and wargames to find the best possible configuration for the land force equipped with renewed capabilities. From 2022 on, the DGA should notify some technical and operational studies to the French industry to shed industrial light and to grip good innovative ideas.

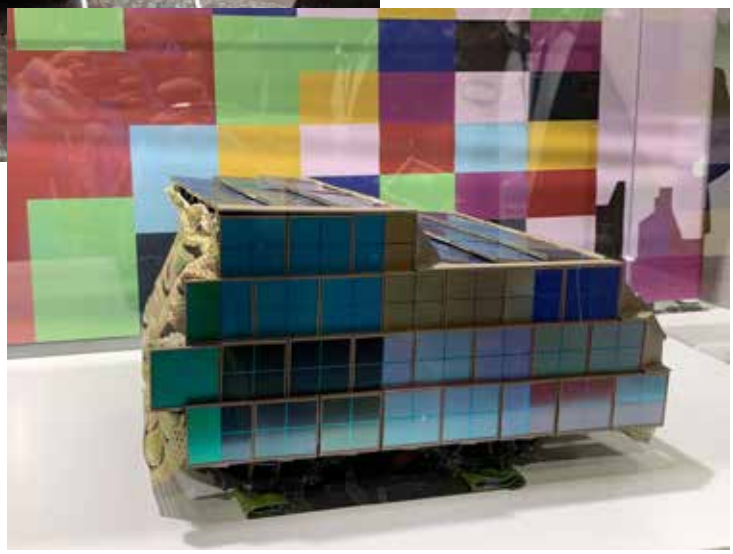
## SIX HIGH PRIORITIES

Nevertheless, Titan has already identified several crucial capabilities. The most publicized is the Main Ground Combat System, the lion king. The French Army want platforms under 50 tonnes. The anticipated system would be designed around four variants, a large calibre gun carrier, an escort system armed with a medium calibre cannon and a laser, a BLOS missile launcher and a command post. A purely "paper" phase, called SADS, entrusted to Nexter, KMW and Rheinmetall, will end at Q2-2022 and should theoretically lead to a phase of demonstration with ten technology demonstrators, the first of which are expected around 2025-26. Discussions between Nexter and Rheinmetall are very hard because they are about the future weapon system of the MGCS. The German company is promoting its new 130 mm smoothbore gun while Nexter has recently disclosed its Ascalon 140 mm system that comprises a gun, a set of semi-telescoped ammunitions and an autoloader. The commissioning of the MGCS should take place between 2035 and 2040 if the Armée de Terre and the Bundeswehr agree on a common requirement and if industrial companies find a fair workshare.

The second component, critical because it affects the Army's very ability to survive in a contested environment, concerns air defence, particularly at low and medium altitude. Main threats are fighters, combat helicopters, UAVs, rockets, mortars shells and guided munitions. It is likely that this capability will be implemented as early as 2028 according to recent statements of the Army staff. With such a schedule, the only option is to assemble off-the-shelf solutions such as MBDA Mistral, MICA VL or CAMM missiles, Nexter 40CTA gun, CILAS Helma laser and anti-drone jammers. As regards sensors, Thales and Safran portfolios include a full range of state-of-art radars and electro-optics devices. The choice of the platform will be an important part of the system engineering because the Armée de Terre needs a highly mobile vehicle able to keep up with MBTs and VBCI on rough terrains. Mobile air defence systems have almost disappeared from European inventories since the end of the Cold War. Over the last 30 years, western armies have benefited from total air superiority, and they have never faced any serious artillery shelling. Rebuild a full air defence capability will require new training and doctrine and more important, a new coordination between land and air forces. The 3D space management is key in the process.

The third requirement is about deep strike. The Armée de l'Air et de l'Espace (French Air and Space Force) will never venture its precious Rafale and its equally precious pilots into a bubble saturated with ground-air systems to drop

*A picture of the Leclerc XLR, the upgraded version developed within the Scorpion programme. France is working with Germany on the MGCS, the future heavyweight system that will be made of a main battle tank and other manned and unmanned elements. © M. Chassillan*



*The DGA, the French defence procurement agency, and Nexter are developing the Chamaleon adaptive camouflage system, that might be well adopted on future vehicles, part of the Titan programme. © M. Chassillan*

few bombs. The land forces will be in charge of the mission. The future system should be able to strike high value targets ideally up to 300 km. The French industry has all the technologies to quickly develop a product that meets the needs. Plan B can only be a purchase of the US Deep Strike Missile, South Korean Hyunmoo-3 / Chun Mu or Israeli Lora, the latter having demonstrated its performances in Nagorno-Karabakh. The deadlines for entry into service of the systems would also be around 2030. This sudden, but salutary, priority given to deep strike capabilities is at odds with other official statements pushing the Common Indirect Fire System back to 2045. The CIFS is one of the five programmes which were planned to be developed in cooperation with Germany.

Land access to heavily defended areas protected by powerful Anti-Access/Area Denial (A2/AD) forces will require heavy specific breaching systems. The Army working groups identify minefields and urban space disrupted by destruction and obstacles to be addressed as a matter of priority. Nothing has yet been said about the platforms that will integrate its capabilities, specific like armoured Caterpillar D9 bulldozers or those that will be eventually selected for the MGCS. The Armée de Terre is currently fielding remotely operated AMX30B2DT assault mine clearing vehicles as well as SDPMAC operating Israeli made Carpet thermobaric rocket launchers from Rafael. Those systems are getting old and the MRO of the AMX30 chassis will soon come to an end. Interestingly, the Bundeswehr has recently ordered 44 Rheinmetall Kodiaks on Leopard 2 chassis to partially fulfil this mission. The British have got the BAE Trojan-Titan pair on Challenger 2 chassis. The heavy breaching capability will not be the exclusivity of land systems. To open access into contested areas, air assets and artillery will be part of the combined arms team in charge of the job too.
Titan also identified the need for electromagnetic support to neutralize enemy C3I assets as the fifth main requirement. Several aerial or ground platforms will be eligible, some of which may be robotic. The increasing importance of warfare in immaterial domains will lead the army to dramatically increase its EW capabilities to deny opponents from using its C3I/cyber assets. EW systems will largely be distributed from lower to higher echelons through-out the combat division organization.

Robotics is considered as a key factor of massification. Massification is required to fight symmetrical threats in high intensity conflicts. The army has set up a dedicated team called Vulcain to build a comprehensive capability with a doc-

*Since the Cold War era western armies have neglected the self-propelled air defence issue. Looking at near-peer confrontations new assets have to be developed to ensure protection against drones and other threats coming from the third dimension. © M. Chassillan*

*The OPTIO-X20 armed unmanned ground vehicle developed by Nexter and based on the Milrem Robotics' Themis tracked platform. UGVs will be come an increasingly important asset in the near future. © M. Chassillan*

trine, trained soldiers, aerial and ground robotic systems and adapted logistics. Vulcain has a lab and can use all fully digitized training ranges to carry out trials and experiments. The French industry is working in close connection with Vulcain as solutions and technology provider.
Finally, Titan formulates the need to replace Tiger combat helicopters with a potentially multiplatform system combining aircraft and drones. By this time, the American Future Attack Reconnaissance Aircraft will have been chosen and the European work on the Next Generation Rotorcraft Capability (NGRC) carried out by France, Germany, Greece, Italy, and the United Kingdom may bring some concepts and technologies. In the meantime, the upgraded Tiger Mk-3s, a joint programme between France and Spain, will have to hold out until 2040.

## PRIORITY TO CONNECTIVITY

Titan's ultimate goal is to achieve connectivity at all levels, inter-arms, inter-service and inter-allies. A huge challenge at a time when two infantry sections engaged on the same terrain and belonging to two different NATO armies are not capable of automatically exchanging tactical data! The keystone of collaborative combat is based on the rapid and fluid broadcasting of information, made possible by the *Système d'Information et de Combat Scorpion* (Scorpion BMS) and the Thales Contact software radio set. For the record, a full year was not enough for seven European countries to agree on the definition of collaborative combat! The road will be long and strewn with pitfalls for officers and engineers in charge of setting new communication protocols and communication software within NATO and the EU. The Army has therefore determined two objectives for the current decade: extend and amplify Scorpion connectivity to the entire land force, vigorously initiate actions intended to obtain inter-service connectivity with the *Armée de l'Air et de l'Espace* and the *Marine Nationale* (French Navy) and finally have a minimum but usable connectivity with local actors. For the latter, the Army focuses on African armies in particular, with limited C3I resources. The Army staff specifies that high-speed tactical Internet everywhere, at all levels and all the time is useless and that the means to achieve it are either outside the scope of technology or too expensive. One of Titan's goals is to carefully define requirements by echelon, arm, and mission.

## THE CONTRIBUTIONS OF ARTIFICIAL INTELLIGENCE TO TITAN

The exponential growth of the volume of data to be processed will inevitably lead to automated processing by algorithms and therefore by Artificial Intelligence (AI). The scope of AI is immense in the military. The Army is considering seven fields of application for AI. Not surprisingly, operations planning comes first because many mechanisms and principles can be easily digested by an AI that can quickly present several options that humans can interpret, modify, and stabilize. Logistics and scheduled maintenance follow similar logic. Collaborative combat


*Among its various robots, Nexter developed the ULTRO, a 4x4 autonomous platform that can support soldiers mostly in the logistic field. Unmanned platforms will allow reducing risks for the soldiers on the future battlefield. © M. Chassillan*

and intelligence are the third and fourth applications. The data collected by the multiple sensors will have to be treated with care because the enemy, using cunning and deception, will multiply false leads to attract fires on false targets. AI will be instrumental in helping to guess enemy intentions and true positions. The AI will optimize the fire plans, their timing, and the management of 3D space. With the establishment of L2I, AI will help combat in immaterial domains. Cyberwar and influence (or softpower) need AI. Countering attacks, crafting retorts, exploiting opportunities, and gaining local dominance are vital to our defence. Robotics and autonomy will consume a lot of AI because it will take a lot of algorithms on board the autonomous platforms to fly, roll, detect, shoot, and defend. The same will be needed to guide swarms, manage automatic logistics convoys, optimize communication flows so as not to congest radio networks, and manage the movements of unmanned vehicles. Finally, the support services (human resources, general administration, medical, etc.) see AI as a powerful support in leaving soldiers or agents only noble tasks.

There is no approach similar to Titan in Europe, any more than there was for the construction of the Scorpion medium force and the concept of collaborative combat. The only equivalent undertaking is arguably the US Joint All-Domain aimed at countering China regardless of the engagement scenario. ■

*According to the Titan study the Tiger combat helicopter will be replaced by a multiplatform system combining aircraft and drones. © M. Chassillan*

# DIGITAL AFTER-SALES SUPPORT FROM ARQUUS

By PAOLO VALPOLINI

HALL 5A - F-F181-281

The importance of after-sales support for Arquus is epitomised by the fact that a separate stand is dedicated to this subject, support items being also exhibited beside vehicles and weapon stations.

While the Support division also acts during the products development phase and potentially in the build-up of local production when transfer of technology is required, most of its activities are related to the after-sales business, ranging from training, to service packages, diagnostic, fleet audit, and refurbishing.

Augmented reality allows trainees to get acquainted with the new system before getting in physical contact with it, saving time and money, and it is also used in diagnostic at distance, to help maintainers in the field linking them to experts at the company.

Adding health and usage monitoring systems (HUMS) is moving the company towards predictive maintenance, while additive manufacturing might soon become the standard at least for some types of spares. Developed for the French Army Scorpion programme, the "diagnostic suitcase" is proposed to Arquus export customers and is being implemented also for other types of vehicles. It allows getting immediate diagnostic, guiding personnel through the process in a very intuitive manner, and as it does not need any Internet link it can be used anywhere.

Arquus developed a fleet audit tool with structured control points allowing to acquire all data needed allowing to forecast spare needs, optimising fleet maintenance.

Based on that, Arquus has developed for the French Army the "Initial Projection Autonomy", a package of spares based on the number of kilometres, the type of terrain and the type of mission. To further improve those tools Arquus is starting to add Artificial Intelligence and Big Data features. ■

# LATVIA SEES RISE IN DEFENCE INDUSTRY AS IT COMMITS TO LARGER SECURITY BUDGET

HALL 5A STAND F 803

By ELISABETH GOSSELIN-MALO

For another year, the Latvian Pavilion opened its doors at Eurosatory 2022, showcasing this time 8 different defence and security companies from Latvia: Brasa Defence Systems, Belss, Catch Smart, Edge Autonomy, Electronic Communications Office of Latvia, Latvian Mobile Telephone (LMT), Riot Engineering and Rigas Dizelis DG. After recently announcing that it would be gradually increasing its defence budget to 2.5 percent by 2023, the Latvian Ministry of Defence says it has seen a significant rise in the demand for weapons and the overall armament industry. On this, Latvian Minister of Defence and Deputy Prime Minister, Artis Pabriks said, "considering that the current geopolitical challenges with the security situation in the region, influenced by Russia's war in Ukraine, we have to immediately perform all possible measures to enhance Latvia's defense and speed up the development of combat capabilities of our national armed forces." This was witnessed during the exhibition, where Latvian defence companies showcased their innovative products and the true local innovation ecosystem that exists in the country. Notably, LMT featured its work in the development of the 5G military testsite project for the Latvian National Armed Forces, the first military base of this kind in Europe, proving to be highly important for NATO allies. Also featured was Edge Autonomy's Penguin C-Mil MK 2 long-endurance unmanned aircraft system, which has a maximum flight time of 25 hours and Brasa Defence Systems showcased its Natrix future combat system. Looking ahead, the Latvian security industry is predicted to continue to expand with new upcoming projects featuring a junction between ICT, military, and innovation as well as the development of kamikaze drones. ■

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# KEY EVENTS OF THE DAY 5

## DO NOT MISS THESE IMPORTANT EVENTS OF THE DAY

**FRIDAY JUNE 17 - CAREER OPERATIONS DAY** Join international land and airS-tudents will be able to discover Defence and Security industry. The "young people" will have the opportunity to discuss with French industrialists, to meet companies that are recruiting and to find out about opportunities in these sectors.

## CONFÉRENCES

Join international land and airland Defence & Security domain players in their reflection on the current and future challenges of the sector. The conference programme is available on the Eurosatory website or at the exhibition's official Web App

| | BALARD HALL 5A | ÉLYSÉE HALL 5B | BEAUVAU HALL 5B | ORSAY HALL 6 | AGORA INNOVATION HALL 5A |
|---|---|---|---|---|---|
| 10:00AM – 11:00AM | **European defence**<br>European Defence Fund – opportunities for SMEs<br>**European Commission DG DEFIS** | **Public Safety**<br>Fire detection and Cyber<br>**FFMI** | | **Eurosatory Recruitment Event**<br>Women in the defense industry<br>**Les Jeunes IHEDN** | **10:00AM – 10:30AM**<br>**START–UP PITCHES**<br><br>**10:45AM – 11:30AM**<br>**MASTER CLASS**<br>GICAT<br>Fight against on–fly UAV<br><br>**12:00PM – 12:30PM**<br>**START–UP TROPHY OF THE DAY**<br>Public vote of the day before for the start–up of the day |
| 11:00AM – 12:00PM | **Eurosatory Recruitment Event**<br>The quest for skills in Defense<br>**ALTEN** | **Cyber**<br>Understanding cybersecurity of industrial and cyber physical systems<br>**HEXATRUST** | | | |
| 12:00PM – 1:00PM | | | | | |
| 2:00PM – 3:00PM | | | | | |

## LIVE DEMONSTRATIONS

| | |
|---|---|
| 9:45am-10:30am | EUROSATORY Live Demonstration |
| Industries of EUROSATORY Live Demonstration | ARQUUS, FN HERSTAL, ICARUS SWARMS, INTERNATIONAL ARMORED GROUP, TSD International, MILREM, SIDES, TECHNAMM |

## 12:00AM AWARD OF THE START-UP OF THE DAY - EUROSATORY LAB - HALL 5A

Discover the attendees favorite start-up!

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**Eurosatory 2022 will be open: Friday June 17 from 9 am to 4 pm**