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Confronting the future

Rheinmetall Defence has chosen Eurosatory to launch the latest version of its private venture Lynx KF41 tracked infantry fighting vehicle (IFV).

The KF41 is fitted with the latest Lance 2.0 turret, armed with the Wotan 35 dual-feed cannon, which fires standard 35x228mm ammunition with a 7.62mm coaxial machine gun. A unique feature of the Lance 2.0 turret is that it has a flexible mission pod fitted either side, which allows for the installation of subsystems, including two Spike anti-tank guided weapons, non-line of sight strike loitering munitions, UAVs or an electronic warfare package.

A computerised fire control system is fitted, as are

Rheinmetall's Stabilised Electro-Optical Sight System and Acoustic Shooter Location System, and an electronic architecture and battle management system.

The basic hull is of welded steel, to which a modular armour package and internal spall liners are fitted. Survivability is enhanced by the installation of a hard kill active defence system and the Rosy multispectral 360° smoke/obscurant system.

The KF41 has a gross vehicle weight of about 44 tonnes, with a stretch potential to 50 tonnes. It is powered by a Liebherr diesel engine developing 1,140hp, coupled to a Renk fully automatic transmission, which gives a top speed of 70km/h. It has a flexible

suspension system developed by Australian company Supashock.

A key feature of the KF41 is a common drive module and a flexible mission module, which allows the end user to reconfigure the vehicle in eight hours to meet changing operational requirements, such as armoured personnel carrier, ambulance, command post vehicle and recovery vehicle.

The first example of the Lynx has taken part in the competition to supply the Czech Republic with up to 210 IFVs to replace its currently deployed BMP-2 vehicles, and Rheinmetall will also enter the Lynx to meet the Australian Army Land 400 Phase 3 requirement.



La résistance du soudage par friction

page 5



Black Eagle is designed for ISTAR missions

page 30



Sophie Ultima, jumelles "Quatre-en-un"

page 24

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STAND B267 HALL 5A

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Hall 6 Booth F-751



Helicopter for everyone

BY DAVID DONALD

Airbus Helicopters is showing a model of its H160M multi-role helicopter (Hall 5A, Stand C158), which has been selected by France to replace seven fleets of helicopters in service with the air force, army and navy.

France has stated a requirement for 169 H160Ms in three versions. That proposed for the Marine Nationale is to replace the Dauphin, Panther and Alouette III. Key features of the naval shipborne version are folding rotor blades and tail fin, deck recovery harpoon, search

H160M is intended to replace the Fennec and Gazelle in roles such as armed scout. The aircraft are proposed with a forward-firing 20mm cannon mounted on the port side weapon stub and Thales FZ275 laser-guided rockets, as well as 7.62mm door guns.

Like all versions, they will feature an undernose electro-optical sensor turret. The HIL aircraft will also be required to work in co-operation with UAVs in manned-unmanned teams (MUM-Ts). Airbus recently performed MUM-T trials in Austria involving an H145 operating with a Schiebel Camcopter.

The three civilian-standard H160 prototypes have completed around 800 hours of flight-testing as part of a campaign that is expected to lead to certification after between 1,100 and 1,200 hours. Hot-and-high trials are to be undertaken in Denver, Colorado, later this month.

The H160M was selected by the French government to fulfil the HIL requirement in March 2017, but as yet there have been no orders. The HIL was not funded in the 2019-25 defence procurement plan, but should be included in the following plan, with deliveries perhaps possible from 2028. In the interim, Airbus continues to study configurations with the three services, a process that could lead to some alterations. ■



Being procured under the Hélicoptère Interarmées Léger (HIL, light joint-service helicopter) programme, the H160M is a militarised version of the new generation of Airbus commercial helicopters that arose from the X4 technology demonstrator.

radar, door gun and ANL next-generation light anti-surface missiles. Weaponisation of all versions employs the HForce system devised by Airbus.

In Armée de Terre service the

The Armée de l'Air is slated to receive 38 H160Ms to replace its Fennecs and Pumas. The air force has a requirement for its aircraft to be inflight-refuellable from C-130J and A400M tankers. They will likely be armed with

cannon and door guns, and tasked with roles including search and rescue; anti-helicopter/UAV; intelligence, surveillance and reconnaissance (ISR); and close support.

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Hall 6 Booth E687/E688

Frictionner et malaxer pour mieux blinder

PAR FRÉDÉRIC LERT

Les zones de soudage sont des points de faiblesse bien identifiés sur des véhicules blindés soumis à des contraintes de plus en plus fortes. Renforcer la structure de ces engins tout en réduisant leur masse est donc un défi permanent pour les fabricants. TRA-C Industrie (France) innove avec un soudage sans ajout de matière : l'assemblage des pièces se fait par friction malaxage (alias Friction Stir Welding, ou FSW). Les matériaux passent à l'état pâteux, permettant ainsi le mélange des matières et la soudure. Le procédé est inédit et complexe, mais il se traduit par des soudures plus résistantes, 95 % des propriétés mécaniques de la matière étant préservées, contre 60 % avec un procédé traditionnel. Il permettrait également la conception de structures en moyenne 30 % plus légères selon TRA-C. La PME lyonnaise, qui a bénéficié du soutien de la DGA et de son dispositif RAPID pour développer son procédé industriel, a été retenue pour réaliser le treillis moteur du VBMR, futur véhicule blindé de l'Armée de Terre française, mais aussi le châssis principal de la

tourelle ARX®25 de Nexter Systems (France).
(Stands 6GF706/Pe6bB170/5aF20-178-268)

▼ **Le soudage par friction malaxage se traduit par une plus grande résistance des soudures et un allègement des structures**



Une solution d'emballage responsable




▲ **No-Nail Boxes, avant tout, une démarche RSE (Responsabilité Sociale des Entreprises)**

PAR ED SIPATSEL

No-Nail Boxes est le fabricant luxembourgeois de caisses pliantes en bois contreplaqué et en acier pour l'industrie. Certifié ISO 9001 et 14001 et labellisé PEFC (Programme for the Endorsement of Forest Certification), il utilise des bois issus de forêts soumises à une gestion durable. Intégré dans la division du Groupe Alipa, il produit quelque 300 000 caisses/an, dont 90 % sur mesure.


(Stand 6C661)



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Belgian Pavilion
Stand E300



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Nec plus ultra

PAR JEAN-PIERRE HUSSON

Toujours à l'avant-garde dans son domaine d'excellence, Extrema Ratio (Italie) propose une gamme de couteaux militaires multi-usages et de combat bénéficiant des dernières innovations et concepts en matière d'armes blanches. Les plus récents modèles se caractérisent par de nouvelles lames profilées H. Elles garantissent des performances mécaniques plus élevées et une réduction de poids, avec un dessin



plus agressif pour une meilleure capacité de pénétration sous tous les angles d'attaque. De nouvelles poignées ergonomiques et ambi-

dextres, facilement démontables sans outils, assurent une adhérence maximale et une tenue en main exceptionnelle, alors que des étuis innovants, avec dispositifs de rétention et de sécurité de niveau II/III, systèmes d'affûtage intégrés en céramique et passants réglables pour le port multi-positions, permettent une interface plus simple et plus rapide avec les systèmes Molle. **(Stand 6C498)**

◀ **Les nouveaux couteaux Extrema Ratio bénéficient du retour d'expérience des opérationnels**

Bien se tenir face à l'œil du Cyclope



PAR JACQUES DE LESTAPIS

HGH Infrared Systems (France) présente les cinq versions de sa gamme de capteurs thermiques Spynel de surveillance 360°. Leurs caméras infrarouges ont cette particularité de pivoter de manière continue, afin d'offrir une image panoramique toutes les secondes. La grande nouveauté de cette

◀ **Le mode automatique "Staring" permet de pister les menaces les plus difficiles à suivre**

année réside dans le Cyclope, le logiciel intégré aux capteurs Spynel. Il permet de pister automatiquement une cible en temps réel en mode "Staring", sans intervention manuelle. Le flux vidéo est de 50 images/seconde. Avec cette nouvelle fonctionnalité, l'opérateur n'a qu'à cliquer sur la menace choisie. Le capteur cesse alors de tourner pour se focaliser sur elle. La menace est ainsi poursuivie de manière totalement automatique, même si elle se déplace et change de direction très rapidement, comme le font les drones et les embarcations rapides. **(Stand 6F370)**

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Ne versez qu'une larme, juste une seule!

PAR JEAN-MICHEL GUHL

La malheureuse poussière dans l'œil, vous connaissez ? Celle qui vous empêche de bien voir... Il semble que la société tchèque EPVÚ Defence se soit chargée de la question avec bonheur pour la régler efficacement à l'aide de son dispositif Pan/Tilt MSR-W ? Ce n'est rien d'autre qu'un support intelligent de 48 kg, mobile en site et en élévation. Acceptant une masse de 100 kg, il est construit pour porter des optiques de surveillance installées sur mât

ou laissées hors de portée de tout soutien régulier. Comme son nom l'indique, il tourne sur 360° et oscille sur $\pm 45^\circ$. Cela lui permet de diffuser sur les optiques, via une commande à distance (interface Ethernet TCP/IP), un liquide de refroidissement, ou bien de nettoyage. Ce qui est idéal pour les environnements désertiques et poussiéreux où les moyens optiques sont mis à rude épreuve. (Stand 5aK511)



▲ Le MSR-W est livré sans les optiques qui prennent place sur les palettes, de part et d'autre, et au haut de la tête

Joyeux anniversaire!

PAR ED SIPATSEL

Force est de constater qu'avec le poids des années, Etienne Lacroix Groupe (France), jeune "start-up" qui fête aujourd'hui ses 170 ans tout de même, compte parmi les plus grands acteurs mondiaux de la pyrotechnie et de la Défense. Né en 1848, le groupe



n'a cessé de se développer, d'innover, de se diversifier. Aujourd'hui, il comprend 7 filiales qui emploient plus de 800 collaborateurs (dont la moitié au service de la Défense), avec des cœurs de métier différents, transverses et complémentaires. Ils couvrent les

secteurs Feux d'artifices et spectacles, Défense, Sécurité civile et Maintien de l'Ordre, Soutien aux forces, Packaging, Plasturgie, Transport et Logistique, Négoce. Le secret de cette longévité et de ces succès ? Point d'élixir de jeunesse, mais la richesse des personnels qui œuvrent dans cette dynamique société, où l'investissement, l'excellence, et les résultats riment avec 170 ans de passion. (Stand 6K48)

EN BREF

- L'évolution du système d'aide au commandement NRBC des armées françaises et son MCO ont été confiés à **Thales Communications & Security** (France) (4 M€). (Stands 5aF20-178-268/Pe6B500)
- Le suivi des LDCU (Layers Display and Control Unit) et INU (Inertial Navigation Unit) des APS (Artillery Pointing Systems) équipant les canons de campagne L118 de 105 mm de l'armée britannique va être assuré par **Leonardo MW** (Royaume-Uni) (3,4 M€). (Stands 6K200/5aC647)
- **Steyr Mannlicher** (Autriche) doit livrer 500 fusils d'assaut supplémentaires à l'armée luxembourgeoise (0,66 M€). (Stand 5aH437)
- La prochaine déconstruction de navires et engins nautiques (chalands, patrouilleurs, remorqueurs...) condamnés de la Marine nationale française et de la **DGA** comprend le démantèlement d'environ 8 unités d'un tonnage global léger de l'ordre de 4300 tonnes. La longueur maximale des coques est d'environ 50 mètres et leur poids varie entre 100 et 1000 tonnes environ. (Stands 5aF20-178-268)



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Triple boost for French Army

BY CHRISTOPHER F FOSS

Following a competition for the Véhicule blindé multirôle-léger (VBMR-L), a contract was awarded early in 2018 by the Direction générale de l'armement for design, development and production. The first tranche covers the supply of prototypes plus 489 production models, which should be delivered by 2025. VBMR-L is a joint proposal of Nexter Systems (Stand B170, External PeB6) and Texelis (Hall 5A, Stand C268).

France has now decided to procure additional VBMR-Ls, with

200 more to be delivered by 2025, bringing the total to 689. Production is being undertaken by Nexter in Roanne. More are to follow.

The first VBMR-L prototypes will be completed in 2019, followed by an initial operating capability in 2021. There will be three main versions plus a number of sub-versions. The first of these is for armoured patrol, which is expected to be qualified in 2021 with a total of 10 variants; the second is communications, expected to be qualified in 2022 with four variants; and the



Scale model of VBMR-L fitted with roof-mounted remote weapon station, acoustic detection system, situational awareness system and counter-IED equipment

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third is reconnaissance, which is expected to be qualified in 2023 with two variants.

The VBMR-L will have a gross vehicle weight of between 15 and 17 tonnes, with growth potential to 18 tonnes to take into account future requirements.

Texelis' Limoges facility will provide the complete mobility solution from the steering wheel through to the drive line, suspension and wheels with the powerpack. The latter will consist of a Cummins 375hp diesel coupled to an Allison SP3000

automatic transmission and a two-speed transfer case, which will give a top speed of 100km/h and a road range of up to 600km.

Standard equipment will include the Scorpion electronic architecture, SICS battle management system and the latest Thales Contact radio.

The VBMR-L will be fitted with a number of subsystems, which are provided as government furnished equipment and are also to be fitted to the Jaguar and Griffon 6x6 armoured fighting vehicles already ordered. ■

300 up for the F-35

Lockheed Martin has just delivered the 300th production F-35 Lightning II. The total comprises 197 F-35As, 75 F-35Bs and 28 F-35Cs for 10 countries: Australia, Israel, Italy, Japan, Netherlands, Norway, South Korea, Turkey, US and UK. The latter is the latest to receive aircraft on its own soil, the first four F-35Bs being delivered to RAF Marham last week. By 2023, the production line is expected to hit an annual delivery rate of 160 aircraft. ■

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HALL 6

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Displays for Turkey

Based in Georgia, American Panel Corporation (APC) specialises in producing advanced displays for supply to vetronics and avionics integrators for military vehicles and aircraft. Among its products is the Large Area Display that is fitted to the Lockheed Martin F-35 Joint Strike Fighter.

Last month, APC (Hall 5A, Stand DC500) announced that it had been selected by Turkish defence electronics company Aselsan to provide displays for the T-70 Turkish Utility Helicopter Programme, for which Aselsan is the avionics integrator. Each cockpit will feature four APC 8x10in M1210 Display Head Assemblies for use as primary/multi-function displays and two M640P 4x5in keyboard display units. APC is scheduled to start shipping the displays this year and deliveries will run until 2025. ■

Building-block air defence

BY DAVID DONALD

IAI has launched a modular air defence system that draws on its experience with the Barak missile family. Known as Barak-MX, the new system takes a modular and scalable approach, linking sensors, launchers and effectors into a system that can be tailored and sized to meet air defence needs. While IAI can provide all of the necessary elements from the company's portfolio, the Barak-MX can work with radar and effector types from other sources, and which may already exist within a country's inventory.

At the heart of Barak-MX is a central command and control battle management centre that has advanced systems that match shooter to threat. To this central core can be added a range of air defence sensors and effectors to scale up the system. This allows an air defence network to be built up in blocks, expanding as needs arise and budgets allow.

The system is equally applicable

to land- and sea-based systems, and can integrate the two into one network.

In terms of effectors, IAI offers three missiles based on the Barak 8: the Barak MRAD with a single-pulse engine giving a range of up to 35km, dual-pulse Barak LRAD for engagements of up to 70km, and Barak ER. Development of the dual-pulse 150km Barak ER weapon is currently under way. The weapon has an additional booster motor that increases its length, and also that of the required launcher. Further tests are planned for the remainder of the year, and IAI suggests it could be ready for production in about a year.

Although these vertical-launch interceptors – or their equivalents – cover the core of the Barak-MX requirement, functions at either end of the engagement scale could be integrated, such as very short range/C-RAM systems at the lower end, and a BMD (ballistic missile defence) capability at the upper end. ■



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Acquisition completed

On 6 June, Northrop Grumman closed its acquisition of Orbital ATK following the receipt of US Federal Trade Commission anti-trust approval. Orbital ATK's former COO, Blake Larson, has been elected as corporate VP and president of what has been created as a fourth business sector in Northrop Grumman known as Innovation Systems.

Eurosatory is the first public exhibition for Innovation Systems (Hall 5A, Stand B627); it is displaying its armament and rocket propulsion expertise. ■



BY CHRISTOPHER F FOSS
Christopher Pyne, the Australian Minister of Defence Industry, unveiled the Supashock Automated Load Handling System (ALHS) on the Rheinmetall Defence Stand (External Pe6B, C241/C201) on Monday.

The ALHS, shown here on a Rheinmetall MAN Military Vehicles HX series 8x8 truck, was designed by Australian company Supashock, of which Rheinmetall recently acquired 49 per cent.

The Supashock ALHS has been developed to enable the

efficient, automated loading and unloading of containers, modules and flat racks by an operator seated in a protected cab. The version shown is the ALHS 17, with the number indicating the maximum weight in tonnes of the ISO containers, modules and STANAG-compliant flat racks.

The ALHS has a number of mechanical degrees of movement that combine with a computer-assisted user interface to make the loading and unloading of a container easier and quicker in all conditions, by just one operator.

According to Supashock, a conventional hook loader has a loading cycle of up to 15 minutes, but this can be cut to less than five minutes using the ALHS 17. ■

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► La lunette-viseur Mepro NYX-200 montée sur arme automatique IWI

PAR JEAN-MICHEL GUHL

Meprolight (Israël), spécialiste de l'optronique, produit des systèmes de détection thermique et de vision nocturne. Y compris des marqueurs laser pour les armes légères. Parmi ses réalisations exposées, la lunette-viseur Mepro NYX-200. Disponible en deux versions optimisées pour le combat rapproché, elle combine canal thermique et vision nocturne afin de permettre une

détection élargie dans les environnements les plus sombres. Mais aussi, une combinaison innovante entre un ensemble thermique et une caméra numérique diurne permettant à un combattant d'évoluer indifféremment d'un endroit clair vers un endroit sombre, et vice versa, sans avoir à changer d'optique. Egalement à voir, le viseur Mepro MicroRDS, à point rouge, muni d'un large écran de visualisation réticulé fonction-

nant de façon très économique avec une simple batterie CR2032. Il peut être monté sur fusil aussi bien que sur pistolet. Toute la gamme Mepro est visible à Eurosatory, y compris le viseur reflex à point rouge Mepro MOR de seulement 30 mm de diamètre. Il permet l'acquisition très rapide d'une cible en gardant les deux yeux ouverts et existe pour armes en 5,56 et 7,62 mm. **(Stand 6D647)**

En première : une caméra thermique SWaP mégapixels

PAR FRÉDÉRIC LERT

Device-Alab (France), spécialiste en caméras infrarouges à bas niveau de bruit, dévoile son cœur de caméra SmartIR1M0E, le mégapixel thermique non refroidi le plus compact jamais produit. Ne consommant que 2 watts, ce poids plume de 70 g, de 52x48x25 mm³ et capable de 9 à 120 images par seconde, s'adresse, notamment, aux applications aéroportées, même UAV ou drones légers, et aux applications terrestres

militaires de surveillance. L'excellente qualité d'image - liée à la résolution et au faible niveau de bruit - assure à longue portée la détection d'une cible, sa reconnaissance, son acquisition et sa poursuite. Le SmartIR1M0E utilise, au choix, une interface USB, YCbCr, ou Cameralink™. Au fait, pour ceux qui s'interrogeraient sur la signification de SWaP, il s'agit, tout simplement, de : "Size, Weight & Power" !

(Stand 5aJ692)

▼ La SmartIR1M0E complète la gamme SmartIR et IrLugX™



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Mulet multirôles

PAR JEAN-PIERRE HUSSON

Successeur du M40E15-WM vendu à plus de 18 000 exemplaires dans le monde ces 30 dernières années, le MUV (Military Utility Vehicle) de Iveco Defence Vehicles (Italie) est un nouvel utilitaire 4x4. Offrant une charge utile pouvant aller jusqu'à 4 tonnes suivant la version, il est motorisé et configuré à la demande du client pour remplir des missions spécifiques : support logistique, transport de personnel (12 + 2), ambulance, etc. Quelle que soit sa configuration, cabine simple

ou double, plateau ridelles, pick-up, fourgon, ou autre, il peut recevoir à la demande un moteur Diesel FTP Industrial Euro VI (175 ch), ou Euro III (146, 175, ou 197 ch), couplé à une boîte manuelle à six rapports, ou automatique à huit rapports. Facilement aérotransportable et conçu pour opérer dans des conditions climatiques adverses de -32° à +49° C, il est très performant en terme de mobilité et de capacités de franchissement. En option, il peut être livré avec un blindage léger. (Stand 6C370)



► **Proposé en différentes configurations, le MUV est en cours d'évaluation par de nombreuses forces armées**

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PAR JEAN-MICHEL GUHL

A l'heure de la transition énergétique et à la mobilité des équipements des armées comme du soutien des infrastructures en opérations, Titan Aviation (France), spécialiste des équipements d'avitaillement pour aéronefs, présente son système EZ Fuelling (lire EZ en "Easy" !). Il vise à réduire la consommation de carburant utilisé lors des avitaillements, tout en diminuant l'empreinte carbone. Cette solution innovante est déclinée en trois versions, permettant d'avitailleur moteur éteint tout véhicule, ou aéronef, avec un

camion oléoserveur ou avitailleur conventionnel. Grâce à l'EZ Fuelling, l'énergie nécessaire à l'avitaillement est générée par une turbine, des batteries additionnelles, ou par le système Start & Stop du camion, sans aucune émission de gaz. Cela permet ainsi de réaliser des économies de carburant et de maintenance du châssis, de réduire sensiblement la pollution et, enfin, d'améliorer les conditions de travail des utilisateurs : moins d'exposition aux polluants de l'air, moins de bruit, et moins de vibrations.

(Stand 6F712)



▲ EZ Fuelling, économiseur de carburant et d'empreinte carbone



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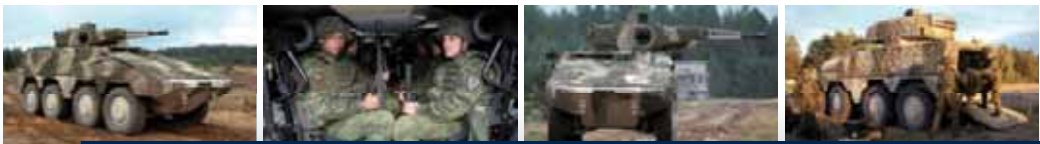
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Bridging wide gaps Down Under

BY CHRISTOPHER F FOSS
Williams Fairey Engineering Ltd (WFEL, Hall 5A, Stand DC821) is supplying two bridging systems to the Australian Army to meet its Land 155 Enhanced Gap Crossing Capability Project, with final deliveries to be made in September 2018.
The Australian contract covers the supply of Dry Support Bridges (DSBs) and Medium Girder Bridges (MGBs),

which were selected after an international competition.
The DSBs are transported and launched from a Rheinmetall MAN Military Vehicles 10x10 chassis, which is fitted with a fully protected forward control cab, and can be launched by just eight personnel in 90 minutes. Prior to delivery to Australia, the DSBs, which are capable of taking vehicles weighing more than 120 tonnes, were put through

extensive trials at the Millbrook Proving Ground in the UK to verify both their road and off-road capability.
The MGBs being supplied are of the link-reinforced version, which can span a gap of up to 49m, which will be supplemented by portable pier and span equipment that will allow bridges of up to 76m to be constructed. Both bridge types being delivered to Australia will have



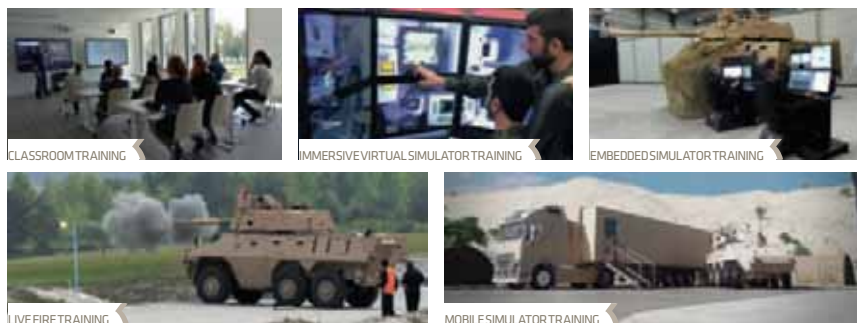
Centauro II at the ready

Development of the latest Centauro II Mobile Gun System (MGS) for the Italian Army is complete and the Consortium Iveco Oto Melara (CIO, Hall 6, Stand B/C 301) is now awaiting a contract for an initial batch of 11 units. The total requirement is for 148 units in two batches of 74.
Centauro II MGS is the long-term replacement for the current Centauro, which is armed with a 105mm rifled gun, with 400 units delivered to the Italian Army and 84 to the Spanish Army. The Italian Army has transferred 141

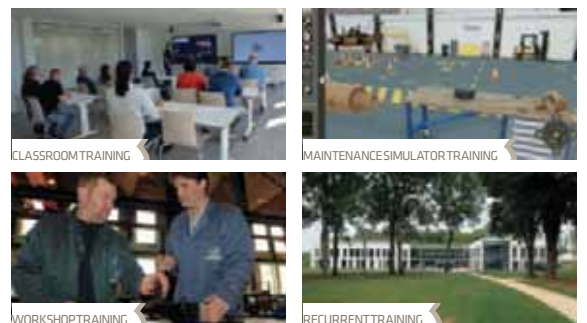
of its Centauros to the Jordanian Army for future deployment. The Royal Guard of Oman has taken delivery of nine Centauros with a 120mm gun.
Centauro II is a new design and the hull has a higher level of ballistic and mine protection. Onto this is fitted a new HITFACT turret armed with the latest 120mm 45 calibre smoothbore gun fitted with a muzzle brake, thermal sleeve and fume extractor. While the first application for the HITFACT 120mm turret is on the Centauro II, it can also be installed

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The Australian DSB is launched from a Rheinmetall MAN Military Vehicles 10x10 truck



walkways to allow separation of vehicle traffic from pedestrians.

The DSB is already in service with Switzerland, Turkey and the US and can be transported and launched from a variety of wheeled platforms, with Turkey and the US using an Oshkosh truck and Switzerland an Iveco Defence Vehicles truck.

The company is currently fulfilling further contracts from the US in support of its European Deterrence Initiative, which will bring the US Army stock of DSBs up to almost 120 units. ■

on other platforms, wheeled and tracked, with the latter including the ASCOD.

At present, the 120mm gun is loaded manually, but there is an option for an automatic loader, which would reduce the turret crew to just commander and gunner.

The 120mm gun is coupled to a computerised fire control system, with the commander and gunner each having a stabilised sight with day/thermal channels and a laser rangefinder.

The commander's sight is of the panoramic type to enable hunter/killer target engagements to take

place. Mounted coaxial with the 120mm gun is a 7.62mm machine gun (MG) and, on the roof, a remote weapon station armed with a 12.7mm MG with a single 7.62mm MG on the left side.

Hull production is undertaken at the Iveco Defence Vehicles facility in Bolzano, while the turret is manufactured by Leonardo Defence Systems in La Spezia.

Centauro II has the same firepower as a Leopard 2 MBT, but has greater strategic mobility because it can be deployed over long distances on its wheels – tracked MBTs require a heavy equipment transporter (HET). ■

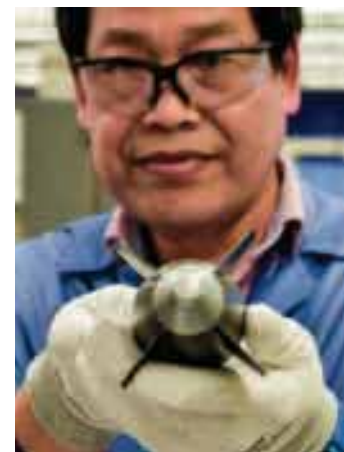
Full production for PGK

Orbital ATK Armament Systems, which has just become Northrop Grumman (Hall 5A, Stand B627), has announced that it has now delivered 25,000 of its M1156 Precision Guidance Kits (PGKs) to the US Army and Marine Corps, as well as some export customers, including Australia and Canada.

The M1156 PGK GPS guidance and navigation unit can be fitted to 155mm artillery projectiles with a deep fuze well to get a step change in accuracy – typically well under 30m. It replaces conventional artillery fuzes, requires no additional modifications to the 155mm and can have point-detonating and proximity-fuzing options.

The US Army has demonstrated the M1156 PGK in a number of 155mm artillery projectiles, including the M795A1, M549 and the widely deployed M107. It has also been successfully tested in mortar bombs.

The US Army has recently awarded the company a \$146 million option that extends M1156 PGK production through to 2021. The company is currently executing the US Army's second production option from the



original base contract, which concluded in February 2018 after having successfully passed all lot acceptance tests.

The US Army and Marines currently only deploy 155mm/39 calibre artillery systems, the 155mm M777A2 towed and M109A6 self-propelled, but the M1156 PGK has already been successfully fitted to 155mm artillery projectiles fired from 155mm/52 calibre systems. These include the German PzH 2000, which used the Rheinmetall DM111 fitted with the M1156 PGK for trials. When fired at a range of 27km, all 10 rounds landed within 5m of the target. ■

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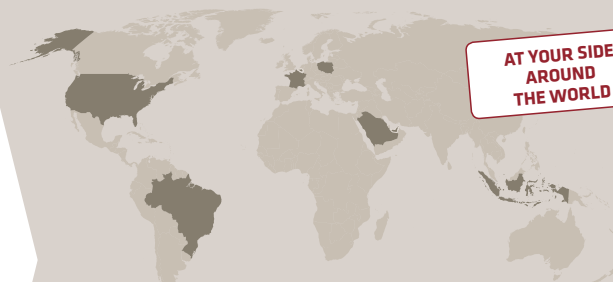
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Ready to shoot

Law enforcement and the military can now avail themselves of the new PMX-D7 sub-machine gun in 9x19mm (9mm Parabellum) calibre launched here by Beretta Defense Technologies (Hall 6, Stand E360).

The extensive use of polymer materials and light alloy metals make for a compact and lightweight design, while barrel and bolt are machined from a special high-strength steel to specifically withstand the rigours

of harsh environments and abusive conditions. To reduce wear and guarantee



corrosion resistance, special surface finishes and treatments are dedicated to the metal parts of the firing mechanisms and on the areas where friction between components exists.

The three-position fire selector,

conveniently located on both sides of the polymer lower receiver, is easy accessible for right- and left-handed use. It permits the selection between safe, single and full auto

fire. An optional three-round burst position is available as well. A translucent, yet resistant, 30-round polymer magazine allows visual count of the rounds.

An optional sound suppressor can be employed, both with subsonic and supersonic ammunition. A bolt-open lever holds the bolt open and rearward after the last round is fired, which allows the user to immediately determine that the sub-machine gun does not have a round in the chamber or in the magazine.

The Beretta PMX-D7 is equipped with Picatinny rails (MIL-STD-1913) positioned on the top, bottom and on the sides of the receiver in order to mount illuminators, pointers or other enablers, as well as vertical front grips or hand guards. ■

Israel's Semi Conductor Devices (SCD, Hall 6, Stand D658) is unveiling its SWIR Imager (SWIRi) Video Core here at Eurosatory.

The SWIRi is a low SWaP, 15µm, high sensitivity InGaAs SWIR (short wave infrared) video core imager that has been specially designed to be a low light level sensor in manportable and handheld devices. It comes with SCD's new low SWaP-C detector package and an SCD SNIR ROIC. It is said to



Seeing is believing

be ideal for applications such as drivers' vision enhancement systems, night vision goggles and handheld binoculars.

"The technology of previous generation image intensifiers is mostly outdated, analogue, with limited performance, and cannot be integrated with advanced command and control

and image fusion technology," said SCD chief executive Dan Slasky. "Our new SWIR Imager meets this need. We have developed dedicated algorithms to meet the requirements of low light night vision, leveraging the 'Night Glow' phenomena to provide high performance, even in conditions of moonless nights and adverse weather. Furthermore, we have managed to keep the module extremely compact and with

low power consumption." Slasky added that development of the product has been completed and it has already been sold to a first customer.

SCD offers a range of off-the-shelf and custom-designed detectors and laser diodes in various configurations, covering the entire IR spectrum – NIR, SWIR, MWIR and LWIR. They are typically applied in IR seekers, thermal imagers, smart munitions, night vision systems, machine vision systems, laser rangefinders and laser designators. ■

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JLTV_007_2018-US-1

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Coup au but !

▲ Disponibles en différents calibres, les nouveaux modèles TRG Sako sont destinés aux tireurs d'élite et de précision

PAR JEAN-PIERRE HUSSON

Nouveaux fusils de précision à répétition manuelle à verrou, réalisés par Sako (Finlande), les TRG-22A1 et TRG-42A1 ont un point commun : ils sont tous deux dérivés du célèbre TRG M10. Les principales modifications par rapport à ce dernier concernent la crosse repliable à réglage multiple - elle a été renforcée, notamment au niveau de la poignée-pistolet -, le rail Picatinny, plus long - de type M-Lock, permettant le montage d'une vaste gamme d'accessoires d'aide au tir -, et la partie centrale de la carcasse, réalisée désormais en aluminium. Le TRG-22A1, décliné en calibres 6,5 Creedmoor, .260 Remington et .308 Winchester, est disponible avec deux longueurs de canon, 510 et 660 mm, et chargeur de 10 coups ; le TRG-42A1, proposé en .300 Winchester Magnum et .338 Lapua Magnum, avec canon de 510 et 690 mm et chargeur de 5 ou 7 coups. Les dimensions de ces deux modèles et leur poids varient suivant la longueur du canon : 1 000 et 1 153 mm, pour 5,3 et 5,7 kg, pour le TRG-22A1 ; 1 020 et 1 204 mm, pour 5,3 et 6 kg, pour le TRG-42A1.

(Stand 6E360)

Sophie, les yeux dans les yeux



▲ Les jumelles de la gamme Sophie, en service dans 55 pays, ont été vendues à raison de 15 000 unités

PAR JACQUES DE LESTAPIS

Prête pour le combat collaboratif, la Sophie Ultima de Thales (France) est une nouvelle génération de jumelles tactiques haute performance à imagerie thermique. "Quatre-en-un", pour un poids de 2,5 kg elle remplace à la fois les jumelles infrarouges, les

tactiques, mais aussi les télémètres jour et multiplicateurs de focales. Permettant, d'ores et déjà, l'utilisation de la réalité augmentée, elle est conçue pour s'adapter aux futures évolutions technologiques par l'adjonction d'eXtension, un concept d'accessoires "Plug & Play".

(Stand Pe6aB500)



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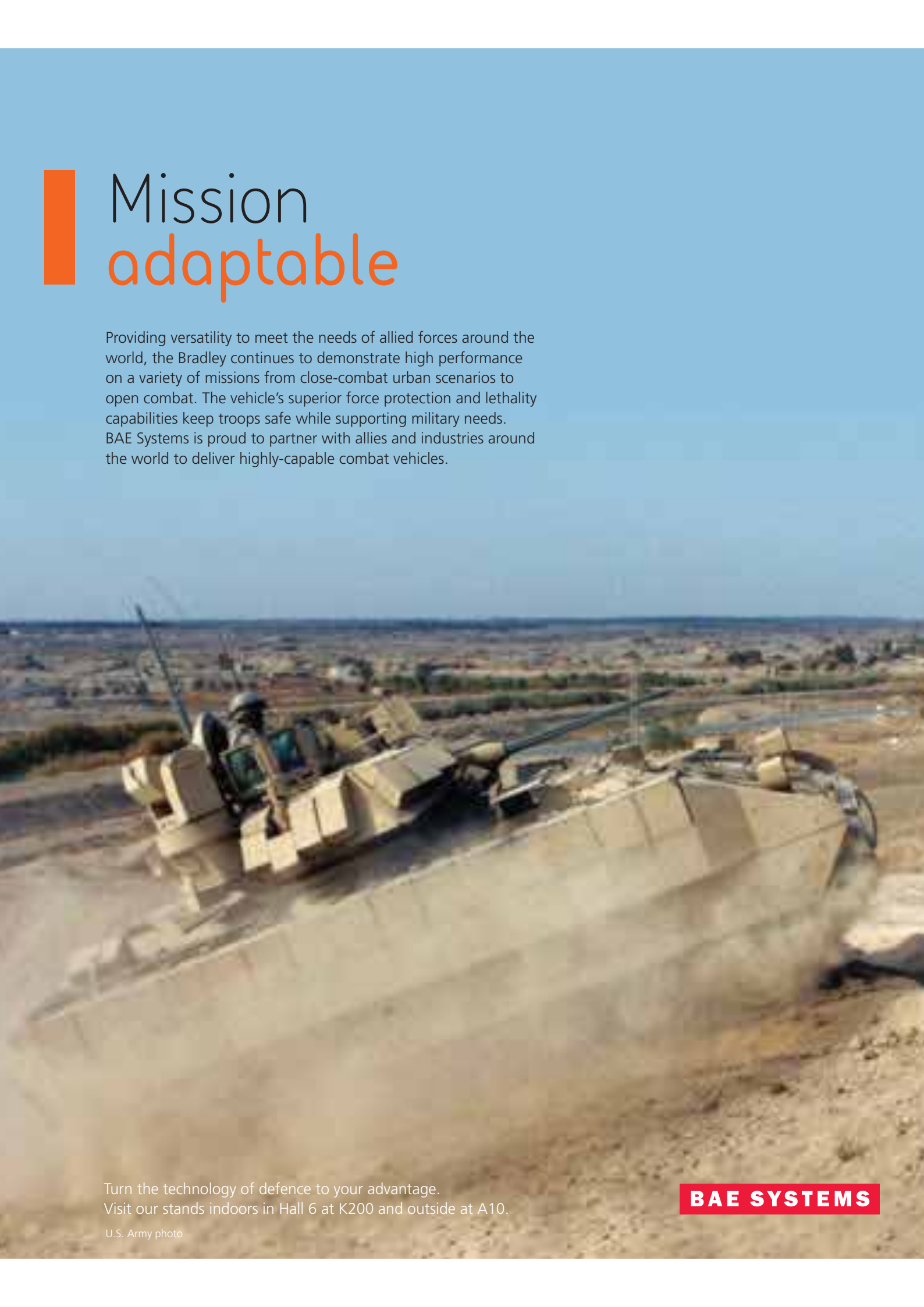


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U.S. Army photo

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Voir dans l'obscurité comme en plein jour !

PAR JEAN-MICHEL GUHL

Photonis (Pays-Bas) est bien connue pour être l'un des leaders mondiaux dans le domaine des imageurs photoniques. Ses réalisations "high-tech" très pointues se retrouvent de nos jours dans nombre de capteurs et de caméras de vision nocturne en service au sein des forces armées. Au fil des ans, cette société a amélioré ses systèmes au point de rendre la détection dans l'obscurité totale un jeu d'enfant ! Elle propose de nombreuses optiques très spécialisées, munies de capteurs

CMOS/CNOD (Complementary Metal-Oxide/ Night Observation Device). Leur consommation électrique, beaucoup plus faible que celle des photodiodes traditionnelles, et leur coût de production raisonnable sont les principales raisons de leur vaste utilisation. Qu'il en soit pour les militaires, pour la surveillance, ou pour les applications scientifiques, les créations de Photonis sont aujourd'hui incontournables et au centre de nombre de capteurs de vision nocturne présentés à Eurosatory.

(Stand 6J80)

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Bien protégé, quel que soit l'environnement

PAR JEAN-PIERRE HUSSON

Assurer aux opérationnels sur le terrain un maximum de confort et de protection dans les environnements les plus extrêmes, tel est l'objectif que s'est fixé Taiga® (Suède), entreprise de l'habillement militaire. Pour atteindre cet objectif, rien n'est laissé au hasard, depuis les matériaux à la confection, afin de proposer des systèmes totalement intégrés et testés en labora-

toire dédié (Climate Lab), permettant d'évaluer leur efficacité et leur résistance aux agressions de l'environnement. Températures basses et élevées (chambres froide jusqu'à -55° C et chaude jusqu'à +55° C), respirabilité, isolation et imperméabilité (simulateur de pluie libérant jusqu'à 250 litres/minute), sont quelques-uns des tests très sévères qui permettent de garantir aux combattants un système de protection durable

et tout le confort dont ils ont besoin pour rester performants et concentrés en toutes circonstances. **(Stand 5aG657)**

► **Sur le terrain, les militaires ont besoin de vêtements polyvalents et fiables, les protégeant des conditions environnementales les plus extrêmes**



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A paragon of performance

BY DAVID DONALD

Lockheed Martin Missiles & Fire Control (Hall 5A, Stand G840) is promoting its Paragon precision-guided bomb, the latest iteration of the highly successful Paveway series of laser-guided and dual-mode weapons.

The Paragon is a development of Lockheed Martin's Dual Mode laser-guided bomb (LGB), of which around 7,000 have been supplied to the US Navy and Marine Corps. The new weapon was originally called the Dual Mode Plus, but was rebranded as Paragon in early 2017.

Drawing on its extensive experience of producing more than 100,000 Paveway II laser-guided bombs, the Dual Mode LGB, and more than 167,000 laser-guided training rounds, Lockheed Martin has improved the seeker system in the Paragon to provide increased stand-off range and greater mission flexibility.

The Paragon has a semi-active laser seeker and integrates an inertial/dual GPS guidance

system, giving adverse weather and moving target capability. The company's flexible streamlined manufacturing processes maintain the weapon system's affordability.

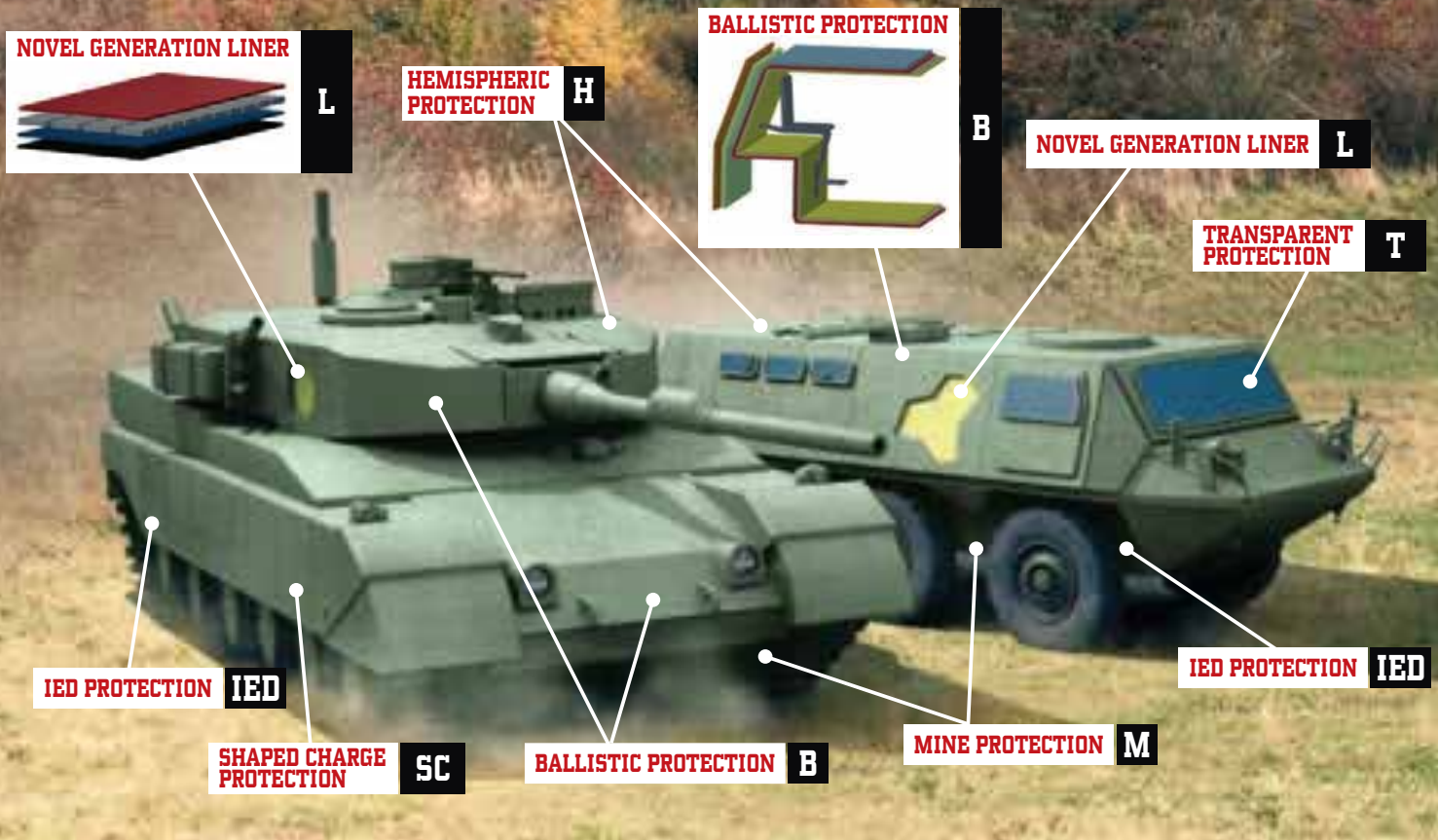
Paragon maintains the outer mould line and mass distribution properties of the Paveway II and DM LGBs, so no extra qualification is required for platforms already cleared to employ the earlier weapons. It uses the standard tail-mounted air foil group of the Paveway II. Warhead options include the 500 lb Mk 82, 1,000 lb Mk 83 and 2,000 lb Mk 84, plus the 2,000 lb BLU-109 hard-target bomb.

Two tests were undertaken from an F/A-18 Super Hornet in August 2016 at the China Lake weapons range, employing Mk 82 warheads fitted with the Dual Mode Plus guidance kits. The weapon is cleared for Super Hornet use, although additional trials are planned.

Test drops from the F-16 Fighting Falcon are to be conducted shortly.

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Black Eagle takes off

BY DAVID DONALD

Israeli UAV specialist Steadicopter is showing its Black Eagle 50 rotary-wing UAV in its final form, having completed development of the 35kg air vehicle. The final configuration is being unveiled at Eurosatory (Hall 6, Stand ED751).

Steadicopter has designed the Black Eagle 50 to answer a number of ISTAR mission requirements in the defence, homeland security and civilian sectors. The company claims it is the smallest platform in its category, making it less cumbersome to maintain, more mobile, and easier to operate



than its rivals, while offering greater mission flexibility and agility.

It can carry a 3kg payload and has a flight endurance of four hours, and a hovering endurance of three. It can operate at up to 100km from its control station,

and has a top speed of 70 knots. Typical cruising speed is 47 knots and it can reach a ceiling of 9,000ft. The total length of the air vehicle is just 2.54m.

The Black Eagle 50 can be fitted with various datalink and payload options. Steadicopter has already integrated the Controp HD D-Stamp electro-optical turret and Top I Vision LEV series of single-/dual-camera systems.

Able to operate from land and sea platforms, the Black Eagle 50 is currently in a demonstration phase to a number of customers around the world. As well as the Black Eagle 50, Steadicopter has developed a conversion kit that can turn manned helicopters into unmanned air vehicles. ■



JLTV can ta

BY CHRISTOPHER F FOSS

Now that production of the Joint Light Tactical Vehicle (JLTV) is ramping up, Oshkosh Defense (Hall 5A, Stand D628) is

Advertisement feature



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In terms of services, MSM GROUP provides complete overhaul repairs and testing of old-stock ammunition of different calibres from 30 mm up to 155 mm and more based on the demand. The process includes disassembly of ammunition, inspection of the materials and their function and potential replacement or repairs.

Companies within MSM GROUP not only own extensive know-how of former Eastern bloc

ammunition but our transformation and forward thinking allow us to develop and implement the production of new types of NATO ammunition.

Outside of the standard "Eastern" calibres such as 30x165mm, 125 mm HE and APFSDS-T, 122 mm GRAD, 122 mm HE artillery ammunition and 152 mm MSM currently provides our customers with state of the art 155 mm ammunition of different types including M107 projectiles and extended range projectiles. Outside of these conventional types of 155 mm ammunition MSM Group is currently implementing Rocket assisted 155 mm and GPS Guided 155 mm ammunition which should be presented and certified in early 2019.

From the mortar programme, MSM currently provides NATO standard 60 mm, 81 mm, and 120 mm mortar bombs. 60 mm bombs are used in ultra-light commando



mortar ANTOS currently used within certain NATO countries as the go-to.

To keep up with the needs for increased protection, we had to come up something special which is why we started the HORNET project – fibre-optic guided tactical missile.

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ckle any environment

intensifying its export marketing.

The first export customer will be the UK, which selected the JLTV to meet its requirement for the Group 1 Multi-Role Vehicle

Protected, with a contract expected to be placed via the foreign military sales programme in the future.

Mike Ivy, senior vice president

of international programs and global product support at Oshkosh Defense, said: "We can tailor the vehicle to meet specific customer requirements to optimise performance in virtually any operating environment."

Following a hard-fought contest, Oshkosh Defense won the JLTV competition and in August 2015 was awarded a contract to replace up to 16,901 protected High Mobility Multi-purpose Wheeled Vehicles (HMMWV).

The JLTV programme office expects the first US Army unit to be equipped with the JLTV in FY19, with the US Army and Marine Corps to achieve an initial operating capability in early FY20.

So far, Oshkosh Defense has

manufactured more than 2,000 JLTVs, of which some 1,600 have already been delivered.

In its baseline version, the JLTV steel armour protects the occupants from small arms fire and shell splinters, but with the aid of an add-on B-kit, it can achieve mine-resistant ambush-protected-type levels of protection, according to the company.

The JLTV is fitted with Oshkosh's latest TAK-4i intelligent independent suspension system, which gives it a higher level of cross-country mobility than the HMMWV. It is also said to be some 70 per cent faster than the standard M-ATV currently deployed. ■

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▲ Lancé depuis une catapulte compacte, l'Orbiter 4 repousse les performances des drones tactiques

PAR FRÉDÉRIC LERT

Aeronautics (Israël) est venue à Eurosatory avec sa gamme de drones tactiques dont le Dominator XP, l'Aerostar, et la famille Orbiter. Dans celle-ci, figure le dernier-né, l'Orbiter 4 multi-missions. Cet appareil de 50 kg peut être mis en œuvre par une équipe de trois personnes, depuis le sol ou d'un navire, en se passant d'une piste en début et en fin de mission. Il offre une autonomie maximale de 24 heures et un plafond opérationnel de 6 000 m. Au choix, il peut emporter simultanément deux charges utiles : radar de patrouille maritime, équipement ISR d'interception des communications de téléphones cellulaires, boule optronique Controp, voire encore radar SAR à ouverture de synthèse. **(Stand 6E571)**

Il "décoiffe", même par temps calme

▼ Le tout nouveau Remington 870DM est alimenté par chargeur amovible de 6 coups



PAR JEAN-PIERRE HUSSON

Plus d'un million et demi de fusils à pompe calibre 12 sur base 870 ont été réalisés à ce jour par Remington (Etats-Unis), qui propose aujourd'hui un nouveau modèle adapté aussi bien à une utilisation militaire que de police. Baptisé 870DM, il se caractérise avant tout par sa rapidité de chargement. Elle est obtenue par l'adoption d'un chargeur amovible de 6 coups, venant remplacer le classique magasin tubulaire placé sous le canon. Autres atouts du 870DM : crosse Magpul SGA, garde-

main compatible M-Lock pour le montage d'accessoires, d'organes de visée réglables avec œillette XS-Sight Ghost, et d'un décompresseur/cache-flamme amovible cranté, bien utile avec les munitions d'ouverture de portes. Ultra fiable grâce à son mécanisme sobre et fluide, facile à utiliser et d'une robustesse à toute épreuve, ce nouveau modèle, qui est doté de rail Picatinny et d'un canon de 470 mm (sans le cache-flamme), affiche une longueur totale de 965 mm pour un poids de 3,2 kg.

(Stand 6E131)

Logistique carburant

PAR ED SIPATSEL

Le réservoir aérolargable de Pronal (France) est utilisé, notamment, par les forces spéciales françaises pour la "Livraison Par Air" de carburant sur des sites isolés. D'une capacité de 1 900 litres, il est aussi tractable-roulable, hélicoptériste sous élingue, mais encore transportable dans un aéronef. Il est adapté en capacité à son utilisation, comme à celle d'emport de son moyen de trans-

port. Polyvalent, il s'utilise en mer (réserve de carburant immergée), sur terre (en stockage en poste avancé), ou aussi en vol. Installé sur une palette de largage, il est parachuté à 700 m d'altitude et descend à une vitesse approximative de 10 à 12 mètres par seconde. Une fois au sol, il est le prolongement de la chaîne logistique pétrolière, jusqu'à la ligne de front et au-delà. **(Stands 5aF131/5aF20-178-268)**



▶ Un réservoir opérationnel 1 900 l de carburant, facile à transporter et à manœuvrer

Beach oh ma beach

PAR FRÉDÉRIC LERT

Mustmove® Beach Access est une nouvelle génération de tapis de débarquement développée et fabriquée en France par Musthane, spécialiste des tissus techniques pour le secteur de la Défense et l'industrie civile. Le tapis est constitué de plaques souples en

matériaux textiles haute résistance enduits d'un polymère spécifique. Enroulables et connectables, elles permettent de prévenir l'enlèvement des véhicules à roues lors des opérations amphibies. La longueur du tapis est modulable grâce à un système d'accrochage rapide et efficace. Des sections

particulières permettent aussi la mise en place de cheminements en courbes sans générer de plis. Musthane annonce également avoir pris trois brevets internationaux pour protéger les innovations de son dernier-né. Il complète efficacement la gamme existante des Mustmove® : Helipad, piste mobile et enroulable

▲ Dans le cadre de la modernisation de sa flotte amphibie, l'armée française vient d'acquiescer le Mustmove® Beach Access

d'atterrissage pour hélicoptères et drones à voilure tournante ; DFP, plaques enroulables de désenlèvement et de désensablement ; SIM, solution permettant de faire des routes pour véhicules, des passages pour piétons, et des planchers de tente étanches et enroulables.

(Stands 6J123/5aF20-178-268)



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EN BREF



■ Toujours à la pointe de l'innovation, **Pyser Optics** (Royaume-Uni) présente le collimateur optique SAC (Small Arms Collimator). Précis et facile à utiliser, il permet de procéder rapidement au zéroage de toute plateforme d'armes de petit calibre et des systèmes de visée associés (mécaniques, lunettes diurnes/nocturnes, etc.), sans utiliser pour cela une source laser ou des munitions. Le SAC a été adopté par la British Army et l'US Marine Corps.

(Stand 5aF721)

■ **Mikro-Pulssi Oy**, spécialiste finlandaise des équipements de lutte contre les feux et les explosions, annonce que son système ExAct Titan de protection contre le feu se décline à présent en "ExAct Titan Lite". Ce dernier allie une très grande compacité à une rapidité de réaction phénoménale permettant d'étouffer dans l'œuf les explosions. Le système est pleinement autonome, ne nécessite pas d'unité centrale, et se contente de deux détecteurs de flamme et d'un extincteur pour protéger un véhicule léger et ses occupants.

(Stand 6K301)

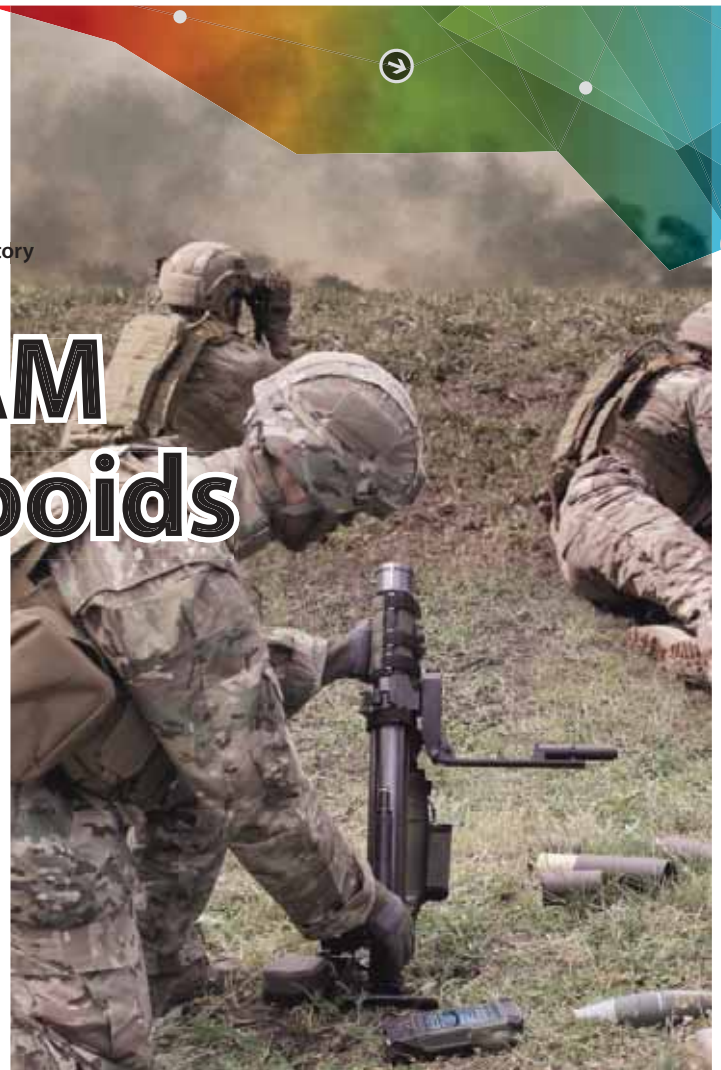
■ **Lincad** (Royaume-Uni) doit fournir des batteries LIPS6 (24V pour 80 Ah) à Sojitz Aerospace Corporation (Japon) qui en équipera son système HALO (Hostile Artillery Locator), utilisé par le **ministère japonais de la Défense**. C'est un équipement acoustique passif permettant de détecter et localiser un tir d'artillerie jusqu'à 30 km de distance.

(Stand 5aD791)

Le GRAM fait le poids

PAR FRÉDÉRIC LERT

La révolution numérique atteint le monde des mortiers portables. À l'initiative de Hirtenberger Defence Systems (Autriche), les mortiers Commando de 60 mm pourront dorénavant être équipés du GRAM, un dispositif de visée électronique venant remplacer l'habituel réglage manuel. Le GRAM (GRid Aiming Mode) offre une manipulation simplifiée et renforce la précision du tir. En conséquence, il réduit la consommation de munitions. D'un poids de 900 g, il comprend des détecteurs de position sur le tube, une interface sans fil – pour communiquer avec le calculateur balistique – et un écran d'affichage. Celui-ci présente, notamment, les points de visée, déterminé et actuel. D'autres



▲ **Le mortier portable de 60 mm gagne une nouvelle acuité avec le système GRAM**

fonctions permettent également une utilisation indirecte et précise du mortier. GRAM a été développé sous la forme d'un kit d'extension

pour le mortier Commando M6C d'Hirtenberger. Il utilise différents types de munitions.

(Stand 5aH388)

Ce précieux lien avec le monde

PAR JACQUES DE LESTAPIS

Dans sa gamme de connecteurs renforcés RJ Field & USB Field, Amphenol Socapex (France) propose deux nouvelles versions

dédiées aux applications à espace réduit. Elles combinent gains de place (-40 %) et de poids (-15 %), à performances égales, aux embases standards RJF TV6 et USB3F TV.

Ainsi, les RJF TV6-Reduced Flange permettent l'acquisition et la transmission de données en connexion Ethernet de catégorie 6, pour réseaux 10 BaseT, 100 BaseTX et 1000 BaseT, dans les environnements difficiles. Quant à l'USB3F TV-Reduced Flange, elle offre les mêmes performances que l'USB3.0. Ces deux connecteurs utilisent un mécanisme d'accouplement de filetage MIL-DTL-38999 Séries III. Ils se déclinent en de nombreuses versions de matériaux et de traitements de surface, tels que le cadmium, le zinc nickel noir, le nickel.

(Stand 5aJ317)



▲ **De gauche à droite, les connecteurs RJF TV6 et USB3F TV**

Voir et reconnaître, avec ou sans lumière

PAR JACQUES DE LESTAPIS

La jumelle VIS-IR de Hensoldt (Allemagne), à grossissement x8, est portable, légère et non refroidie. Elle facilite l'observation rapide et la reconnaissance, en toutes conditions de lumière. Elle dispose de deux canaux de vision, diurne et nocturne (deux plages spectrales : visuel 400 à 700 nm, et imagerie thermique 8 à 14 μm), qui commutent de façon simple et rapide. L'image du canal de vision nocturne est affichée sur une OLED interne, de sorte qu'une superposition est possible. Grâce à une sortie vidéo, l'image IR peut être affichée sur un moniteur externe.

(Stands Pe6C170/6E131)



▲ La VIS-IR fonctionne avec quatre piles standard CR123

Sauver des vies

PAR JEAN-PIERRE HUSSON

Assurer aux intervenants - policiers, militaires, secouristes et soldats du feu - sur le terrain un équipement à la hauteur de leurs attentes, tel est l'objectif que s'est fixé East Gear (International) (Hong Kong). Parmi ses nouveaux produits, une mention particulière pour le First Response Casualties Kit et le Titanium Halligan. Compact et fonctionnel, le premier est une trousse qui permet d'assurer en opération les premiers secours aux blessés

grâce à un équipement médical complet. Elle peut cependant être adaptée selon les besoins des intervenants. Quant au second, il s'agit d'un outil multifonctions, conçu aussi bien pour les interventions de police que pour les opérations de lutte contre les incendies et de sauvetage. Robuste et extrêmement léger puisque construit en titane, il offre, par ailleurs, une résistance élevée à la corrosion et une toute aussi haute résistance à la traction, quel que soit l'angle de travail.

(Stand 5bB80)



◀ Les intervenants sur le terrain ont besoin d'équipements de qualité qui leur permettent de faire face à toute situation. Ici, le First Response Casualties Kit

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Advancing networked capability

BY DAVID DONALD

Elbit Systems (Hall 6, Stand D751) is showing a range of its broad product portfolio, with a variety of fire systems, command/control/communications solutions, sensors, and systems for protection and simulation. Among the company's new products making their debut at Eurosatory are a networked strike cell, improvements for the E-LynX software-defined radio (SDR) system, a new intelligence-gathering system, and a wide-area acoustic sensor system.

On show on Elbit's stand is a command and control strike

cell presenting a networked and automated system that employs the Torch C³I system running on the E-LynX SDR communications network. The installation is demonstrating how data concerning potential targets can be gathered through the network from a wide variety of sensors before being fused and analysed using artificial intelligence tools to create an engagement plan that matches the optimum fire asset to the target. Using the E-LynX's high data rate, actionable video imagery is disseminated to the relevant fire system.

E-LynX itself is being shown

with a number of enhancements, including the adoption of concurrent flooding techniques that decrease delays and extend coverage. Reductions in size and weight of the radios have permitted smaller vehicle and man-pack radios to be developed, easing the burden on dismounted soldiers while allowing the system to be installed in densely packed combat systems.

Among the fire assets that Elbit produces and which could be employed as part of the strike network is the SkyStriker loitering munition. First shown at last year's Paris Air Show,



IN BRIEF

Award-winning technology

India's prestigious Defence Technology Award was recently conferred on SMPP (Hall 6, Stand B483) for its bulletproof jackets. The company has supplied bulletproof products to the Indian Air Force, naval commandos, paramilitary forces and state police, and armed forces around the world.

SMPP's advanced technology includes boron carbide to make some of the lightest bulletproof jackets on the market, which conform to the Indian Army's GSQR-1438. Developed in pursuit of the country's Make in India initiative, the ultra-light bulletproof jackets provide 360° protection at level NIJ III+ Standard, i.e. against a 7.62mm calibre bullet fired from an assault rifle.

SMPP also manufactures ballistic shields, armour for vehicles, aircraft and ships, blast protection solutions and combustible cartridges for tank and artillery munitions.

Pointing the way ahead

BY CHRISTOPHER F FOSS

CTA International, a joint venture between BAE Systems of the UK and Nexter of France, has now built more than 240 of its 40mm Cased Telescoped Cannon (CTC), with production running at 14 per month at its Bourges facility on a single shift basis.

CTAI has firm orders for 515 CTCs for the UK MoD and an initial 110 for the French Army, which makes it the largest medium-calibre production run in Europe.

For the UK, it is installed in a two-person turret supplied by Lockheed Martin UK for the General Dynamics Land Systems Ajax scout vehicle and in the turret for the Lockheed Martin UK Warrior Capability Sustainment Programme (WCSP).

For the French Army, the weapon is installed in the Jaguar (6x6) reconnaissance vehicle being developed by Nexter/

Arqus; the first two prototypes have been completed.

While the actual weapon is called the CTC, when combined with the gun mount, ammunition handling system, gun control equipment and controller, it is called the Cased Telescoped Armament System (CTAS).

The company has delivered more than 100,000 rounds of target practice – tracer (TP-T), armour-piercing fin-stabilised discarding sabot – tracer (APFSDS-T), general purpose round – air burst tracer (GPR-AB-T) and general purpose

round – point detonating – tracer (GPR-PD-T). The target practice reduced range (TPRR) round will be qualified in 2018 and will be followed by the kinetic energy – air burst (KE-AB), which is optimised to engage unmanned aerial vehicles (UAVs) and contains a number of sub-munitions.

While the first examples of the 40mm CTC are for the ground-to-ground role, Thales has developed the Rapidfire for the air defence/UAV role; this consists of a remote-controlled turret on a UNIMOG (6x6) platform with a protected cab. ■



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Spear Mk 2 automated 120mm mortar system.

Inset: SkyStriker loitering munition



the SkyStriker employs electric propulsion for a low acoustic signature while operating at low altitudes. The munition can be programmed for a variety of attack modes, as well as allowing the operator to issue in-flight commands, including the ability to abort up to two seconds before impact. It also has the ability to return home.

Another potential fire asset is the Elbit Spear Mk 2, an automated soft-recoil 120mm mortar system mounted on a Plasan 4x4 tactical vehicle. The networking capability of the system allows Spear to receive targeting information from the battle management system, including target prioritisation.

The mortar can fire at rates of up to 15 rounds per minute and automatically engage multiple targets in rapid succession. Last month, Elbit revealed that the Israel Defense Forces have been



Revised configuration of the E-LynX SDR

using a slightly different version of Spear Mk 2 – known as the Hanit (javelin) – in recent border clashes.

A further debutant from Elbit is the May wide-area acoustic

sensing solution. This provides real-time analysis of sounds such as gunshots, mortar firings and other anomalies, allowing their classification and geo-location to provide critical information for the protection of military forces and emergency first-responders.

Also being showcased for the first time is the Sigmacell intelligence system that targets the cellular communications employed by terrorists and criminals. It detects, identifies, intercepts and locates cellular devices over a wide area, and can capture several hundreds of devices at the same time. Coverage is provided across all the cellular spectrum, including GSM, UMTS and LTE. ■

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Last month, Israeli loitering munition specialist UVision Air (Hall 5A, Stand BC627) undertook two live firings of its Hero-30 short-range loitering munition. One was undertaken in front of representatives from a strategic customer during a military exercise, while the other was conducted during the International Fire Support Symposium with an audience

including NATO armed forces representatives.

Both tests demonstrated the Hero-30's silent pneumatic launch and its ability to gather intelligence while loitering, before locating and locking on to the target and attacking it with an accuracy of less than 1m CEP. The Hero-30 also demonstrated a mid-air aborted attack, after which the munition returned to loitering flight

before re-engaging the target.

Weighing in at just 3kg, the Hero-30 is man-packable, and is the smallest of the UVision Air range. It has a 0.5kg warhead, range of up to 40km and a 30-minute endurance.

The Hero family comprises loitering munitions in seven weight classes, the largest of which is the 125kg Hero-1250, which can carry a 30kg warhead to a range of 200km. ■



Hero on fire

HD sight for shooting precision

BY SAM J BASCH

Israel-based Controp (Hall 6, Stand H548) is launching its latest targeting payload, the Sight-HD, at Eurosatory. The sight was specifically developed to maintain bore-sight in conditions of shock and vibrations.

According to Hagay Azani, Controp's new chief executive, the specialised targeting EO/IR payload, which



weighs just 13kg, is ideal for remote weapon stations and armoured fighting vehicles (AFVs). "It incorporates digital and mechanical compensatory systems that we have developed to significantly

contribute to shooting precision," he said.

The gyro-stabilised payload facilitates mid- to long-range target acquisition, day or night, and installed on AFVs, it can be used for a wide range of applications, such as border surveillance, perimeter protection of sensitive installations, force protection and route clearance. ■

Light ye

BY DAVID DONALD

Australian defence technology specialist XTEK is showcasing its range of ballistic armour at Eurosatory as part of the Team Defence Australia exhibition (Hall 6, Stand K517). The company's XTclave manufacturing technology has allowed it to produce armour that protects against strikes from 7.62x39mm mid-steel core rounds, yet are around 30 per cent lighter than traditional solutions.

XTclave Composite Consolidation Technology was

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t strong

developed by XTEK initially to answer the need for small arms protective inserts (*below*), which have been supplied to the Australian Defence Forces and to FY Composites in Finland for European defence customers. Armour plating has been delivered to the US Department of Defense, which has also tested XTEK's panels and helmets. The XTclave process produces high-quality carbon composite ballistic protection laminates that are



void-free, have low resin content, and are ideal for small radius precision components. They can be produced to meet varying protection requirements.

Other systems developed by the company include XTatlas (*above*), which uses video from small

unmanned aerial systems for digital targeting. The technology is being further exploited to add layers from other sensors, and to generate 3D terrain models from video imagery. Another XTEK system is the XTviz tool for visual impact analysis of accurate 3D environments.

Spot the enemy

The Gabriel multisensor target surveillance system from Seraphim Optronics (Hall 6, Stand C708), is carried in a backpack, quickly deployed and easy to use. Its electro-optics and radar can be calibrated in minutes by means of a tablet-displayed map. "Radar detections and live video are dispatched to a tablet via wi-fi, cellular or cable communication, and the data is disseminated quickly for a rapid response to emerging threats," said CEO Tsuli Hershkoren. ■

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EN BREF

■ Bertin IT (France) et Wallix lancent Crypto CrossinG®, solution combinant les mécanismes de sécurité avancée (rupture protocolaire, innocuité, filtrage) de CrossinG® - la passerelle de confiance conçue par Bertin -, et DataPeps®, la technologie de chiffrement "as-a-service" de Wallix. Crypto CrossinG® garantit l'intégrité et la confidentialité des données sensibles transitant par courrier électronique entre un réseau protégé et une infrastructure extérieure non sécurisée.

(Stand 5aH267)

■ Le logiciel Hexagone de Othello (France) est capable de mesurer, quantifier et analyser objectivement les réactions exprimées à travers le visage, la voix, le corps, ou encore les mots. Développée sur la base de modèles statistiques d'aide à la décision, cette technologie permet de distinguer mensonge et vérité à des taux supérieurs à 75%. Ce logiciel pourrait donc s'avérer très utile dans des situations particulièrement sensibles et face à des individus déterminés et entraînés à dissimuler leurs intentions. On peut, notamment, penser à la détection de signes précurseurs de radicalisation dans les déclarations d'individus ou de groupes idéologiques.

(Stand 5a/Eurosatory Lab)

■ De nouveaux lance-roquettes air-sol TDA Armements (Thales - France) LRF4 - 80 ont déjà été livrés - vont armer des Jaguar modernisés de l'Armée de l'Air indienne. Sécurisées DRAM, les 15 000 munitions F1 NG de 68 mm, livrables cette année, comprennent pour moitié des HE (High Explosive) et des ECC (charge creuse).

(Stand Pe6B500/5aF20-178-268)

► Le FlashHawk s'adapte à différents aéronefs, tels que drones, hélicoptères, avions, ou ballons captifs

L'œil et l'oreille du faucon

PAR JACQUES DE LESTAPIS

Le FlashHawk d'Avantix (France) a pour application le renseignement électronique aéronautique SIGINT et IMINT (capteurs EO/IR), avec un réseau matériel électronique intégré pour l'optimisation ISR et l'intelligence actionnable. Evolutif, il permet une géolocalisation 3D précise sur 360°, et fournit par liaisons de données

des solutions aux forces sur le terrain pour détecter, caractériser, géolocaliser, et identifier, notamment, les émetteurs radio travaillant dans les fréquences 30 MHz à 3 GHz. Il bénéficie de charges utiles collaboratives, avec des capteurs extrêmement compacts. Ceux-ci, au niveau antenne et Processing, présentent une véritable rupture technologique. (Stand 5bB178)



Communications tactiques

PAR VICTOR BARREIRA

EID (Portugal) a été retenue par le ministère portugais de la Défense pour la fourniture des systèmes de communication du SIC-T (Système d'Information et de Communication-Tactique) de son Armée de Terre, un marché de 7,48 M€. Incorporé dans des shelters montés sur véhicule 4x4 protégés ou non, il porte sur des radios numériques VHF/UHF et HF/VHF PRC-525, des amplificateurs de puissance de 50W VHF AP-525 et 150W HF VK-3150, des stations d'accueil

radio simple MT-525S et double MT-525D, et leurs accessoires. A Eurosatory, sont présentés, entre autres, les systèmes numériques d'interphonie ICC-201 (notamment installé sur les Pandur II portugais) et ICC-251 (équipant les Leopard 2A6 du Portugal), en service dans douze pays. L'ICC-201 à technologie par "Internet Protocol", est exposé avec le nouveau terminal de commandement CC-210 doté d'un écran tactile. A voir encore, la radio TWH-100 vendue à neuf pays.

(Stand 6L547)

Pour l'Amérique latine et les Caraïbes



PAR ED
SIPATSEL

La sixième
édition du

Salon Expodefensa qui s'est tenue à Bogota (Colombie) en décembre dernier a reçu plus de 12 500 visiteurs professionnels. Parmi eux, les membres de 74 délégations de 30 Etats et 887 VIP. Pendant trois jours, chacun a pu apprécier des matériels et équipements présentés sur 12 000 m² par 269 exposants de 34 pays, relevant avant tout des domaines des forces terrestres, aériennes, et navales, mais aussi de ceux de police et de sécurité, de secours et de protection civile. Le prochain Expodefensa se tiendra du 2 au 4 décembre 2019. Rappelons que cet événement international est placé sous l'autorité du ministère colombien de la Défense et organisé par Corferias et le COGES (Commissariat Général des Expositions et Salons du GICAT). (Stand 6J51)



▲ Le tout terrain protégé SandCat (ici en version MSIS) est bien connu avec plus de 600 unités en service de par le monde

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PAR ED SIPATSEL

Affaire d'équipe, les firmes israéliennes Plasan Sasa et Bird Aerosystems présentent pour la toute première fois un véhicule d'intervention protégé SandCat particulier. Ce 4x4 est doté du MSIS (Multi-Sensor Integration System) de partage d'informations en temps réel. Ce système procure à une patrouille sur le terrain une image tactique complète et mise à jour en permanence à partir de sources aériennes (drones, hélicoptères ou avions) collectées et retransmises ou partagées via un C².

(Stands Pe6bB191/6E697)

Des antennes radio vraiment "intelligentes"

▼ Antenne Cojot à commutation de faisceaux installée sur une unité navale de débarquement



PAR JEAN-MICHEL GUHL

Un des grands avantages de la numérisation des postes radio tactiques actuels est la clarté indéniable du signal audio que cette technologie procure aux opérateurs. Toutefois, cela suppose au mieux l'utilisation d'antennes d'un nouveau type, dit "à commutation de faisceaux". C'est ce que la société finlandaise Cojot a anticipé, elle

qui propose un choix d'antennes adaptives, dites "intelligentes", à fort gain, permettant d'agir avec flexibilité sur les effets de lobe parasites, et donc de les diminuer, voire de les annuler, grâce à une sélectivité spatiale accrue des faisceaux radio. Et, cela, dans toutes les directions. Comment ça marche ? Au lieu d'utiliser les propriétés métalliques d'une seule antenne

fixe mono-élément, une antenne à commutation de faisceaux (dite SBA - Switched Beam Antenna) combine, à l'aide d'algorithmes simples, le signal fixe de plusieurs antennes. Elle le fait "sauter" d'un faisceau étroit disponible à l'autre, en fonction du mouvement de l'émetteur, afin d'avoir toujours un rapport émission/réception idoine. C'est nouveau, d'un coût abordable, et cela augmente utilement les capacités des matériels hertziens. En effet, ce type d'antenne est parfaitement adapté aux radios numériques SDR ou CR et aux technologies MIMO (celle de nos téléphones portables) qui utilisent des réseaux d'antennes, autant à l'émission qu'à la réception, afin d'améliorer la qualité du rapport signal sur bruit (dit SNR) et le débit de transmission. Autre atout, cela permet aussi de pouvoir diminuer le niveau d'émission du signal afin de réduire la pollution électromagnétique environnante et d'ajouter à la discrétion hertzienne.

(Stand 6K301)



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EN BREF

■ Depuis les batailles de Mossoul et de Raqqa, on sait que l'emploi de drones commerciaux, modifiés artisanalement pour transporter des grenades, fait désormais partie de l'arsenal de la guerre asymétrique. En partant de ce constat, **MBDA** (France) a adapté son système Licorne de commandement et contrôle (C²) de défense aérienne pour forces de réaction rapide. Pour détecter la présence de micro-drones, il met en œuvre une unité mobile de détection radiofréquence de **CerbAir** (France), capable d'intercepter les émissions de liaison de données. Une fois la menace détectée, localisée et sa fréquence déterminée, Licorne permet à l'opérateur d'activer des contre-mesures au moyen d'un réseau d'effecteurs spectraux de la société **Keas** (France), que l'on peut répartir sur le terrain et qui sont destinés à brouiller les liaisons de données et signaux GPS des drones couramment en service.

(Stands Pe6aC371/5aF21)

Des sœurs jumelles pour voir loin

PAR FRÉDÉRIC LERT

Merio (France), spécialisée dans la conception et la production de systèmes robotisés et de charges utiles, propose un ensemble de tourelles gyrostabilisées de hautes performances, pour des applications militaires ou parapubliques. Elles couvrent la gamme de poids de 0,75 à 2,4 kg. A l'exception des capteurs de prise d'images, cette société conçoit et réalise les pièces mécaniques, les moteurs électriques, les cartes électroniques, les logiciels de commande et de contrôle. Dans le segment haut de sa gamme, elle présente aujourd'hui les tourelles Temis XL16 (1,8 kg) et XL19 (2,4 kg).

Elles intègrent des capteurs voie jour et thermique non refroidis et offrent



la possibilité d'emporter un pointeur et un télémètre laser, ainsi qu'une caméra IR à deux champs. Si toutes deux partagent la même optique voie jour avec zoom optique x30, la XL19 se distingue toutefois par une focale infrarouge supérieure (100 mm, contre 75 mm). Merio commercialise également les équipements permettant de visualiser et de traiter les flux vidéo et de les piloter

(Stand 6GF567)

▲ Merio avance avec de solides arguments sur le marché des capteurs optroniques pour drones et avions légers (ici, la Temis XL19)

Un treuil suédois qui s'en tire bien

PAR JEAN-MICHEL GUHL

Le monde de Sepson (Suède) est depuis plus d'un siècle concentré sur les treuils. Parmi ses clients,

Nexter Systems et Thales. Mis en avant cette année, le nouveau treuil Septrac est un équipement hydraulique bi-éléments, novateur et compact. Il présente l'avantage de fournir une traction régulière et continue, assortie d'une capacité d'enroulement constante à faible contrainte. Le câble – ou le filin synthétique –, est stocké séparé-

ment sur son tambour. Ceci, afin d'éviter tout coincement mécanique malencontreux – ou étirement excessif – durant la manipulation (avec seulement un guide-câble placé entre les deux parties, afin d'assurer un bon déroulement ou enroulement). (Stands 6H421/Pe6B170/Pe6B500)



▲ Le système Licorne a été adapté pour faire face aux menaces asymétriques



▲ Nécessitant peu d'entretien, le Septrac se monte sur tous types de véhicules et engins, militaires et civils

Du trompe-l'œil sur mesure

PAR JEAN-PIERRE HUSSON

Relevant du domaine du camouflage et de la dissimulation, Fibrotex (Israël) innove une nouvelle fois avec Sophia. Kit multispectral et polyvalent, il offre aux forces sur le terrain la possibilité de choisir des solutions de camouflage en fonction de la situation du moment. Avec plus de 30 m linéaires de filet 2D, compact, ultraléger et réversible, contenu dans un kit ignifuge et hydrofuge de 15 kg pour des dimensions de 50x50x50 cm³, Sophia permet aux soldats d'adapter directement sur



▲ **Solution de camouflage adaptable à la situation, Sophia augmente la survie des forces sur le terrain**

le terrain la taille, la configuration et la forme de camouflage dont ils ont besoin, que ce soit pour eux-mêmes ou pour les équipements et véhicules, afin de pouvoir assurer leur mission, tout en augmentant du même coup leur capacité de survie. **(Stand 6D628)**



Une veste connectée au monde

PAR ED SIPATSEL

Destinée aux forces spéciales, la veste connectée autonome de Tecknisolar (France) a un poids inférieur à 1,7 kg. Faite en tissu athermique afin d'éviter toute détection par caméra IR, elle est lavable en machine à laver. Elle incorpore un bloc batterie incassable, rechargeable par de petits capteurs solaires, amovibles et pliables, suffisant pour l'alimentation et la recharge d'une tablette, d'un téléphone portable, d'un émetteur-récepteur. De plus, elle dispose d'un dispositif Tecklocator. Par radio, il envoie en temps réel sa position - latitude et longitude - une application très utile en milieu urbain (guerre civile). **(Stand 6F463)**

Take off with Thuraya Aero

Thuraya Aero is a state-of-the-art in-flight broadband communications system that supports internet access, voice calls, text messaging, and real-time, high-speed data applications such as video conferencing and aerial surveillance on board small to medium planes, as well as rotary wing aircraft.

With its unique design, Thuraya Aero offers a wide choice of terminals with built-in video compression capability that can handle HD streaming speeds of up to 700 kbps.

Thuraya Aero's robust capabilities are the ideal communication solutions for beyond line-of-sight (BLOS) flights, as well as high-end applications such as search and rescue (SAR), ISR (Intelligence, Surveillance and Reconnaissance), office-in-the-sky, military missions and telemedicine.

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IN BRIEF

Middle East manufacturing

A supplier of electromechanical assemblies for military applications, Milectria (Hall 6, Stand J351) has created a manufacturing base in the United Arab Emirates (UAE) to better serve customers in the MENA region and worldwide. Its product range comprises cable harnesses, electrical panels and assemblies for vehicles. Called Milectria Middle East Cables, the new company's aim is to act as a local partner for international OEMs, especially those interested in manufacturing or service partnering from the UAE.

Organisational readiness

UK-based 4C Strategies (Hall 5A, Stand CD792) is showing its Exonaut software, which is used worldwide by armed forces and emergency services in support of organisational readiness. For the military market, the prime solutions are training and exercise management, and capability development. The British Army uses Exonaut to plan, deliver, assess and exploit all its collective training from company to divisional level. Other operators include the armed forces of Australia, Canada, Switzerland, Sweden and Norway.

Extremely rugged

MicroMax Computer Intelligence (Hall 5A, Stand C687) is showing new extremely rugged computer systems in its M-Max arsenal, especially designed to house PC/104 boards to build high-performance systems using passive cooling. Among its highlighted products are the 771 PR7/MMS with data acquisition features; 400 TBT for mission-critical applications; and the small and lightweight 640 LP/MMS with ultra-low power consumption.

Success for quadcopter

BY DAVID DONALD

Israel Aerospace Industries (Hall 6, Stand F751) has conducted a successful live trial of its Rotem L assault vertical take-off and landing loitering munition. The air vehicle is intended to provide a single soldier with the ability to conduct local surveillance missions, and to attack targets during urban and close-quarters engagements.

Rotem L is powered by a replaceable battery pack that provides up to 30 minutes' endurance in standard attack/surveillance mode. The vehicle



has two camera sensors – one in the nose and one under the belly – that relay imagery to a ruggedised tablet control unit. The nose sensor can be rapidly swapped between day and night units. For attacks, the vehicle is armed with a two-

grenade warhead. However, this can be replaced by an additional battery pack, giving a further 15 minutes of flying time in surveillance-only mode.

Designed for ease of use and the ability to be rapidly launched, Rotem L has automatic

Cut out the engine

An innovative powertrain system from AxleTech Systems (Hall 5A, Stand B648) was unveiled at Eurosatory this week. Combining its expertise in electric vehicle powertrain systems and independent suspension technologies, AxleTech developed the next-generation 5000 Series electric Independent Suspension Axle System concept, which it calls eISAS.

eISAS features custom-designed electric motors as part of the axle, thus becoming a complete electric powertrain system that eliminates the traditional drivetrain, including engine, transmission and gearboxes, which has obvious cost savings. The system provides for full battery electric

vehicles, fuel-cell range extender electric vehicles and internal combustion engine or turbine generator range extenders. For military operators, this technology has the benefit of improved stealth, lower heat signatures and fuel savings.

According to the company, the concept will allow for the energy from braking to recharge the vehicle's batteries. The eISAS concept axle will also utilise parallel axis gearing instead of traditional bevel gearing, thus maintaining the axle ground clearance and allowing for maximum torque to the wheels.

Currently, the concept is intended for future vehicles with a gross combination weight rating of up to 26 tonnes. AxleTech is considering similar concepts for lighter load vehicles for military and commercial applications. ■



Powerful trucks



BY SAM J BASCH

Gaia Automotive Industries (Hall 6, Stand C712) has two of its latest vehicles on show. What distinguishes the company's offering is that it works with

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r bomb

take-off and landing capability, abort and emergency 'return home' functions. It can fly to pre-programmed routes or be retasked in flight. Once an attack is commanded by the operator, the vehicle accelerates to around 100km/h in the terminal phase, and can approach its target from varying angles. The air vehicle would typically operate at ranges of 1-2km, with a maximum of 10km. It incorporates an audio distance-measuring system that uses sonar to prevent it from inadvertently colliding with walls and other obstacles. ■

Keep a watchful eye

Specialist R&D company ThirdEye Systems (Hall 6, Stand C712) is showing its Meduza man-portable passive drone detection platform at Eurosatory for the first time.

Able to detect drones low on the horizon,

even against a complex background, Meduza can be installed as a standalone unit or as a complementary system to long-range detection systems.

As chief executive Lior Segal explained: "Meduza offers high scanning abilities over vast areas and can detect objects over different types of terrain, including urban areas."

The company is also presenting the

artificial intelligence-based aEye, a neural network thermal analytics and classification system, which is able to undertake threat



detection while the drone is in flight. It is

fully autonomous, with day and night capabilities. Its

management software facilitates enhanced situational awareness, thus reducing an operator's cognitive stress levels.

According to Lior, aEye can identify people and objects while in motion and transmit the information direct to the control room, which avoids the need to send in patrol shift forces.

aEye can be installed on any third-party drone, and is already operational on an advanced long-range VTOL platform. ■

ul



customers to produce a vehicle tailored to specific requirements.

The Thunder multipurpose 4x4 armoured vehicle is built on a commercial chassis, such as the Ford F-550, with a crew

compartment offering Level II/III Stanag 4569 protection. It carries up to 12 people and a payload up to 1,800kg. As a personnel carrier, the Thunder is ideal for police, logistics, peacekeeping and ambulance roles. For other operations, optional equipment can be added, such as firefighting systems, night vision, NBC filtration, gunner turret and a remote-control weapon station.

The heavier Amir (*pictured*) is a multipurpose 4x4 or 6x6 mine-resistant ambush-protected vehicle able to carry up to 12 people and a payload of 3,000kg. Its independent suspension enhances tactical mobility. With ballistic protection up to Stanag 4569 Level 4 and up to 10kg TNT mines, the Amir is ideal for applications that include rapid intervention and reconnaissance. Options include a remote-control weapon station, manual one-man turret, missile launcher, anti-aircraft turret and a mortar carrier. ■

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Put a brake on vehicles

BY SAM J BASCH

A new bespoke armoured vehicle brake caliper developed by UK-based Alcon (Hall 6, Stand C712) is now "production-ready", according to the company. Having undergone extensive testing and validation, the CIR55 designed to fit 8x8 type military vehicles of 30-40+ tonne gross vehicle weight, significantly increases braking performance and reduces both weight and cost in comparison with existing alternatives.

Featuring a custom-designed eight-piston, four-pad configuration, the caliper can be used on disc diameters of 400mm to 410mm. The centre split design allows caliper variants to be available for a variety of disc thicknesses. Alcon explained that the fully hanging, high-friction pads are fitted with an anti-rattle system, while the caliper and seals are protected to cope with harsh military environments.

The brake was developed in co-operation with AxleTech (Hall 5A, Stand B648) and offered as part of AxleTech's brake portfolio under the Hydraulic Disc Brake family HD860 series. While Alcon is established in the light to medium military vehicle market, with the CIR55 it is moving into the heavy end. ■

Changing colours

BY DAVID DONALD

Saab has unveiled two new additions to its Barracuda Mobile Camouflage System (MCS) to enhance the signature reduction system's effectiveness. At the same time, two new initiatives have been launched to foster more effective employment of the MCS across the 60-plus countries that have bought Barracuda products, in the forms of a User Group and a training academy.

Revealed at Eurosatory is the Adjustable MCS, which Saab (Hall 6, Stand K371) is offering at similar prices to the standard MCS. This patented system recognises the need to change the visual signature of vehicles when operating in different environments. MCS is applied as a tailor-made 'uniform' for the vehicle, and in the new Adjustable variant there are panels that can be folded back to change the colour of the camouflage.

Typical examples would be an all-white outer camouflage for Arctic operations, with green fold-back panels that can be deployed if the vehicle moved into semi-forested areas. Similarly, a desert camouflage could be changed to one that suited a semi-arid terrain, or a woodland green system can be changed to one suited for urban operations. Altering the visual signature can be accomplished in about five minutes for a typical armoured vehicle, and maintains the full multi-spectral



PHOTO: JOHAN LINDQVIST FOTOGRAFI



concealment offered by the MCS. The system reduces signature in ultra-violet, near infrared, short-wave infrared, thermal and radar bandwidths, as well as reducing the operating temperature inside vehicles. Recent operational experience has shown that it can give more time to react to threats, and also make weapon systems more lethal by allowing enemy forces to approach closer without threat.

A second new Barracuda product is a multispectral Arctic Camouflage Net. The two-sided net has an all-white side for snowfield operations, while the other has patches of grey and green for operations in shadowed areas or those with exposed vegetation or rocks. The net also uses an improved textile that is less brittle than previous fabric at extreme cold temperatures.

To coincide with Eurosatory,

Saab has launched a Barracuda User Group as a forum in which users can exchange knowledge and share their experiences of operating with Barracuda signature management products, as well as to shape future developments based on real-world operational needs. The first meeting is to be held during the show, and will include military and industry representatives from 16 nations. The group will be launched with an address from Major General Karl Engelbrekton, Chief of Staff of the Swedish Army, whose primary theme will be the importance of signature management. The Barracuda User Group will meet annually, alternating between Eurosatory and the DSEI show in London.

Saab is also launching a Barracuda academy, which will start in August. This will provide a Sweden-based signature management master-class, with particular emphasis on new sensors and how to remain concealed from them. There will also be a train-the-trainer course, which could be conducted in the user's own nation. ■

La Jeep ? Plus jeune que jamais !

PAR JACQUES DE LESTAPIS

AADS (Africa Automotive Distribution Services Ltd) (Gibraltar), distributeur de Chrysler Military, commercialise dans le monde la Jeep J8 4x4, châssis long JK. Douze variantes sont proposées et peuvent être modifiées à la demande et selon les besoins exprimés (blindage, circulaire de toit, armement, transport de troupe, PC, ambulance, pick-

up, etc.) par les clients, dont des organisations gouvernementales. A la fin de l'année, une nouvelle J8 va être proposée en 12 différents modèles sur une plateforme JL Cots produite à Toledo, Ohio (Etats-Unis). AADS réalisera les conversions demandées à Gibraltar, au Portugal et, pour ce qui concerne le blindage, en Pologne, chez AMZ.

Stand Pe6aC430



▲ La Jeep J8 JL est proposée en douze versions différentes, à deux ou quatre portes

Protection balistique légère à toute épreuve

PAR JEAN-MICHEL GUHL

DSM (Pays-Bas) présente sa fibre de protections balistiques Dyneema® bien connue de par le monde. Elle entre dans la fabrication, notamment, de gilets pare-balles, de casques, de blindages divers. Mais, nouveau, pour les engins blindés, elle compose aussi des chaînes et câbles synthétiques, des cloches de radome ou autres,

des revêtements pare-éclats, des filets anti-RPG à haute performance. A poids égal, Dyneema® est une fibre légère jusqu'à 15 fois plus solide que l'acier et jusqu'à 40 % plus solide que celles en aramide. Un gain de poids pour des performances accrues. Et, nouveau encore chez DSM, le UD "Uni-Directional bullet resistant sheet". C'est là une fibre écologique spéciale à basse

teneur en carbone. Elle aussi participe à la réalisation de gilets, de casques et de plaques de protection en tous genres.

(Stand 6H80)



▲ Une idée pour recycler les gilets pare-balles réformés ! En faire du mobilier (ici, une table signée par le concepteur Marc Meijers, de DenimX)

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AXLETECH

EN BREF

■ L'ETI française **NSE** et **Arquus Défense** signent aujourd'hui un contrat de prestations de service dans le cadre de nouvelles offres qu'Arquus met à disposition de ses clients. L'accord définit les termes de la collaboration entre les deux entreprises en matière de soutien, avec la création d'un portail internet permettant l'élaboration et le suivi de demandes d'assistance technique, ainsi que la consultation d'offres de formation. NSE assure la gestion du parc de valises de diagnostic et de lunettes connectées. En outre, pour ce qui relève des véhicules blindés Panhard, dont la fabrication est arrêtée, NSE en assure la logistique et le pilotage des réparations de sous-ensembles.

(Stands 5aED158/5aD177)



■ Le missile de croisière supersonique Mach 2,5-2,8 russo-indien BrahMos, de **Brahmos International** (Inde), déjà en service au sein des forces armées indiennes, peut être opéré par de nombreuses plateformes terrestres, aériennes et navales. Sa portée est de 290 km. Pour la première fois, en mars dernier, il a été tiré en utilisant un autodirecteur indien développé par **DRDO** et **BrahMos Aerospace** et produit par **ECIL**, en remplacement des équipements d'origine russe. C'est un pas de plus vers le "make-in-India" cher aux autorités indiennes.

(Stand 6B433)

La reine des batailles

PAR JEAN-PIERRE HUSSON

Yugoimport (Serbie) présente ses systèmes d'artillerie, obusier automoteur Alexander et MLR Shumadia. Système entièrement automatisé de 155 mm, installé sur châssis 8x8 avec cabine blindée accueillant les trois membres d'équipage, l'Alexander embarque 24 obus, dont 12 immédiatement prêts au tir et 12 autres en soute. Ils se chargent automatiquement sans intervention de l'extérieur. Installé également sur plateforme 8x8 et tout aussi rapide à mettre en batterie, le Shumadia est un lance-roquettes multiple d'artillerie. Modulable et automatisé, il peut délivrer ses roquettes jusqu'à une distance de 280 km, avec un CEP de 50 m en mode INS/GPS, ou 150 m en mode INS. Le rechargement est



assuré par un véhicule logistique pouvant transporter deux modules avec, chacun, deux roquettes de 400 mm, ou six de 267 mm. Autre nouveauté du Salon, un tourelleau téléopéré avec mitrailleuse de 12,7 mm.

(Stand 6B571)

▲ La cadence de tir de l'Alexander, qui est couplée à un système de contrôle de tir informatisé, est de 6 coups/minute (25 km de portée)

Le Griffon montre ses muscles

PAR FRÉDÉRIC LERT

Turgis et Gaillard Industrie (France) expose un moteur de VBMR Griffon, futur véhicule

tactique de l'Armée de Terre française et remplaçant du légendaire VAB (Véhicule de l'Avant Blindé). La présence de ce moteur



▲ Spécialiste de l'entretien et de la rénovation des véhicules terrestres, Turgis et Gaillard Industrie se prépare à l'arrivée du Griffon dans les forces françaises

symbolise la réussite de cette PME de 150 personnes, essentiellement présente, pour ce qui est de l'armement terrestre, sur le marché du MCO, de la reconstruction et de la revalorisation. La majeure partie de son activité est liée à la fourniture d'organes mécaniques (moteurs, boîtes, ponts) pour donner une deuxième vie aux VAB et camions des armées françaises. Mais, au-delà de ce savoir-faire sur les matériels anciens, Turgis et Gaillard Industrie entend bien développer également son offre de service en matière de réparation, de rénovation et d'approvisionnement en pièces détachées au profit des matériels de nouvelle génération.

(Stands Pe6B101/5aF20-178-268)

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Protection et confort assurés

PAR JEAN-PIERRE HUSSON

Proposées par Bollé Safety (France), les lunettes Gunfire ont été conçues pour assurer un maximum de protection balistique et de confort lors des séances d'entraînement au tir. Extrêmement légères et durables, certifiées Stanag 4296 et EN172,

elles sont évolutives puisque livrées en kit comprenant deux jeux de verres en polycarbonate - version incolore et teintée CSP (intérieur/extérieur), avec traitement exclusif Platinum® anti-rayures et antibuée -, et deux jeux de branches flexibles et facilement interchangeables. Ces dernières sont de couleur noir/rouge et noir/gris. **(Stand 6F647)**

◀ **Les lunettes de protection balistique Gunfire sont livrées dans un kit rigide noir et avec étui microfibre**



◀ **L'antenne du MobileSat-DEKA 040/OTM peut tenir sur le toit d'un véhicule, grâce à des aimants montés sur amortisseur, et fonctionner jusqu'à des températures de +60° C**

Satcom pour tous et partout

PAR JEAN-MICHEL GUHL

S'appuyant sur des liens étroits avec de grands laboratoires de recherche, Actia Telecom (France) propose des réponses "high-tech" aux problèmes de transmission d'informations. Son expertise Satcom a pris corps avec des programmes importants de la DGA. Elle s'est développée pour offrir des solutions techniques avancées dans trois domaines : les amplificateurs et sous-systèmes RF, les stations terriennes pour opéra-

teurs civils et gouvernementaux, et les systèmes de supervision de réseaux. Tout beau et tout neuf, son terminal MobileSat-DEKA 040/OTM On-The-Move, à destination militaire. Il permet des communications large bande en mode continu pour la voix, la vidéo et le transfert de données, en environnement dynamique, et un positionnement inertiel GNSS. Particulièrement original est son antenne passive de forme ramassée, dotée de 4 ports. **(Stand 5aG682)**

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IN BRIEF

Electric bore cleaning

Armed forces all over the world use the standard Vibrating Pneumatic Bore Brush (VPBB) from Sweden's CLP System (Hall 5A, Stand G692), but new demands have led to the development of the Vibrating Electric Bore Brush (VEBB). The 24V DC/110-230V AC-powered VEBB uses only mechanical parts inside the barrel, while all the electric components remain on the outside, making the VEBB easy and safe to use. Live tests have shown that the same efficiency of cleaning and preserving bores is achieved as with the approved pneumatic VPBB. VEBB is operated by one person and cleans a 120mm MBT bore in less than 30 minutes. It will initially be available for all medium and large calibres from 76-155mm.

Star-struck soldiers

The STAR-PAN soldier-worn multiport power and data hub designed for joint terminal air controller (JTAC) and special forces operators is being shown by Glenair (Hall 5A, Stand K328). They are used for critical missions such as digitally aided close air support (DaCAS). The ongoing evolution of DaCAS missions requires corresponding improvements in battery power management for the broad range of electronic equipment, so that the mission time, weight distribution and supply logistics of the dismantled soldier ensemble remain fully optimised. This is never more essential than in border protection missions, which can last from 12 to 72 hours. STAR-PAN enables soldiers to make the most of C4ISR devices, improving situational awareness, surveillance, intelligence and reconnaissance.



BY SAM J BASCH
Senso-Optics (Hall 6, Stand C712) is presenting its new X-SEE FusIR monoscope, said to offer outstanding image fusion performance.

Senso-Optics' president and CEO, Jacob Dagan, said: "The X-SEE FusIR monoscope is based on our proprietary camera-on-chip ASIC image processor, which generates exceptional image quality with VGA resolution (640x480) within tiny dimensions, weight and power consumption."

He explained that it offers the advantages of both visible and far infrared spectrum channels, day and night and in all weather and environmental conditions, such as fog, dust and smoke. Users can now see through glass windows, lights, signs and even colours with X-SEE FusIR's blended fused image, which they cannot do with thermal imaging alone.

The unit weighs only 300g with a x1 lens, going up to 700g with a x4 lens. It complies with MIL-STD-810 and other standards. ■

Stop the fuel leak

Oil and fuel tanks are vulnerable, which is why Israeli company Magam-Safety (Hall 6, Stand C688) has developed a self-sealing flexible fuel tank. The company claims it prevents leakage when hit by bullets up to 20mm calibre.

"Standard metal tanks, when penetrated, immediately begin to leak fuel," said Magam chairman Amit Tesler. "Our self-sealing technology... prevents leakage by self-sealing the holes within 0.1 milliseconds, reducing the ignition potential and thus saving lives and equipment.

"Our flexible fuel tanks are installed on all types of military aircraft, armoured fighting vehicles and maritime platforms around the world."

Made of several chemically sensitive layers of rubber, the laminated flexible rubber fuel tanks are placed between two fuel-resistible layers on a special fabric matrix.

Magam also provides on-site coating of existing fuel tanks, which provides thermal and corrosion protection. ■

Shooting straight

A range of new assault rifles is being shown by Israel-based Emtan (Hall 6, Stand D733), including the MZ-47, MZ-4P (piston) and the MZ-300.

The MZ-47 in 7.62x39mm calibre is compatible with the AK-47 standard magazine and ammunition and is available in two barrel lengths. Similarly,

with two barrel lengths, the 5.56x45mm calibre MZ-4P (piston) is compatible with NATO ammunition and variations thereof.

The MZ-300 7.62x35mm calibre .300AAC Blackout automatic weapon is available with three optional barrel lengths. Utilising 5.56x45mm



standard bolts and magazine without any alterations, it is ideal for automatic and semi-automatic firing with short barrels and suppressors. ■

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REGIONAL FOCUS

Asia-Pacific

North Korea's nuclear weapons programme and potential thaw in relations with the US, a border stand-off between India and China, fighting in the southern Philippines, large naval procurement programmes in Southeast Asia, and a new US strategy for Afghanistan have made for a busy year in the Asia-Pacific region.

North Korea continues to dominate the regional landscape, although further south, China has vowed to increase its air and naval patrols and to enhance its defence capabilities in the South China Sea following several freedom-of-navigation operations by the US Navy in the disputed waters.

Meanwhile, a two-month-long military stand-off over disputed borders between China, India, and the Himalayan kingdom of Bhutan; clashes between the Philippine military and Islamic State-linked militants; and incremental military procurement in Southeast Asia have ensured that the Asia-Pacific security landscape continues to exhibit febrile tendencies.

North Korea

It was announced on 21 April 2018 that North Korea would immediately halt its missile and nuclear tests and dismantle its nuclear test site at Punggye-ri. This would occur ahead of summits with South Korea and the US which – at the time of writing – were set to take place in late May/early June.

The state-run Korean Central News Agency (KCNA) media

outlet quoted North Korean leader Kim Jong-un as saying that no further nuclear tests or test-firings of ballistic missiles are necessary for now, "given that the work for mounting nuclear warheads on ballistic rockets" has been completed.

Kim said his country would "discontinue" such tests from 21 April, adding that the mission of the "northern nuclear test ground" at Punggye-ri had "come to an end" and that it would therefore be "dismantled to transparently guarantee the

discontinuance" of nuclear tests.

The North Korean leader described the move as part of "an important process for worldwide disarmament" and indicated that his country would join the international desire and efforts for the total halt of nuclear tests. Kim also pledged neither to use nor transfer nuclear weapons or nuclear technology "under any circumstances" unless nuclear threats or provocations are made against North Korea.

He was also quoted by the KCNA as vowing to concentrate on economic reconstruction as well as on facilitating "close contact and active dialogue with neighbouring countries and the international community to

Key facts: Asia-Pacific market



defend peace and stability on the Korean Peninsula and in the world".

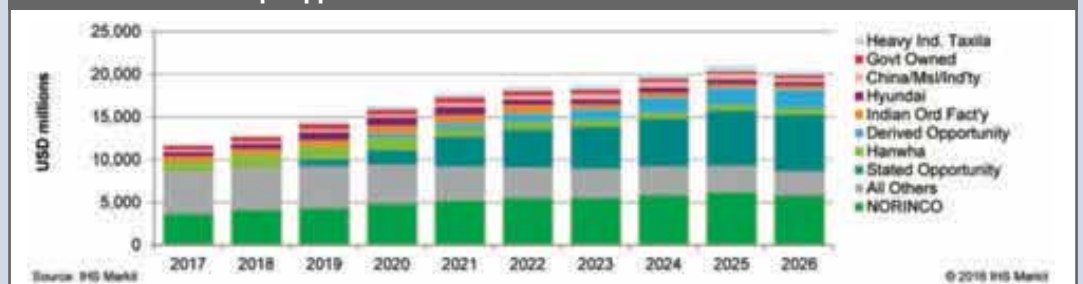
US president Donald Trump welcomed the North Korean announcement by saying in a Twitter post that the move meant "very good news for North Korea and the world" and that he looked forward to his summit with Kim.

It is likely that key conceptual differences will remain between North Korea and the US in interpreting the term

Asia-Pacific market: major functional segments



Asia-Pacific market: top suppliers



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Key facts: South Korea



is consistently improving and acquiring new technologies with public-private partnerships to remain abreast with Western AFV developments. The focus is towards networked and agile armoured vehicles, amphibious vehicles, and long-range air defence systems.

Major procurement/upgrade programmes

- Type 97A (ZBD97) IFV (2,000 units): USD8.07 billion.
- Type 99A2 MBT (1,360 units): USD7.4 billion.
- ZTD-05 Amphibious Vehicle (962 units): USD4.8 billion.
- HQ 16A SAM (38 batteries): USD4.1 billion.
- HQ 16A SAM (39 batteries): USD4.2 billion.
- ZBL-09 Reconnaissance Vehicle (1,550 units): USD2.6 billion.
- ZTQ Light Tanks (674 units): USD2.1 billion.

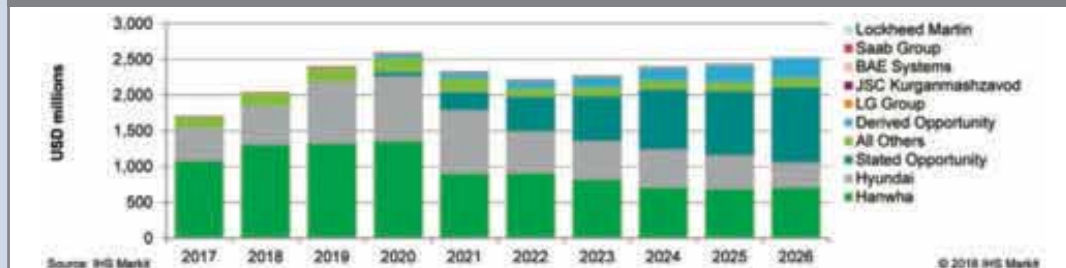
Opportunities

- APC (Akin VN10 APC): USD2 billion.
- Wheeled self-propelled howitzer: USD713 million.

Key facts: Japan



South Korea



India

Despite several defence procurement and spending reforms, Indian military vehicle procurements continue to stall and face technical difficulties owing to delays in decision-making, a complex defence procurement procedure, corruption, and insistence on furthering the government's 'Make in India' initiative without any significant increase in R&D spending or additional support for its private defence industry.

Major procurement/upgrade programmes

- T-90S Bhisma MBT (690 units): USD4 billion.
- Indian Army Barak-8 MRSAM (five regiments): USD1.1 billion.
- Tatra Trucks (1,600 units): USD881 million.
- Arjun Mk 2 MBT (118 units): USD737 million.
- T-90 Upgrade (395 units): USD551 million.
- BMP-2 Upgrade (693 units): USD357 million.

Opportunities

- Future Infantry Combat Vehicle (FICV): USD2.9 billion.
- Wheeled APC (8x8): USD1.4 billion.
- Mounted Gun System: USD1.2 billion.
- Future Ready Combat Vehicle (FRCV): USD1.2 billion.

South Korea

The Republic of Korea Army (RoKA) plans to acquire manoeuvre and rapid strike capabilities to maintain a significant qualitative edge over the Korean People's Army (KPA). The focus remains on acquiring armoured vehicles, air defence systems and artillery systems, apart from layered missile defence. South Korea's procurement is geared towards boosting self-reliance and military capability of the RoKA through acquisition of technology and international partnerships.

Major procurement/upgrade programmes

- K9 Self-Propelled howitzer (240

units): USD2.2 billion.

- KM-SAM (10 batteries): USD1.8 billion.
- K-21 IFV (300 units): USD1.3 billion.
- EVO-105 mounted SPH (800units): USD1 billion.
- KW2 8x8 APC (508 units): USD1 billion.

Opportunities

- MBT: USD1.8 billion.
- IFV: USD1.2 billion.
- Short-range AD Vehicle: USD456 million.
- MLRS: USD451 million.

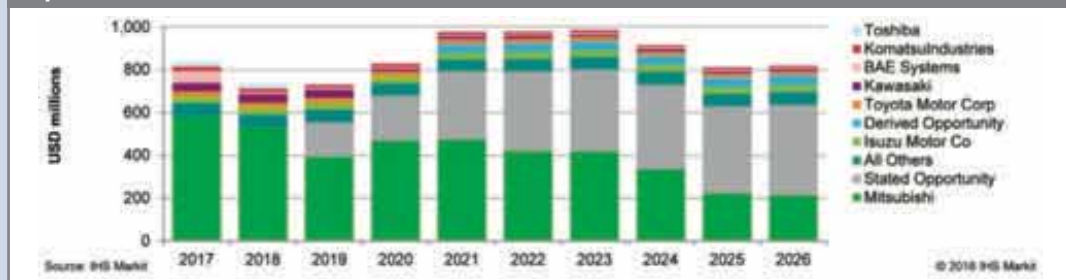
Japan

- Middle Range Multipurpose Anti-tank Missile Vehicle (138 units): USD167 million.
- AAV7 Amphibious Assault Vehicle (11 units): USD136 million.

Opportunities

- Light Self-Propelled Howitzer (LSPH): USD1.3 billion.
- CCV: USD1.02 million.
- APC: USD190 million.

Japan



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Major functional segments

Main battle tanks lead regional market segments, with 12.4% five-year CAGR and a market value of USD32.5 billion. IFVs have a 13.1% CAGR and USD28.0 billion share of the region, while the self-propelled artillery segment shows a 3.5% CAGR and USD21.9 billion forecast.

SIGNIFICANT DEFENCE MARKETS

Vietnam

Vietnam is a defence market with significant potential. The country's economy continues to grow rapidly, investment in the defence sector is increasing and the communist government in Hanoi has demonstrated a willingness to open up its defence market and procure materiel from international suppliers beyond Russia; traditionally its favoured military supplier.

Other positive signs for market entrants include Hanoi's requirement to procure a range of modern military equipment to respond to strategic challenges that are unlikely to dissipate in the foreseeable future, and an indigenous defence industrial base that is, in the main, poorly equipped to meet the requirements of the Vietnam People's Army (VPA) and its affiliated air force, navy and coast guard.

In terms of military expenditure, Jane's Defence Budgets forecasts Vietnam's defence budget to expand from USD5 billion in 2018 to about nearly USD6.5 billion by 2022, an overall increase of 30%. Annual expenditure allocated to defence procurement in the same timeframe is expected

to rise at a slightly faster rate (35%), from USD871 million to USD1.18 billion.

Vietnam has also in the past demonstrated an ability to spend beyond this base level prediction given the country's propensity to occasionally fund major acquisitions through the barter of natural resources, notably gas or nuclear energy.

This policy has enabled Russia to consolidate its position in Vietnam through flexible defence contracts based on barter/counter-trade. However, Vietnam is evidently not prepared to rely solely on Moscow for its defence materiel, and, as part of an effort to expand strategic ties across the globe, Hanoi has since 2009 entered into collaboration defence partnerships with a host of nations, particularly those in Europe.

These agreements are designed to shore up strategic alliances in the face of increasing concern over China's intentions in the South China Sea – where Vietnam owns rapidly increasing oil and gas assets – and they are also focused on facilitating defence trade and industrial collaboration; the latter of which is intended to boost indigenous capabilities and enhance self-sufficiency.

In future years Vietnam is forecast by Jane's to continue its present strategy of building military capability in particularly air and sea domains – in response to its offshore challenges – and while most major platforms can be expected to be sourced from Russia, Western suppliers are likely to continue to increase their share of the defence market.

There is also likely to be increasing opportunities for US contractors following

Washington's decision in May 2016 to fully lift its long-standing military sanctions imposed on the country.

It should also be noted that as of 2018, Vietnam is preparing a new Defence White Paper, its first since 2009. This defence policy is expected to place additional emphasis on military modernisation efforts against a backdrop of rising territorial tension in the region.

Challenges

Despite reasons to be optimistic about the Vietnamese defence market, numerous challenges remain for foreign suppliers. These include wariness as a result of previous international trade restrictions; reliance upon counter-trade agreements; limited transparency; and a lack of indigenous capabilities.

Counter-trade

Vietnam's occasional use of energy resources to fund major purchases of materiel from Russia provides Hanoi with flexibility in light of limited spending allocations. It also provides Russia with fuel and enables Moscow to consolidate its position in the Vietnamese defence market.

It is unlikely, however, that funding for purchases of materiel from Western suppliers will be sourced through such methods due to Western suppliers' lack of flexibility in such matters. Western purchases are more likely to progress through more orthodox methods and, due to Vietnam's low procurement budget, could be limited in terms of contract value.

Limited capabilities

Vietnam has historically placed a preference in its defence

procurement on cost and quantity over quality and advanced capability. Vietnam also possesses ageing equipment due to a major halt in procurement programmes in the 1990s, limited indigenous defence industry capabilities and an almost exclusively Soviet-designed installed equipment base.

As a result, the country's ability to absorb advanced Western defence technologies is restricted.

Land sector indigenous industry

Vietnam's principal defence industry capabilities are in the manufacturing of small arms and small-arms munitions. These programmes – which are undertaken by VPA factories with support from local industry – include the manufacture of P-40, MDH-10, NO-MZ-2B and MN-79 mines, a range of small arms, mortars and associated submunitions.

The land sector has also benefited from Vietnam's emphasis on developing capability through international partnerships. For instance, in February 2014 Israel Weapon Industries (IWI) established in Vietnam a joint production facility at the MND's Z111 factory in Thanh Hoá to support its supply of Galil 31/32 ACE assault rifles to the VPA.

The Z111 facility, which is run by the MND's General Department of Defence Industry, took complete control of Galil 31/32 manufacturing processes in late 2015 following the agreed withdrawal of IWI, which had completed its responsibility under the contract of setting up the production run.

In August 2017, the Vietnam

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MND said its Z111 factory has so far exceeded its production target, which was set at the beginning of the year. In 2016, the Z111 factory also surpassed its target by 16%, added the MND. In addition, the MND said the factory has recently successfully started producing 12.7mm guns that can reach a range of 1,800m and can penetrate light armoured vehicles. The MND did not specify the type of gun, but said it was of Russian design.

In terms of military vehicles production, Vietnam's capabilities are limited. VPA-run factories provide MRO services and collaborate with Russia on some production programmes. Russian company Kamaz, for instance, has established a production facility in Vietnam in partnership with local industrial group Vinacomin to produce military trucks and logistics vehicles. The company also exports vehicles directly to Vietnam.

The degree to which Vietnam industry is involved in the Kamaz military vehicle production programme is unclear, but other cases of industrial collaboration suggest that local industry will play a role. In 2017 Kamaz said it wanted to expand its production base in Vietnam and use its facility in the country to expand into regional markets.

Malaysia

The expansion of Malaysia's defence market has been constrained in recent years by economic challenges that have faced the country. Much of the funding anticipated to be available for military procurement in the 2011-15 Tenth Malaysia Plan did not emerge due mainly to a

requirement to address the country's stubbornly high national deficit.

Similar problems are hindering spending during the current 2016-20 Eleventh Malaysia Plan, meaning a number of major programmes – most notably the acquisition of multirole combat aircraft – are likely to continue to face delays.

Despite this, there are reasons for optimism. The country's economy is forecast by IHS Global Insight to be on track for relatively strong economic growth during the Eleventh Malaysia Plan, averaging about 4.7% between 2017 and 2021, driven by strong investment and domestic demand as well as growing exports. This expansion should underpin some mild growth in the core defence budget, with Jane's Defence Budgets expecting a climb from USD3.28 billion in 2017 to USD3.65 billion in 2021; an overall increase of 11%.

Defence procurement spending is forecast by Jane's to grow at a similarly modest rate from USD758 million in 2017 to USD846 million by 2021. In addition, it should be noted that Malaysia has, in the past, shown a tendency to fund major acquisitions through special out-of-budget allocations. For instance, the AV8 8x8 armoured vehicle and next-generation patrol vessels programmes are funded in this way.

Malaysia also continues to face a number of security concerns. They include unresolved border disputes in the east of the country; growing concern about China's assertiveness in the South China Sea; occasional interstate tension with Thailand; and piracy and illegal immigrant problems.

Another procurement driver is Malaysia's apparent desire to keep pace with the military modernisation that is taking place elsewhere in Southeast Asia.

As a market, Malaysia has historically taken an unusually broad approach to procurement with inventories that include Polish main battle tanks; Anglo-Italian helicopters; Russian fighter aircraft; and French and German naval systems.

Looking forward, it is reasonable to argue that Malaysia will continue to balance its procurement relationships, although it is debatable whether this strategy has always served the country well.

Delayed procurement

A number of major programmes (ranging from the MRCA programme to the acquisition of self-propelled howitzers and multipurpose support ships) have been subject to delay as a result of economic travails and it remains to be seen whether they will be included in the Eleventh Malaysia Plan.

Low-level indigenous capabilities

Efforts to meet technology transfer and local participation demands have been hampered by the relatively unsophisticated capabilities of Malaysia's defence industrial base. Efforts to drive local development are unlikely to yield results in the short term, particularly given the country's limited R&D expenditure. This suggests that industry will continue to struggle to absorb technologies and work obligated under offset, and remain dependent on foreign partners.

Politicised major procurement

While procurement relationships have been broad, major procurement programmes in particular appear to have been highly politicised. Jane's notes the argument that decisions relating to larger programmes often circumvent the Ministry of Defence with the final say taken by the office of the prime minister. Non-operational considerations may, therefore, influence decisions.

Land sector indigenous industry

Indigenous military land systems capabilities are concentrated in the hands of wheeled vehicles developer Deftech, truck group Pesaka Astama, and transmissions specialist Muadamzam Oto (M) Sdn Bhd.

It is in the land domain that Malaysia is arguably closest to self-sufficiency, although high levels of foreign assistance in major programmes are still required.

Deftech, for example, is the company behind the AV8 8x8 (a multibillion dollar procurement contract for which was signed in early 2011). The programme is progressing through a partnership between the Malaysian company and Turkey's FNSS Savunma Sistemleri. Another major project is Deftech's production of the AV4 4x4 multipurpose armoured vehicle. In this project Deftech is partnered with Chaiseri from Thailand, which designed the vehicle for the Thai Armed Forces.

Deftech is also understood to be collaborating with Chaiseri on a programme to upgrade Malaysian Army 4x4 Condors. ■

SECURITY

Intelligence and the digital revolution in the 2020s

By 2030, the operational security environment for intelligence and law enforcement agencies will be unrecognisable to a practitioner from the turn of the century. The ability of a state to maintain an informational advantage – over competitors and even its own citizenry – is no longer assured. The exponential pace of the digital revolution has already had a profound effect on how intelligence agencies, law enforcement, and open-source intelligence (OSINT) analysts operate, consigning much Cold War-era tradecraft to history.

The digital revolution brings both threats and opportunities to both the classified intelligence community and OSINT analysts. Nation-states have begun to adapt and innovate. In 2015, the CIA launched a new Directorate of Digital Innovation. In 2016, Alex Younger, the head of the UK's Secret Intelligence Service – which aims to recruit up to 1,000 new personnel by 2020 to address digital challenges – said: “The information revolution fundamentally changes our operating environment. In five years' time, there will be two sorts of intelligence services: those that understand this fact and have prospered, and those that don't and haven't.”

Nevertheless, the pace of change threatens to outstrip state agencies. Multiple disruptive new technologies will come on-stream

in the coming decade that will have profound implications, and commercial companies will build capabilities that exceed those of all but the most advanced states.

Disruptive decade

Many changes by 2030 will not be directly technological. Other trends will inform a shifting security environment, such as the demographic ascendancy of the computer-literate millennial generation, rapid urbanisation within megacities, increasing popular scepticism about the state monopolies of power, and the transition to a service-based knowledge economy.

Nevertheless, technology is set to be the pre-eminent driver of change, and this will occur within a context of multiple emerging systems. Cryptocurrencies and blockchain technologies will challenge the established global financial system; US primacy in space-based technologies will face challenges from the rise of genuine state peers, most notably China, as well as from private companies taking advantage of reduced technological and financial barriers to entry to place their own satellite constellations into orbit; and the nature of the internet itself is likely to change with differing conceptions about its operation and regulation.

Technological innovations are likely to emerge – many unforeseen or unpredictable –

that will necessitate a sudden and substantial response. The vast amount of data generated will require new approaches to both classified and OSINT collection, analysis, and counterintelligence, such as using artificial intelligence (AI) and machine learning to ‘join the dots’.

Since the revelations in 2013 by former National Security Agency contractor Edward Snowden about the alleged capabilities of Western signals intelligence (SIGINT) agencies, much public debate has revolved around the requirements, abilities, and oversight of agencies carrying out communications interception. Yet the post-Snowden public debate about communications interception has often obscured analysis of multiple other technologies that will emerge during the 2020s.

These will include the widespread adoption of AI and advances in robotics; quantum computing; expanded constellations of small commercial satellites (CubeSats) and long-endurance stratollites (high-altitude balloons); neuromorphic engineering (replicating brain functions in electrical engineering); and artificial neural networks (processing systems modelled on mammalian brains). Of these, AI and quantum computing have attracted particular attention.

Quantum computing offers the prospect of a qualitative

shift in processing power. Computers operating at that level could theoretically break most current public-key encryption standards and quantum-key distribution raises the possibility of communication invulnerable to covert interception. Advances in AI systems ultimately threaten to create machines with human levels of intelligence and cognitive ability at a point of convergence dubbed ‘technological singularity’.

Primacy of sensors

Jane's judges that there will be a considerable leap forward in the 2020s in the proliferation, efficiency, and miniaturisation of sensor-based technology. Indeed, during the 2020s, sensor-based intelligence collection is likely to become a primary means of technical intelligence-gathering. This will be a product of both the ubiquity of sensor-based platforms and also of a likely reoriented focus on targeting ‘data at rest’ rather than ‘data in transmission’ because of the growing difficulties in communications interception.

Numerous sensor platforms – including imaging satellites, unmanned aerial vehicles (UAVs), and smart closed-circuit television – have already revolutionised how states and threat actors carry out surveillance. Jane's assesses that a significant milestone will be passed in about 2020, when more than 100 ‘intelligence-grade’ (sub-1m-resolution) commercial

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imaging satellites – often CubeSats – will be in orbit.

This increased capability, available commercially, will have considerable implications for states in their already-diminished ability to conceal facilities, infrastructure, troop formations, and new construction from aerial surveillance. The rapid expansion of new space-based commercial offerings is indicative of the strength of the sector.

State responses

In terms of states’ response to threats, it is likely that greater numbers of multidisciplinary intelligence teams will be stood up to confront an identified

threat, involving personnel with a human intelligence (HUMINT), SIGINT, geospatial intelligence (GEOINT), or OSINT background, among others, working in a single team against a single threat, and tasked with the full range of intelligence activity.

Publicly avowed developments suggest a process of merging is already under way in some countries. In the US, the controversial restructuring of the CIA in 2015 involved the creation of 10 ‘mission centres’ that each bring together human, technical, and digital intelligence, as well as operations and analysis. In Russia, where boundaries in digital espionage often appear

blurred between state and non-state entities, the Federal Security Service appears to be positioning itself as a pre-eminent ‘super-agency’, with a growing role in foreign and cyber operations.

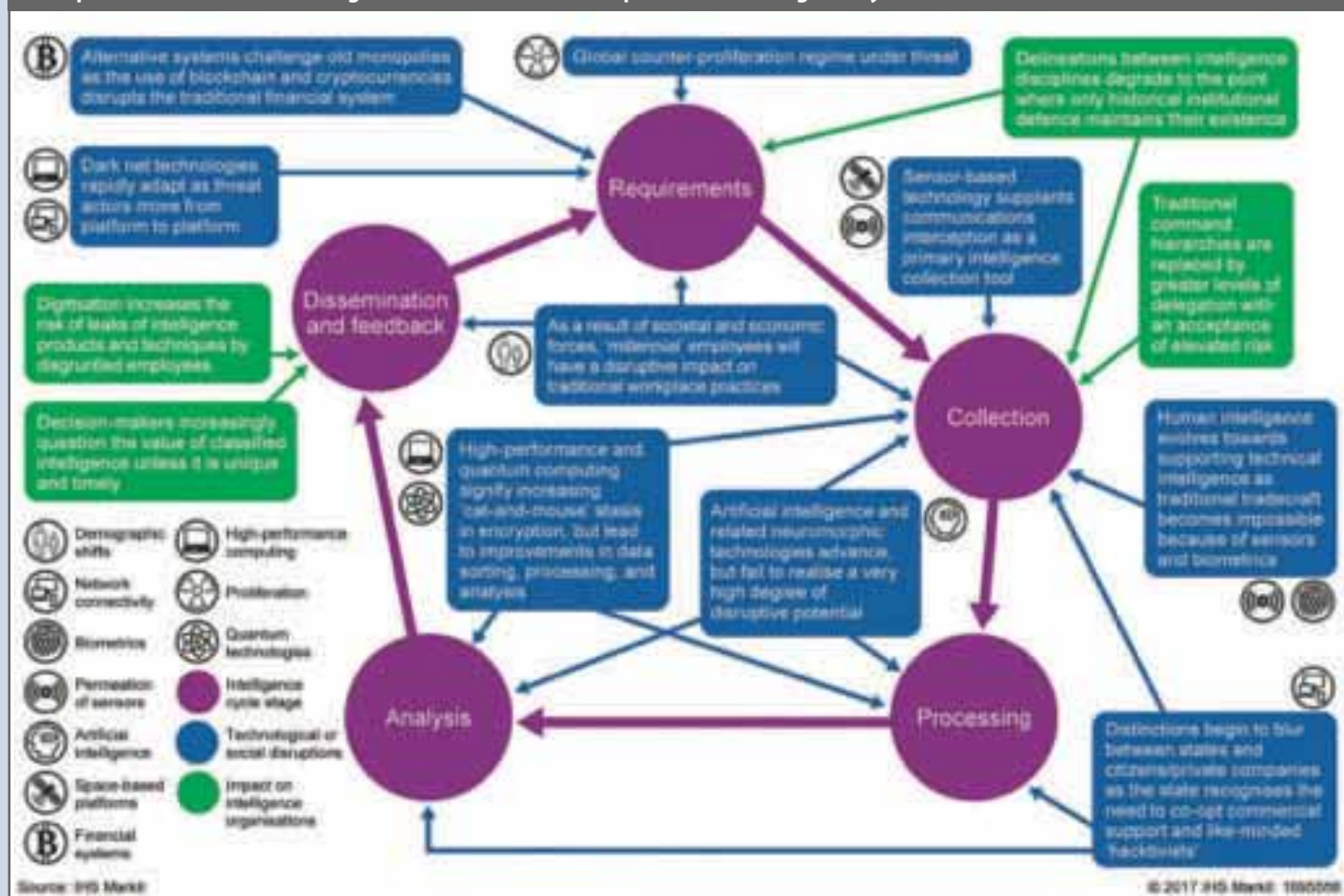
Nevertheless, an overemphasis on the impact of the digital revolution risks creating blindness towards other likely trends in the 2020s that will also affect agencies. These can be summarised as the critical disadvantage that large institutions have in responding to sudden change of the type that will almost certainly increase through to 2030. Elements of this disadvantage include leadership mindset, risk-management techniques, adapting to the

computer literacy of younger generations, and public oversight.

In the years to 2030, both intelligence agencies and OSINT practitioners will therefore be under the greatest pressure they have ever experienced to maintain informational superiority and to deliver unique, predictive intelligence to decision-makers. At the same time, an assumption of constant technological progress is questionable, since – in some cases – countermeasures will rapidly dilute the impact of innovations and certain technologies will evolve or be taken up more slowly than predicted.

Material drawn from *Jane’s Intelligence Review*

Examples of trends around the digital revolution and their impact on the intelligence cycle



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NEWS / ACTUALITES

OUTDOOR LIVE DEMONSTRATIONS PROGRAMME / PROGRAMME DES DEMONSTRATIONS DYNAMIQUES EXTERIEURES

Daily at 09:45 a.m. and 03:30 p.m. (except for the afternoon of Friday, June 15) / Tous les jours, à 09h45 et 15h30 (sauf l'après-midi du vendredi 15 juin 2018)

In a new area, closer to the exhibition, the Eurosatory 2018 outdoor live demonstrations are the theatre of Security and Defence of today with: automated convoys, robotics, law enforcement, less than lethal use, protection, surveillance, and combat. The area provides the scene to display vehicles and operating systems in action. Complemented by wide-screen projections, these demonstrations boost exhibitor visibility at the event and promote their products / Avec plus de décors, le Show des démonstrations dynamiques d'Eurosatory 2018 est le théâtre des opérations de Sécurité et de Défense d'aujourd'hui, avec des missions de

convois automatisés, de maintien de l'ordre, avec utilisation progressive de la force de protection, de surveillance, et de combat. La zone d'évolution tactique a totalement été repensée. Cette année, on y accède à pied. Elle permet de présenter des matériels et des systèmes en action. Une mise en scène opérationnelle et l'utilisation de renvois d'image en direct sur grand écran assurent le succès de cette activité qui reste une originalité du Salon. Cette présentation à but professionnel apporte l'information essentielle que ne peuvent offrir les brochures et les vidéo-clips. Pour Eurosatory 2018, sont présentés des produits du domaine Sécurité aussi bien que de celui de la Défense.

VEHICLES AND EQUIPMENT MANŒUVRES / MATÉRIELS ET ÉQUIPEMENTS EN ÉVOLUTION

Aeneas Formation (France) – Armed Private Security / *Sécurité privée armée dans les transports* ■ **Arquus** (France) – Military vehicles (Sherpa) / *Véhicules militaires* ■ **Azur Drones** (France) – UAV systems (Flying Guard FG-800) / *Drone* ■ **Daimler** (Germany) – Military vehicles (LAPV & Unimog) / *Véhicules militaires* ■ **FN Herstal** (Belgium) – Weapons and ammunitions (deFNder RWS) / *Armes et munition* ■ **Isuzu Motors** (Japan) – 4x4 vehicles (D-Max) / *Véhicules 4x4* ■ **Manitou** (France) – Logistics / *Logistique* ■ **Milrem Robotics** (Estonia) – Robotics (THeMIS) / *Robotique* ■ **Protecop** (France) – Personal Protective Equipments (demining) / *Equipements de protection individuelle (déminage)* ■ **Sides** (France) – Special vehicles (Fire Fighting) / *Véhicules spéciaux (lutte anti-incendie)* ■ **Spartan Military – Cybergun** (France) – Airsoft Training Weapons / *Armes d'entraînement Airsoft* ■ **Streit Group** (Canada) – Military vehicles (Sherp) / *Véhicules militaires*

EXHIBITION OPENING HOURS / HORAIRES D'OUVERTURE DU SALON

- From Wednesday, June 13 to Thursday, June 14, from 9 a.m. to 5 p.m. / Du mercredi 13 juin au jeudi 14 juin 2018, de 9 h à 17 h
- Friday, June 15, from 9 a.m. to 4 p.m. / Vendredi 15 juin 2018, de 9 h à 16 h

TODAY'S MAIN EVENTS / EVENEMENTS DE LA JOURNEE

French Army day and Chief fire Officers and Police Officers day / Dominante du jour : Armée de Terre française et Réunion des responsables de Police et de Pompiers

- **09:00** – Exhibition opens / *Ouverture du Salon*
- **09:30-10:30** – IHS Jane's Morning Briefings - GCC defence markets: changing dynamics and requirements / *Les marchés de défense du CCG : évolution de la dynamique et des besoins* (Room 10)
- **09:30-11:00** – Security Forum - Towards enhanced Security and Defence development and cooperation between the African continent and France? / *Forum Sécurité - Vers un développement et une coopération renforcés en matière de Sécurité & de Défense entre le continent africain et la France* (Room 9)
- **09:45-10:45** – Outdoor live demonstrations / *Démonstrations dynamiques extérieures*
- **10:00-11:00** – Land and Airland Operations Forum - Low level air-coordination (firing, airmobile combat, "drones du contact") and automatized systems / *Forum des Opérations Terrestres et Aéroterrestres - Le besoin de coordination basse couche (feux, aérocombat et drones du contact) et l'emploi des systèmes automatisés* (Room 2)
- **10:00-11:00** – Artificial Intelligence - Defence and Security applications of Artificial Intelligence / *Intelligence Artificielle - Applications de l'intelligence artificielle en Défense et Sécurité* (Room 6)
- **10:00-11:00** – AN2V - How do you create a smart building, a smart campus or a safe city? / *AN2V - Comment créer un (vrai) Smart Building, un site type campus ou une ville?* (Room 7)
- **11:00-11:30** – Exhibitor Conference - Atos / *Conférence Expositant - Atos* (Room 10)
- **11:00-12:00** – Start-Up - Financing Open Innovation in Defence: national agencies, industries, and venture funds are in the race! / *Start-up - Financements de l'Open Innovation dans la Défense : agences, industries et fonds d'investissements sont dans la course!* (Eurosatory Lab)
- **11:30-12:00** – Outdoor live demonstrations French Army / *Démonstrations dynamiques extérieures Armée de Terre française*
- **11:30-12:00** – Exhibitor Conference - Bertin Instruments / *Conférence Expositant - Bertin Instruments* (Room 10)
- **11:30-12:30** – CBRNe - Innovative Solutions in countering the CBRNe threats / *NRBCe - Des solutions innovantes pour contrer les menaces NRBCe* (Room 9)
- **13:45-15:00** – Think-Tank - European defence fund and land defence industries: what possibilities? / *Fonds européen de Défense et industries d'armement terrestre : quelles perspectives?* (Room 9)
- **14:00-15:00** – ECCO - Offsets for dummies / *ECCO - Les Offsets pour les nuls* (Room 3)
- **14:30-15:00** – Outdoors live demonstrations French Prefecture de Police inter-services (BRI, BSPP, CSI) / *Démonstrations dynamiques extérieures Interservices Préfecture de Police (BRI, BSPP, CSI)*
- **14:30-15:30** – Land and Airland Operations Forum - Anti-UAV fight / *Forum des Opérations Terrestres et Aéroterrestres - La lutte anti-drones* (Room 2)
- **14:30-15:30** - Maintenance in operational condition - Technological evolutions of maintenance in operational conditions for 2025: impacts for industry / *Maintien en Condition Opérationnelle - Les évolutions technologiques du MCO à l'horizon 2025 : impacts pour l'industrie* (Room 8)
- **15:00-16:00** - Security-development continuum and the resilience - Technical opportunities for peace-keeping operations / *Continuum Sécurité - Développement et résilience - Opportunités Technologiques des Opérations de Maintien de la Paix* (Room 6)
- **15:00-16:00** – CBRNe – ENCIRCLE: Improving European CBRNe resilience and capability to CBRNe / *NRBCe - ENCIRCLE - Améliorer la résilience et la capacité NRBCe européenne* (Room 9)
- **15:30-16:30** - Outdoor live demonstrations / *Démonstrations dynamiques extérieures*
- **16:00-17:00** – Chief of Staff of the French Army (CEMAT) - Soldiers, armament engineers, business managers, innovation partners / *CEMAT - Soldats, ingénieurs, entrepreneurs, partenaires d'innovation. Conférence du Chef d'Etat-major de l'Armée de Terre française* (Room 1 – Invitation only)

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