Defence Industry Bulletin

Insider knowledge for the discerning defence and security professional

Issue #11 October 2016

MORTAR RECOIL A THING OF THE PAST?

TEXTRON LOOKING EAST TO VEHICLES MARKET

KC-390 IN IT FOR THE LONG HAUL

BLUE SKY THINKING

DEMAND GROWS FOR FLIGHT TRAINING SOLUTIONS

INTERVIEW

INZPIRE CHIEF ON INDUSTRY 'RESPECT'

EGYPT RECEIVES SECOND AMPHIBIOUS CARRIER

AJAX GETS ITS SIMULATORS

CHILEAN NAVY MULLS MISSILE SYSTEM

Defence Industry Bulletin

Welcome to Defence Industry Bulletin

A U.K. military vehicle quickly crosses the makeshift bridge that closed the gap in the Vistula River in Chelmno, Poland as part of a joint exercise in Exercise Anakonda 2016. The bridge was created by connecting 34 U.K. and German Amphibious Rigs, which was able to support the crossing of 200 U.S. Army vehicles. Image: Staff Sgt. Debra Richardson

As the leaves turn, so too does the world of defence. Since the last issue, Britain has appointed a new Prime Minister, who has claimed she will work to "maintain what is the most significant security and military capability in Europe," but faces a tough challenge in doing just that, with questions over Trident, terrorism, foreign conflicts and the defence industry coming to the fore. In response to the Brexit referendum, meetings between EU nations have been marred by disagreements and uncertainties over how to reassess the collective strategy to deal with Russia. Meanwhile, the US presidential race will soon be at an end, with early debates underscoring the issues of Daesh, Iran and cybersecurity as weighing heavily on the minds of both frontrunners. Undoubtedly, all of these outcomes will have far reaching impacts on the industry and it's no wonder the markets are holding their breath. Winter is coming – but will it be one of discontent?

In this issue of Defence Industry Bulletin, our correspondent Georg Mader reports on developments in the military helicopter domain with a look at Bell's much-anticipated Future Vertical Lift platform, the V-280 Valor, which could revolutionise the way we see troop transport in the near future. Plus, he meets the minds behind Austria's Diamond D-450 turboprop trainer and Brazil's KC-390 multirole transport programme.

Our latest Land news includes updates on Israel's new Rakiya family of armoured vehicles, the Malaysian Army's adoption of 2R2M mortar systems, and a look at a fascinating technology from Spanish company Everis that may offer a more definitive answer to the mortar recoil challenge. This month's Sea updates explore Australia's Hobart-class trials, new patrol boats for Portugal, the Philippine Navy's important frigate decision, and more. Plus, we spoke to the CEO and founder of Inzpire, a company offering flight training services and tablet-based mission systems, to find out how a £300 venture turned into a multi-million pound defence business.

I hope you find it insightful!

Richard de Silva
Editor-in-Chief

The Broader Picture

‘EU Army’ murmurs full of false starts and careful wording

Pola Zafra-Davis

New rumblings for an EU Army began on 26 August as a plea from the Prime Ministers of Hungary and the Czech Republic amid the aftermath of the EU’s 2016 migrant crisis. This initial call expanded in scope and quickly gathered momentum in Germany-France and Italy’s defence establishment. The three countries drew up their own visions and benchmarks for a more integrated defence by writing informal papers ahead of the September 26 Bratislava Summit.

The idea of an EU Army was brought up in serious discussion by Italy in September, whilst France and Germany erred on the side of caution and resisted requesting a permanent standing force. Instead, the German-French proposal includes ‘the establishment of a permanent joint military headquarters of the EU, expanding EU peacekeeping missions, and joint development in military hardware.’

Luxembourg’s Jean-Claude Juncker, current president of the European Commission was also in favour of an EU military headquarters containing both the civilian and military aspects of missions. The suggestion appears to be one based on practicality, as several EU members have valuable experience of peacekeeping and operations abroad with the main message being one of military centralisation. Back in March 2015, Juncker made a bolder statement for the EU requiring its own army to boost foreign policy credibility in the face of Russia and other threatening actors. He also added that the purchase of military equipment would “bring significant savings” and the need to focus on further developing rapid force reaction. Italy’s proposal was more familiar to Juncker’s 2015 appeal and went beyond France and Germany’s. Specifically, Italy desired the EU funding and deployment of Europe’s currently un-tested battlegroups as well as a common technological and industrial base for the members state’s defence and aerospace industry. The paper stated these measures are necessary for a “capacity to project stability in areas and regions critical to our security,” shying away from previous EU statements of a unified Europe being a Russian deterrent. The Italian proposal was also reminiscent of German Defence Minister Ursula von der Leyen’s early September call in Vilnius for a “Schengen for Defence.”

The Broader Picture

The UK's response to this enthusiasm was unsupportive. UK reasons against the creation of an EU Army, outlined by UK Defence Secretary Sir Michael Fallon, were fears of "bureaucratic duplication" and how the creation of this bureaucracy would threaten to undercut "the primary function of defending Europe, which is NATO".

> The idea of an EU Army was brought up in serious discussion by Italy in September

The UK's recent utterances are far cries from the days of the St. Malo declaration of 1998, where UK PM Tony Blair stood alongside French President Jacques Chirac in proclaiming the need for the EU to have autonomous capacity so that it may respond to international crises. St. Malo's vision became ultimately restrained with the 1999 Helsinki Headline Goal's texts that explicitly states "this process will avoid unnecessary duplication and does not imply the creation of a European army," following US negotiations with the UK to dissuade their EU compatriots from undergoing full autonomous-action of an EU Army.

Sir George Fallon's statements compliment the two of the three redlines in the US support of the European Security and Defence Policy/ the use of NATO assets in EU-led operations, (1) No De-coupling from NATO; (2) No duplication of NATO command-structures or alliance-wide resources; and (3) No discrimination against NATO European members that are not part of the EU. In contrast, the French-German and Italian plans are in contravention of those redlines. The defence policies of the UK thus appear aligned with the politically and economically powerful NATO partner, the US. It is no wonder then that the new cries of new EU defence autonomy would come from Germany, France and Italy, who have been more critical of US foreign policy vis-a-vis NATO and are also the top financial contributors to EU and NATO defence budgets.

It is also interesting to note that the Visregard Group of Hungary, Czech Republic, Poland and Slovenia – current supporters of an EU Army – were once staunch allies in the US's more controversial foreign policy decisions (Iraq and Afghanistan). The original Hungarian and Czech argument for an EU army lies less with force-projection in out-of-area conflicts, and more towards ameliorating the consequences of open-borders and the EU's internal Security. Such measures would not be contrary to participation with NATO in out-of-area operations. Albeit agreement amongst EU states in NATO exploits have been 'spotty' since 9/11. More importantly, such a path would not duplicate NATO command structures and it would fall squarely in the new Area of Freedom, Justice and Security (FJS) and Common Security and Defence Policy (CSDP) created by the Treaty of Amsterdam and echoed by The Hague Program, allowing the EU to act externally in matters of Justice and Home Affairs.

The frequency of these statements towards plans for an EU Army, or at least an EU military HQ, comes at the heels of Brexit. The UK currently still retains its veto power until it exits the union, with two-year negotiations reportedly starting in early 2017. Tellingly, the UK was not invited to sit in the EU Bratislava Summit. The air of caution persisted in Bratislava as the European defence ministers explored the idea of the central HQ but not of Italy's proposal for the financing of an actual EU army. As a result, the rumblings of EU defence cooperation have intensified but have also been decidedly muted for the time being.

Israeli Rakiya armoured vehicles nearing horizon *T. Magill*

Initial development of Israel's long-awaited new family of light armoured vehicles is edging closer, according to reports from within the country. The Rakiya ('Horizon') series – otherwise known as Future Manned Combat Vehicle – has been rumoured to be in the pipeline since 2012, when an RFP for the fifth-generation follow-on to the IDF's Merkava Mk4 MBT was first thought to be in its draft phase.

A programme branch to oversee the development has now been established within Israel's Research and Development Directorate, with input coming from multiple elements of the MOD, including artillery, infantry and combat engineering. It is understood that operational requirements could be determined by the start of the new year, with the vehicles expected to be a mainstay for combat operations beyond 2020.

The vehicles will integrate with existing Merkavas and Namer APCs, providing – with some variants at around 35-tons – an agile option for manoeuvrability within urban environments, thereby responding to entirely different operational requirements which will likely include transport for special operations.

Despite the delay, a request for proposals could be issued by the end of 2017, with sources indicating that the MOD has actively learned lessons from the failed U.S. Future Combat Systems (FCS) program and is instead applying a simpler and more focused approach to developing the Israeli capability.

The Rakiya family is not being rushed, with programme managers anticipating a similarly methodical pace that was applied to the 10-year approval and research process afforded to the Namer, which saw Merkava M4 vehicles adapted in design for gradual introduction of the heavy troop carrier.

The Rakiya vehicles will work in tandem with the Namer APC [pictured] and Merkava MBTs. Image: Abir Sultan

Lithuania signs for 88 Boxer combat vehicles *Victor M.S. Barreira*

After several months of negotiations, on 22 August 2016, the Organization for Joint Armament Cooperation, the OCCAR (Organisation Conjointe de Coopération en matière d'Armement) awarded on behalf of the Lithuanian Ministry of National Defence a EUR385.6 million contract for the procurement of 88 Boxer 8x8 multi-purpose modular armoured vehicles to consortium ARTEC GmbH (ARmoured TEChnology). ARTEC GmbH is formed by Krauss-Maffei Wegmann (KMW) and Rheinmetall MAN Military Vehicles (RMMV).

> 53 will be manufactured by KMW and the remaining 35 by Rheinmetall, with deliveries by the end of 2017 to 2021

On 11 December 2015, ARTEC GmbH has been declared preferred bidder. Lithuania recently becomes one of seven OCCAR programme 'Participating States'.

Most of the fleet will be supplied in four versions of infantry fighting variant and a small number in the command post variant, believed to be four. The Boxer's powerpack consists of 710 hp multi-fuel engine from Rolls-Royce Power Systems which is coupled to fully automatic transmission from Allison Transmission.

Lithuania follows Germany and the Netherlands in acquiring the Boxer combat vehicle. It is understood that the country's most significant contract to date also include training, special tools, technical documentation, logistics support and spares. 53 will be manufactured by KMW and the remaining 35 by Rheinmetall, with deliveries by the end of 2017 to 2021. In the Lithuanian Land Force service, the vehicle will be called the 'Vilkas'. The fleet will arm the 'Grand Duke Algirdas' and the 'Grand Duchess Birut Uhlan' battalions of the 'Iron Wolf' Mechanised Infantry Brigade.

Most of new Lithuanian vehicles will be fitted with Rafael Advanced Defense Systems Samson Mk II ballistic protected dual-axis, gyro-stabilized remote-controlled weapon station fitted with 30mm Orbital ATK Mk44 Bushmaster automatic cannon, coaxial 7.62mm FN Herstal MAG machine gun, side-mounted banks of smoke grenade launchers, retractable dual-launcher for Rafael Advanced Defense Systems Spike-LR anti-tank guided missile, under-armor ammunition reloading system and commander and gunner electro-optical sights.

In an effort to improve its defence capabilities aimed at addressing regional tension caused by Russia, the Baltic country has acquired a wide array of military equipment, including 21 PzH 2000 self-propelled 155mm/L52 artillery howitzers (including two for training and three for spares) from German Army surplus to arm the 'General Romualdas Giedraitis' Artillery Battalion of the 'Iron Wolf' brigade. A total of 26 M577A2 armoured command posts and six Bergepanzer 2 armoured recovery vehicles also were procured from Germany together with PzH 2000s on 29 September 2015.

GTK Boxer 8x8 armoured with Samson Mk II remote weapon station. Image: Rheinmetall

Malaysian Army will receive Thales 2R2M mortar systems

Victor M.S. Barreira

Several of the 257 Gempita 8x8 armoured infantry combat vehicles being built in twelve different variants by a consortium formed by DRB-Hicom Defence Technologies (DEFTECH) of Malaysia and Turkish defence contractor FNSS Savunma Sistemleri (jointly owned by Nurol Holding and BAE Systems) for the Malaysian Army will be equipped with a customised configuration of 2R2M (Rifled, Recoiled, Mounted Mortar) 120mm mortar system from French firm TDA Armements (an operation of Thales). Malaysia is believed to have purchased eight of the mobile mortar carrier variant. The Gempita (also known as the AV-8) is based on FNSS-designed Pars multi-purpose, multi-mission, wheeled armoured vehicle.

> It can be integrated into a battle management system such as the Thales ATLAS

The whole 2R2M system consists of the vehicle-mounted mount system; 120mm rifled barrel; shooter; loader with semi-automatic loading; Safran Electronics & Defense Sigma 30 inertial navigation system; automatic laying system; power supply unit consisting of hydraulic power unit and electrical unit; odometer; gunner display unit; tactical radio set and vehicle commander display unit with integrated ballistic calculator.

The mortar kit offers a weigh of 1.5t, 8km maximum range or 13km with rocket assistance, and rate-of-fire of 10 rounds per minute. It was designed to deliver self-propelled fire support capability to infantry.

The mortar fires the existing panel of unguided and guided rifled ammunitions, including high-explosive, rocket assisted projectile, rifled smoke round, illuminating and infrared illuminating ammunition, insensitive munitions, anti-amour practice shells and the new 17km-capable very long-range 120mm guided ammunition.

It can be integrated into a battle management system such as the Thales ATLAS (Automatisation des Tirs et Liaisons de l'Artillerie sol/Sol) system, and linked to vehicle-mounted fire direction center with ballistic computer and to dismounted forward observer equipped with global positioning system, radio set and tripod-mounted target acquisition system with laser range finder.

It is currently fitted to FNSS Savunma Sistemleri ACV-S tracked armoured carriers in service with the Malaysian Army, FNSS Savunma Sistemleri's modernised M113A4 tracked armored carriers of Royal Saudi Land Forces, and Renault Trucks Defense VAB (Véhicule de l'Avant Blindé) 6x6 armoured carriers of Royal Guard of Oman. It has been also seen on CIO VBM (Veicolo Blindato Medio) 8x8 armoured vehicle, General Dynamics Land Systems LAV (Light Armoured Vehicle) 8x8 armoured vehicle and ACV-19 tracked armored carrier of FNSS Savunma Sistemleri. Typical crew is comprised of driver, mortar leader, shooter and loader.

The 2R2M mounted in Renault Trucks Defense VAB 6x6 carrier. Image: Victor M.S. Barreira

The 2R2M is also a potential competitor for installation of a future mortar carrier variant of Griffon 6x6 multirole being developed by a temporary consortium formed by Nexter Systems, Renault Trucks Defense and Thales for the French Army. This specific variant of the 6x6 vehicle for France will be designated as Griffon MEPAC (Mortier Embarqué pour l'Appui au Contact).

Thales to supply simulators for AJAX armored vehicles *Victor M.S. Barreira*

Thales Training & Simulation (TTS) is developing a driver training simulation system aimed at training future drivers of the British Army's AJAX family of tracked armoured combat vehicles.

The simulation and training operation of Thales Group was awarded a contract in 2014 by the UK Ministry of Defence's Defence Equipment & Support (DE&S) organisation to develop and deliver 28 driver training simulators for the British Army's future vehicle. Delivery of the simulators will be taking place between 2017-2020. The company is working together with the vehicle's manufacturer, General Dynamics Land Systems-UK to develop the simulation training solution.

In September 2014, General Dynamics Land Systems-UK was awarded a £3.5 billion contract to deliver 589 tracked platforms based on the 42t General Dynamics European Land Systems ASCOD 2 design.

> Delivery of the simulators will be taking place between 2017-2020

The AJAX programme (formerly known as the Scout Specialist Vehicle programme) will see the delivery of this 589-strong fleet in six different variants comprising the AJAX reconnaissance fighting vehicle, the ARES reconnaissance support vehicle, the APOLLO equipment repair vehicle, the ATHENA command and control vehicle, the ATLAS recovery vehicle and the ARGUS engineer reconnaissance vehicle, to progressively replace the Combat Vehicle Reconnaissance (Tracked) range between 2017 and 2024.
minimises crew reaction time.

Lynx is being characterised by four core capabilities: firepower, force protection, SA and mobility.
Source: Rheinmetall

Is this the solution that solves the mortar recoil challenge for good?

Richard de Silva

An early version of the Alakran. The modernized system will be unveiled in October in London, UK. Image: Abir Sultan

For years, the issue of reducing or eliminating mortar recoil force has been one of the most in need for proven solutions among mortar crews. The dynamic load produced by the firing of shells can impose a massive burden on support structures, including the vehicles from which they are often fired. Soft recoil technology has been on the market for some time, but the dissipation of energy is still far from perfect. The requirement for a reliable solution is all the more needed in today's specific combat environment, where forces need to be highly mobile or find themselves at risk from the likes of RPGs, sniper fire, or even high-end counter-artillery. For many, that same pressure is encouraging many militaries to replace or augment vehicle fleets with lighter, faster vehicles.

Defence company NTGS, part of Everis Aerospace and Defense, based in Spain, believes it has the ultimate answer in the form of the Alakran mortar carrier system.

Alakran deploys from the vehicle to the ground on a base-plate platform, firing 81mm or 120mm rounds and sending the recoil energy directly into the ground. This means there is no need for any vehicle reinforcement, which in turn means that lighter vehicles – both cheaper and transportable by helicopter – can be deployed as mortar carriers.

> Alakran is said to require only 30 seconds to be ready to fire

"Recoil mitigation solutions are, from our perspective, fighting against physics, and that's not good because physics – in the long term – always wins," says Javier Estrella, NTGS head of engineering..

"What I mean is that these solutions must absorb a lot of energy – around 850,000 Joules when shooting 7 charges. This energy is absorbed by the recoil absorber and part of it is transformed into heat, but heat will limit the operability of the mortar barrel. Plus, a large per centage of the energy won't be absorbed and transferred to the vehicle. Imagine an excellent recoil absorber system that could absorb up to 70 per cent of the energy – even that vehicle still has to absorb 255,000 Joules or the equivalent of five Humvees falling from 2 metres onto the vehicle."

Everis claims its solution – which has been in various stages of development for five years – offers a near-100 per cent energy transference, regardless of the size of the mortar. Its developers have aimed to simplify the design to its maximum potential, while ensuring it is still robust under strenuous operating environments. ➔

The concept of transferring the energy into the ground rather than attempting to fight the recoil seems a surprisingly simple idea

One of the areas being scouted for customers is the Middle East, where equipment not only has to hold up under hot and dusty climates but is prone to insurgent tactics and therefore sees the shoot-and-scoot factor as vital for local forces.

Fortunately, after the vehicle comes to a stop, Alakran is said to require only 30 seconds to be ready to fire, two seconds to re-aim after shooting, five seconds to aim at a new target, and 15 seconds to be on the move again. Tests have been conducted in which the system has, in one day, fired over 100 rounds, changing position after every 5 shots, and without any failure.

While the concept of transferring the energy into the ground rather than attempting to fight the recoil seems a surprisingly simple idea, the design itself has a number of undisclosed complexities and its mechanics have presented engineers with more than enough to scratch their heads over. Aside to the idea of effectively using the ground as part of the system, the fact that troops dismount to operate the mortar provides more space to prepare and load. In addition, it means that issues concerning the height of the vehicle or existing components connected to the vehicle floor are practically irrelevant, so integration with existing vehicles is easier to achieve.

Survivability has been a consideration in other areas. When troops operate from the ground instead of elevated on the vehicle, their profile is reduced and the risk of sniper fire is lowered. Likewise, the deployment system is no longer hydraulic but electro-pneumatic, so the manual procedure reportedly allows a pair of soldiers to move the tube in and out the vehicle in just two minutes.

In its latest form, Alakran supports multiple-round simultaneous impact, having added a display that helps operators avoid mistakes during this type of fire. A functionality called ‘zonal shooting’ has been installed that allows the system to automatically makes slight adjustments to the barrel position over a wide area (100x100 or 200x200).

At present, the company has had “high interest from several customers” in the Middle East and has at least one pre-order for 100 units set to be confirmed before the end of the year. Special operations forces and expeditionary forces have reportedly shown interest in the product, while given the company’s origins, the Spanish Army is an obvious commercial target for the future.

“The overall system is at least 40 per cent less than the cost of the nearest competitor for the same fire capabilities,” claims Estrella, who also says the company offers on-site maintenance and a 1-year guarantee with an extension guarantee program for an additional 15 per cent yearly. The company will be briefing on Alakran at this year’s Future Mortar Systems conference (October 25-27; London, UK).

Botswana orders VL MICA air defence system from MBDA *Victor M.S. Barreira*

The Government of Botswana has purchased an undisclosed number of the MBDA VL MICA (Missile d'Interception, de Combat et d'Autodéfense) ground-based short-range mobile air defence system to boost the air defence capability of for the country's military, the Botswana Defence Force (BDF). Alongside the system, the African nation has purchased from the same company Albi vehicle-mounted lightweight twin-missile launchers for ready-to-fire MBDA MISTRAL (MISsile Transportable Anti-aérien Léger) series very-short range surface-to-air fire-and-forget missiles. Éryx man-portable short-range anti-armour missile systems (comprised of launcher and missile) were procured for the special operations forces. Both the VL MICA and Albi systems will equip the ground forces' 16th Air Defence Brigade.

MILAN ER (Missile d´Infanterie Léger Antichar-Extended Range) man-portable anti-tank systems (tripod-mounted launcher and missile) were previously ordered from MBDA (a joint venture of Airbus, BAE Systems and Leornado) for the 1st and 2nd brigades.

The organisation of a typical ground-based VL MICA unit mainly consists of truck-mounted vertical launcher unit deploying the MICA fire-and-forget missile, currently capable of being fitted with either a heat seeking homing head (the VL MICA infrared version) or with an active radar (the VL MICA radio-frequency version); a vehicle-mounted shelter-protected tactical operations centre, also known as the MBDA Platoon Command Post system (PCP), is capable of carrying out all command, control and coordination functions, including real-time engagement, mission planning, system monitoring and connection with the higher level of command.

The PCP remotely controls tridimensional radar mounted on a separate tactical wheeled vehicle and three to six vertical launcher units. The VL MICA all-weather missile offers an interception range of up to 20 km and an interception altitude of up to 30,000 ft.

The ground-based configuration of VL MICA was assessed at the first operational firing of a VL MICA missile in late 2012. The Omani system includes 8x8 truck-mounted container-based C-band Airbus Defence and Space TRML-3D tridimensional air Surveillance and defence radar capable of detecting, tracking, and classifying various types of targets.

A naval configuration of VL MICA was developed to provide an air defence capability to surface combat ships. This naval version was ordered by Egypt, Morocco, Indonesia, Malaysia, Oman, Qatar, United Arab Emirates (EAU) and Singapore.

The VL MICA system here features launching, command and control and radar units (MBDA)

France selects the HK416A5 as its new standard assault rifle

Victor M.S. Barreira

On 22 September, the French Ministry of Defence armament procurement agency, the Direction Générale de l'Armement (DGA), awarded a consortium formed by Heckler & Koch SAS France of France and Heckler & Koch GmbH of Germany a contract to supply the French Armed Forces with 102,000 of the HK416F 5.56x45mm NATO assault rifle, which is based on the company's HK416A5 design.

The HK416A5 is already fielded by several NATO nations

The programme, designated AIF (Arme Individuelle Future, or Future Infantry Weapon in English), saw the launch in May 2014 of a European tender aimed at acquiring a latest generation 5.56x45mm assault rifle to gradually allow the replacement of the FAMAS (Fusil d'Assaut de la Manufacture d'Armes de Saint-Étienne) series 5.56x45mm assault rifles in service with the country's armed forces.

The contract calls for the supply of up to 102,000 rifles, 10,767 40x46mm grenade launchers, ammunition, spare parts, training, initial support services and accessories, for over a period of 15 years from 2017. The weapon will be available in two versions with different barrel lengths. The French Army already uses the 7,62x51mm Heckler & Koch GmbH HK417A2 precision rifle.

The German-made rifle was selected over the SCAR (Special Operations Forces Combat Assault Rifle) weapon of Belgium's FN Herstal. The HK416A5 is already fielded by several NATO nations, including Portugal, Germany, Turkey and Norway. It is most frequently operated by special operations units.

The HK416A5 rifle is available in 11", 14.5", 16.5" and 20" barrel length configurations. It can be fitted with a sound suppressor and flash hiders; quick release/diopter sights; assault grip; a different buttstock, handguard and magazines; rail cover; eyelet for carrying; and incorporates MIL-STD-1913 Picatinny or NATO STANAG 4694 rails for weapon sights and other accessories.

The new rifle will also be integrated into the French Army's FELIN (Fantassin à Équipements et Liaisons INtégrés) dismounted soldier system from Safran Electronics & Defense.

The HK416A5 is frequently used by special operations units

Defence iQ

THE GLOBAL ARMOURED VEHICLES MARKET REPORT *2017*

Sponsored by NIMR

The sixth edition of *Defence IQ*'s annual ***Global Armoured Vehicles Market Report*** is the **world's most comprehensive free resource** on the latest developments in this market, including **exclusive** survey data and market intelligence for military end-users and industry.

Available to download October 2016

Exclusively on

www.DEFENCEIQ.com &
www.INTERNATIONALARMOUREDVEHICLES.com

In association with

INTERNATIONAL ARMOURED VEHICLES

23 - 26 January, 2017
Twickenham Stadium, London, UK

International Armoured Vehicles

Portugal receives new patrol boats *Victor M.S. Barreira*

The Portuguese Navy is receiving four locally modernised Tejo-class coastal patrol boats aimed at reinforcing the country's ability to monitor its comprehensive exclusive economic zone (EEZ). First-of-class NRP Tejo (P590) was inducted into service on 5 May, and remaining units, NRP Douro (P591), NRP Mondego (P592) and NRP Guadiana (P593) are scheduled to be received by late 2017. The fleet allows the progressive replacement of Cacine-class patrol ships and NRP Schultz Xavier (A521) multi-mission vessels.

Remaining units are scheduled to be received by late 2017

The fleet of STANFLEX 300 Series 2 (SF300) modular patrol boat design was built by former Danish shipbuilder Danyard for the Royal Danish Navy (RDN) as the Flyvefisken-class and was originally named as HDMS *Viben* (P562), HDMS *Raven* (P560), HDMS *Glenten* (P557) and HDMS *Skaden* (P561). It was purchased on 23 October 2014 by the Portuguese Ministry of National Defence from Danish Defence Acquisition and Logistics Organization (DALO) according to a contract worth EUR4 million.

The four ships were decommissioned in October 2010 from the RDN and were stored at Korsør naval base awaiting a possible sale. A fourth ship, HMDS *Gribben* (P558) was purchased in March 2015 to serve as a source for spares.

All were shipped by sea from Korsør in Denmark to the Portuguese Navy main naval base near Lisbon by towage and maritime assistance services company REBONAVE-Reboques e Assistência Naval, Portugal between May and August 2015, according to a contract placed by the NATO Support and Procurement Agency (NSPA).

The overhaul, refurbishment and modernisation work carried out in Portugal by the local state-owned shipyard Arsenal do Alfeite includes installing I-band navigation radars from Kelvin Hugues; protected weapon mount armed with government furnished 12.7mm heavy machine gun; NPDS 3500H davit and two 6.5m FRB 650 fast rescue boats from Harding Safety; integrated communications system from EID, including the company's ICCS 6 communications control system; electronic chart display and information system, global maritime distress and safety system; differential global positioning system; satellite communication terminals (INMARSAT mini-C type and KVH Industries TracPhone v7 IP system); weather station; computer network infrastructure; in-house integrated navigation system; communications antennas; search and rescue transponder; VHF transceiver; Quadrans fiber-optic gyrocompass and attitude reference unit from iXbLue; and updating the original platform management system from Wärtsilä 's Lyngsø Marine. An electro-optical sensor is also expected to be installed.

Modifications to the arrangement of the medical facility, bridge and operations room were executed and the air to air conditioning was reconverted.

The ship made of FRP (fibre-reinforced plastic) material feature displacement of 345.8t, length of 54m, width of 9m, endurance of 9 days, top speed of 20kts and range of 2400nm for a crew of 23. Propulsion consists of two Rolls-Royce Power Systems MTU 16V396 diesels and one GE Aviation LM500 gaz turbine.

First-of-class NRP Tejo was inducted into service on 5 May.
Image: Victor M.S. Barreira

In an effort to modernise its fleet, Portugal allocated EUR1 billion in its Military Programming Law 2015-2026 approved May 2015. Major projects include two Viana do Castelo-class NPO (Navio Patrulha Oceânico) offshore patrol vessels purchased from consortium CWSE-NPO (formed by local privately-owned shipbuilder West Sea-Estaleiros Navais and Thales' software house Edisoft) on 22 July 2015. The ships NRP Sines (P362) and NRP Ponta Delgada (P363) are scheduled to be commissioned in June and December 2018 respectively to complement NRP Viana do Castelo (P360) and NRP Figueira da Foz (P361) that were built by Estaleiros Navais de Viana do Castelo (ENVC) and commissioned in December 2010 and November 2013 respectively.

The Vasco da Gama-class (MEKO 200PN design) and two Bortolomeu Dias-class (Type M ships purchased from the Royal Netherlands Navy) frigates are being progressively modernised. A mid-life upgrade of the two Tridente-Class attack submarines NRP Tridente (S160) and NRP Arpão (S161) is planned between 2022 and 2025. The submarines were commissioned from ThyssenKrupp Marine Systems in 2010. One fleet replenishment ship is expected to be acquired to replace the existing NRP Bérrio (A5210) unit.

The five Super Lynx Mk 95 helicopters will be modernised by Leonardo Helicopters (previously AgustaWestland) with the latest generation of avionics and LHTEC CTS800-4N engines according to a contract signed on 21 July. Five new helicopters to replace the current fleet will be purchased at a later date.

The service is scheduled to soon receive an Action Speed Tactical Trainer purchased from Rheimetall Defence Electronics, with operation planned to begin in early 2017.

Pietro Venuti submarine delivered to Italian Navy *Eugenio Po*

At Fincantieri's shipyard of Muggiano (La Spezia) the submarine Pietro Venuti was delivered to the Italian Navy. The submarine, as its twin vessel Romeo Romei (launched last year in the shipyard of Muggiano) is the third of the Todaro-class and first of the U-212A second batch. The U-212A is a joint programme between Germany and Italy for building a total of ten submarines: six for Germany and four for Italy.

These two new submarines will replace Prini and Pelosi (Sauro-class, 3rd Batch), two units built in the 1980s.

Venuti – with a surface displacement of 1,509 tonnes, an overall length of 55.9 metres and a maximum diameter of 7 metres – is the 101st submarine built at the Muggiano shipyard since 1907. These submarines have a hull built entirely with amagnetic steel and are designed using the most modern silencing techniques to reduce acoustic signature.

The submarine is equipped with an AIP (Air Independent Propulsion) system with 300 kW PEM (Polymer Electrolite Membrane) fuel cells that can allow longer underwater operations. The submarine can stay submerged for 3-4 weeks with an endurance 3-4 times grater than a conventional diesel-electric submarine. The AIP power plant is ideal for patrolling in silent mode, at 3-5 knots. The boat can reach a maximum speed of more than 16 knots. Compared to the first two Italian U-212A submarines, Venutie and Romei have an improved electroacoustic suite with a new Atlas Elektornik side scan sonar and new elevating mast installed in the sail. The command and control system and automation system have also been improved.

This year Italy allocated 113 million euros for the entire U-212A programme while the overall cost for the programme for the four submarines will be 1,885 million euros – 970 for the first two vessels and 915 for the second two units.

Italy's U-212A submarines will replace the Prini and Pelosi

Philippine Navy opts for Korean frigates *Oliver Austin*

The Philippine government has formally issued an agreement for Hyundai Heavy Industries to build its two newest naval frigates.

The contract, signed by Delfin Lorenzana, the Secretary of National Defence, is reported to be valued at $337 million. It will cover the construction of a pair of 114.3 m vessels with an overall beam of 14m and a hull draught of 4 m. The HDF-3000 multipurpose design offers a standard displacement of approximately 3,000 tonnes with the ability to accommodate engines in combined diesel or gas machinery arrangements.

With a maximum speed of 30 kt and a standard range of 4,500 nm at a cruising speed of 18 kt. Weapons system options include space for a 127 mm naval gun and two anti-surface missile launchers, plus a pair of triple torpedo tubes and associated fire control systems.

Hyundai's offering is already part of Republic of Korea Navy's (RoKN's) fleet, being the basis for the Incheon (FFX-I)-class guided-missile frigates.

The Philippine Navy's effort to introduce these ships began in late 2013 under an acquisition programme designed to fulfil requirements for long-range maritime surveillance, patrol and interdiction. According to published data, the frigate requirements include 'no degradation of anti-air and anti-surface capabilities at Sea State 5, and no degradation of anti-submarine warfare capability at Sea State 4' while also being able to survive at Sea State 7.

The Philippines is currently making efforts to formally boost cooperation in and around its waters with the likes of Indonesia and Malaysia, owing to territorial disputes with China. Japan has also committed to lending patrol boats to the Philippines to dissuade encroachment.

September saw the BRP Tarlac – the Navy's largest ever vessel and first Strategic Sealift Vessel (SSV) – dented while moored near Naval Station Romulo when it was hit by a Liberian merchant tanker. However, damage was minor and operations were unaffected.

The new frigates will be based on the RoKN's existing Incehon-class vessels

Egyptian Navy receives second Mistral-class LHD *Oliver Austin*

The second Mistral-class Landing Helicopter Dock (LHD) was successfully delivered by French naval shipbuilder DCNS to the Egyptian Navy in a change of flag ceremony in September.

Handover of the carrier was attended by the chiefs of staff of both the Egyptian and French Navies, marking completion of the two-ship deal. Dubbed the Anwar El Sadat, this second vessel has been scheduled to undertake a training exercise with the French Navy before sailing to its homeport of Alexandria. 180 sailors have undergone training in Saint-Nazaire to operate the vessel.

The vessel is 653 ft in length, with a 105 ft beam. Fully loaded, the vessel possesses a displacement of 23,479 tons, and is capable of reaching a speed of 18.8 kt. It is equipped with a hospital to better enable humanitarian missions and can be deployed for a range of missions including the transportation of troop and the deployment of amphibious landing craft.

> Russia and Egypt are now negotiating deliveries of Ka-52K helicopters to equip the carriers

Herve Guillou, chairman and chief executive officer of DCNS, said: "The delivery of the Landing Helicopter Dock vessel Anwar El Sadat is a demonstration of trust that we have established with the Arab Republic of Egypt to support the expansion of its navy. We are very proud to see, being brought under the Egyptian flag, a ship which is the result of the French industrial excellence."

The first Mistral-class (Gamal Abdel Nasser) was delivered to Egypt in June under a contract quickly arranged in 2015. The deal had been the centre of contention as the ships were sold to Russia but were cancelled after Russia's involvement in destabilising and annexing Crimea. However, Russia and Egypt are now negotiating deliveries of the Russian Ka-52K helicopters to equip the carriers and the two nations have arranged a training programme for Egyptian pilots to operate the aircraft.

The first Mistral-class was delivered to Egypt in June under a contract quickly arranged in 2015. Image: Yannick Le Bris

Australia's Hobart-class begins sea trials *T. Magill*

The Royal Australian Navy's (RAN) Hobart-class air warfare destroyer began its builder's trials in September, during which it will seek to validate the performance of propulsion, maneuvering, auxiliary, control and navigation systems.

Further trials will take place in early 2017 to asses and demonstrate the performance of combat and advanced systems

The trials were being undertaken off the coast of South Australia, during which a civilian master and crew, plus numerous specialists from the Air Warfare Destroyer (AWD) Alliance, have taken command.

Before the ship is put to sea, the AWD must evaluate the ship's adherence to safety regulations, embarked personnel, the environment and other seafarers under the 'Alliance Sea Trials Release Process'. These initial sea trials are being carried out with a dedicated shore support team on hand and in regular communication with the civilian to guide them through the necessary processes. The AWD has also been undertaking dock trials, including measurement of the ship's stability and vertical centre of gravity, and bollard trials. Once complete,

The ship is to be designated HMAS Hobart and will be the first of three destroyers of its type entering the RAN in 2017, 2018 and 2020, respectively. Further trials will take place in early 2017 to asses and demonstrate the performance of combat and advanced systems. The Hobart-class ships are fitted with Aegis Weapon System Baseline 8, AN/SPY-1D(V) Phased Array Radar, Horizon Search Radar, Advanced Harpoon Weapon Control Systems, two quad launchers.

The programme has been underway since the turn of the century, with plans to replace the existing Adelaide-class frigates emerging in 2000 under the SEA 1400 (later known as the SEA 4000) acquisition project.

The RAN's HMAS Hobart will enter service next year.

Chilean Navy weighing up Type-23 upgrade bids *Oliver Austin*

The Chilean Navy has now received all bids for the upgrade of the combat systems on its three Type 23 frigates. The winning team will integrate either the MBDA Sea Ceptor anti-air guided weapon system or the Barak-8 from Israel Aerospace Industries (IAI). Initial bids had included an approved sale of the RIM-162 Evolved SeaSparrow Missile (ESSM) from Raytheon, but this option has since been discarded for unknown reasons. A final decision is set to be made before the end of 2016.

Four companies competing for the contract were shortlisted last year and have submitted formal proposals over the summer. They comprise Thales Nederland, Lockheed Martin, IAI and BAE Systems, with the latter involving QinetiQ in its bid. For each ship, work is to be undertaken on the combat management system (CMS) and surveillance/target indication radar, as well as a full replacement of the GWS 26 Mod 1 VL Seawolf command-to-line-of-sight point-defence missile system with an active radar or semi-active radar guided weapon system.

Four companies competing for the contract were shortlisted last year and have submitted formal proposals over the summer

BAE Systems is understood to be proposing a replicated upgrade of its solution that has been adopted by the Royal Navy's Type 23 Capability Sustainment Programme (CSP), which involves the Outfit DNA(2) CMS, the ARTISAN 3D medium-range radar and the MBDA Sea Ceptor local area anti-air weapon system. MBDA claims that the Sea Ceptor would allow the Chilean Navy to retain commonality with their UK equivalents, while the installation of these systems has already been performed and verified on the British vessels, de-risking the process if the system is selected.

The Chilean frigates in question are themselves ex-Royal Navy ships reassigned post-decommission to Chile between 2006-2007.

A final decision on the winning bid will be made before the end of the year.

Eurotraining is coming back!

Multinational flight school could arrive by 2019 Richard de Silva

The MATC has already seen successful collaboration on its rotory-wing programme. Image: MATC

Europe has found itself in a difficult situation. Following the UK referendum that determined an exit from the EU, a crisis summit in September 2016 was held in Bratislava Federica Mogherini to put up a united front. However, the event was marred by disagreement as issues surrounding immigration and economy instead highlighted some deep divisions between member nations.

When it comes to defence and security, Angela Merkel told the press that "Europe is at a very decisive point in time. I believe that we need a clear agenda."

Francois Hollande appeared to echo this resolute sentiment, stating: "We know the challenges. We know what's at play."

> "There should definitely be opportunities for industry since the solution will probably be an outsourced one"

Cooperation has been on the lips of all nations when it comes to defending the continent, but in particular, Eastern European states have been eager to merge their efforts under continued fiscal pressure and an obvious threat of Russian military build-up. One avenue that has been steady ground for cooperation of late has been in collaborative training, including a range of multinational exercises taking place continent wide.

In June 2015, the Czech Republic, Croatia, Hungary and Slovakia committed to a Memorandum of Understanding to cooperate in the area of shared helicopter training. Full support to the MATC project and interest to participate in future MATC activities was also declared by the United States during the signing ceremony. While the campaign in Afghanistan certainly improved elements of interoperability between European militaries, the rotary domain has long been said to have been lacking.

As a result, these nations have been working towards the development of the Multinational Aviation Training Centre (MATC), as part of a 'Smart Defence' initiative.

In its earliest form, the MATC will provide comprehensive training for flying and maintenance personnel from allied and partner nations on MI-type helicopters. They will attempt to maximise the use of existing capabilities and structures while minimising overall costs. Aside to benefiting NATO operations, other international militaries should eventually see a return, such as the Afghan National Security Forces (ANSF), which receive training from European Air Advisor Teams. The key to improvement will be through standardisation – with education and training, airworthiness rules and technical and tactical benchmarks all being levelled across the playing field.

"To be efficient, European forces need to be interoperable and this is obtained through common training," explains Laurent Donnet, European Defence Agency Project Manager. "Hence, the latter is one of those areas into which European nations should put effort. Looking at air forces, cooperative training can and should become the rule from the start. You don't even have to be flying the same aircraft. Although when you do, a much deeper level of interoperability can be reached and operational effectiveness will be substantially increased.

"An extremely valuable outcome has been reached for the countries involved in the MATC. To be noted is that the MoU stipulates that it could be enlarged to jet pilot training, which is exactly what these nations need in the short term."

Some may remember earlier efforts to create a jet 'Eurotraining' initiative in recent years. Known as the Advanced European Jet Pilot Training System (AEJPT), the project aimed to develop a common Integrated Training System (ITS) to train future pilots with at least 12 nations operating the same trainer aircraft and supporting infrastructure and training syllabus. AEJPT was in development for around a decade, with the Italian Alenia-Aermacchi (now Leonardo-Finmeccanica) M-346 shaping up to fill the jet role. However, things appeared to fall apart in 2012, with the project folding and those nations involved left to fend for their own training futures.

> "I expect that people will step out of this Military Flight Training conference with a better view on robust options"

"European jet pilot training is indeed again on EDA's potential project list, but not exactly in the same framework as the AEJPT," Donnet tells Defence IQ. "Today the approach is much more regional and it looks like that the MATC nations will launch a concrete project shortly. The MoU provides a legal framework and discussions are ongoing with the EDA to create a jet pilot school in 2019 in the Czech Republic. There should definitely be opportunities for industry since the solution will probably be an outsourced one."

Such a development could add some much-needed improvements to the sense of a unified Europe, aside to streamlining costs and enhancing skills in tomorrow's operational environment, which would undoubtedly be one of a coalition nature.

To elaborate on this effort and to drive forth progress, Donnet will be chairing the Military Flight Training Eastern Europe conference in Bulgaria this November, which will receive briefs from air and training officers from the Czech Republic, Poland, Slovenia and Georgia, to name a few.

"Air forces need to train the way they operate," says Donnet. "Hence, it is important that nations requiring jet pilot training know what is available, especially now that several European nations are looking for a European solution. And since most of them need to graduate only a few pilots a year, they need to cooperate with other air forces.

"Looking at former projects, regional approaches have more chances for success and this is why having dedicated conferences in specific European regions is so important. Knowing some of the requirements in the region, I expect that people will step out of this Military Flight Training conference with a better view on robust options available for their jet pilot training."

For more information, visit www.militaryflighttrainingee.com.

India verges on Guardian UAV purchase T. Magill

The Indian government is said to be close to making a deal with the United States for a provisional order of 22 unarmed multi-mission Predator Guardian MQ-9 unmanned aerial vehicles (UAVs) to help protect its maritime interests in the Indian Ocean.

> The platform would act as a force multiplier for the Indian Navy

The General Atomics platform would act as a force multiplier for the Indian Navy in its concerted efforts to round out surveillance technology at sea, including a $1 billion July contract to Boeing for four P-8 Poseidon maritime patrol aircraft.

The Guardian – which has already been deployed by the U.S. Coast Guard and Customs and Border Protection – would augment India's UAV inventory of Israeli-built Searcher II and Heron UAVs.

This past summer saw India designated as a 'major defence partner' of the U.S., with further efforts to strengthen industrial, strategic and diplomatic ties on the back of a Prime Ministerial visit to Washington and lengthy meetings between defence minister Manohar Parrikar and US defence secretary Ashton Carter.

The Indian Navy issued an official request to the Department of Defense in February for the possible adoption of the Guardians, marking what would be the first significant military weapons purchase under this newly defined partnership and potentially sealing President Obama's commitment to greater security in the Asia-Pacific region.

While the sale remains undecided at time of writing, multiple sources indicate that the process has begun and various agencies involved in the procurement are assessing the request. Given the impending end to Obama's term in office, a letter of acceptance is expected before the end of the year.

India has been one of the world's biggest adoptees of unmanned air systems, recognising the commercial and security value they can offer. Following an attack on Pathankot air base by Pakistan-based terrorists earlier in the year, the air force deployed surveillance UAVs over all of its bases in the western sector in the run up to a September training exercise.

Guardian has previously been deployed by the U.S. Coast Guard and border control agency. Image: USCG

Boeing-Saab team finally unveils T-X trainer candidate Oliver Austin

Boeing and Saab unveiled their much-anticipated, clean-sheet, fifth-generation jet fighter trainer in September, which is currently in contention to be one of the leading options for the U.S. Air Force's multi-billion dollar T-X competition to find a fifth-generation aircraft.

The collaborative team showcased two fully functional 'Boeing T-X' aircraft (initially codenamed 'Black Diamond') at a press event in St. Louis, Missouri, which featured twin-tails and stadium seating and – according to the company – an advanced cockpit with embedded training, plus state-of-the-art ground-based training with maintenance-friendly design for long-term supportability. The aircraft is said to have been designed in a flexible fashion to support upgrades as it looks to adapt to any changes in the air force's requirement sheet.

The biggest selling-point for the Boeing T-X is in its projections for long-term cost-effectiveness, with claims that it can reduce the costs of future aircraft programmes by infusing more automated assembly into complex aircraft structures, thereby lowering manu¬facturing expenditure while maintaining the flexibility to build a high-performance aircraft.

The aircraft is said to have been designed in a flexible fashion to support upgrades

Other teams in contention for the T-X include the U.S. manufactured T-50A from Lockheed Martin and Korea Aerospace Industries – a proven design, being a variant of KAI's T-50, that is currently in use in South Korea, Indonesia and the Philippines. A Raytheon-Leonardo team is bidding with the T-100, a design based on the M-346 two-seater already selected by Italy, Israel, Singapore and Poland. Meanwhile a team combining Northrop Grumman, BAE Systems and L-3 is bidding with an unnamed design that made its first flight in August, and which is effectively a low-wing, single-engine aircraft with side-mounted inlets and a conventional horizontal and vertical tail.

350 aircraft – along with simulators and associated systems – are expected to be purchased once a contract has been awarded, believed to be at a cost of around $11 billion. USAF is due to release a final RFP in December, and anticipates awarding a contract in 2017. Initial operating capability is planned for 2024, when the old fleet will be retired. To stoke competition, the air force is incentivising industry to exceed the threshold requirements for specific performance aspects, such as a bonus for every 0.1G above the 6.5G threshold, and up to the 7.5G objective. In other words, for two T-X proposals at the same price, the one with the higher sustained-G capability will be rated higher overall. Depending on the cost of the competing solutions, a proposal with a slightly higher price tag for a greater sustained-G capability could receive the better rating.

The first Boeing T-X trainer aircraft was revealed to the public in St. Louis in September. Image: Boeing

The World's First International Summit on Countering Civilian Drones

COUNTERING DRONES

Main Conference:
7th-8th December 2016

Regulatory & Legal Framework Pre-Conference Focus Day:
6th December 2016

London, UK

Developing strategic solutions to counter the threat of drones

Join the inaugural Countering Drones conference to:

- Effectively measure and prepare for the risk posed by drones by receiving exclusive security briefings from leading international experts
- Make an informed assessment of different types of counter-drone technologies and identify which system is best for your unique circumstances
- Influence future policy by contributing to high-level discussions with policymakers, insurers and legal practitioners
- Ensure that your organisation is aware of current developments in national security strategy, regulations and aviation legislation by hearing from senior policymakers from the UK, Europe and US
- Benefit from legal and insurance policy guidance to better protect your organisation from drone-related incidents

Sponsors include

robin radar systems

RHEINMETALL DEFENCE

ROHDE&SCHWARZ

2016 Speakers Include:

Don Head, Commissioner, **Correctional Service of Canada**

Detective Chief Inspector Colin Smith, Counter Terror Advisor, **UK Home Office**

John Miller, Deputy Commissioner, Intelligence and Counter-Terrorism, **New York Police Department**

Tim Johnson, Policy Director, **UK Civil Aviation Authority**

Maxim Moussa, National Coordinator for Security and Counterterrorism, **Netherlands Ministry of Security and Justice**

Julien Sabéné, Secretary General for Defence & National Security, **Government of France**

Dvir Rubinshtein, Aviation Security Operation Center Manager, Security Division, **State of Israel**

Rony Dresselaers, Director Security & Transport, **Federal Agency of Nuclear Control (FANC) Belgium (Tentative)**

Anh Duong, Program Executive Officer, Unmanned Aerial Systems, **U.S. Department of Homeland Security Science & Technology (Tentative)**

Christian Leininger, Vice President Safety & Security, **Berlin Airports Corporation**

Assistant Chief Ethel McGuire, Assistant Police Chief for Homeland Security and Intelligence, **Los Angeles World Airports**

Earl Lawrence, Director, Unmanned Aircraft System Integration Office, **FAA**

Szabó István, Deputy Director Security, **Budapest Airport**

Elina Millere, International Affairs Coordinator, **Civil Aviation Agency of Latvia**

Alfred Vlasek, Safety Manager, **Austro Control**

www.counteringdrones.com

Textron targeting Asian and Eastern European vehicles markets

Textron Systems Marine & Land Systems is world-renowned for its design, manufacture and support of next generation armoured combat vehicles, having seen its solutions integrated across international militaries and security forces. This September, the company will be sponsoring the Armoured Vehicles Eastern Europe conference at a time when regional spending on land systems has seen an upturn.

During a wider discussion on the armoured vehicles market and the company's portfolio, *Defence Industry Bulletin* spoke with Textron Systems Marine & Land Systems Vice President of Business Development Jonathan Dalrymple to get his thoughts on how the business is tackling the Eastern European and Asian defence markets, having already seen success in Latin America and the Middle East...

Textron's SCTV was adopted by Ukraine this year. Image: Textron

Defence Industry Bulletin: Jonathan, what does Textron Systems Marine & Land Systems make of current armoured vehicle market activity in the Eastern European region?

Jonathan Dalrymple: Due to the recent increase in security concerns and unrest in the Eastern European region, we are seeing an increased demand for armoured vehicles. The European desire for armoured vehicles includes high levels of protection as well as highly mobile and dependable systems that can fit into a modern C4ISR (Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance) system. These ideal vehicles are nodes in the battlefield network that allow for end-to-end solutions from sensor to shooter. Our COMMANDO line of vehicles is a perfect example of a vehicle that meets these conditions. Our Textron Systems geospatial software and products integrate seamlessly with our COMMANDO vehicles to provide our fighters with not only a world class armoured vehicle, but a world class fighting system.

DIB: This year you announced the first export sale of the Survivable Combat Tactical Vehicle (SCTV) to Ukraine. Why has this solution proved an asset to this country and what's the potential for further business here?

JD: For the short term requirement, the Survivable Combat Tactical Vehicles (SCTV™) were used to upgrade and harden the Ukrainian forces' High Mobility Multipurpose Wheeled Vehicles (HMMWV). The long term challenge that Ukraine is facing is to find a solution to retire various series of older, more tired and less protected HMMWVs and replace them with modern, highly-protected utility vehicles that are reasonable to operate, while providing world class protection.

The HMMWV was not originally designed for the asymmetric threats facing everyone today. However, the levels of protection and the thought that went into the design and functionality of the SCTV makes me proud to present it to users, who understand the benefits of our survivability capsule.

As for our partnership with Ukroboronprom, we have developed outstanding relationships with leaders throughout the company and believe they will be a key player in the market. Together, we have many opportunities to move forward as a team.

The Briefing Room

DIB: Blast and IED concerns remained high on the list among priorities for European nations over the past year. What does the company provide in way of technology and expertise to mitigate thosethreats?

JD: Textron Systems has invested a lot of time and resources into developing products to best help the war fighter. We have our own patented recipe of steel, and the material that is used to weld the steel pieces together is our own patented formula. These developments, as well as our ability to simulate blasts and model the affects during an explosion, help mitigate the threats.

Many companies build to a North Atlantic Treaty Organization (NATO) specification. That has value, but there are many more threats to the people inside a vehicle that are not covered by the NATO specification. Our designers and engineers build our vehicles as safe as we can possibly make them. Unlike other highly protected vehicles on the market, we have not sacrificed vehicle mobility with the increase in survivability. Our COMMANDO line of vehicles has demonstrated unparalleled mobility in a wide array of real world conditions. Crew survivability and mission accomplishment are always at the forefront of our efforts.

DIB: Understanding different regional standards has been cited by many companies in our research as one of the key challenges for international business in this regional market. How have you and your team been able to manage these standards and expectations at the multinational level?

JD: There is a trend today to move more towards NATO Standardization Agreements (STANAGs). This is not only for the members of NATO, but for other countries as well. And it's a trend we've been monitoring closely and work alongside when necessary.

DIB: Let's talk about Asia. That's a particularly healthy market for military vehicles at the moment...

JD: Right. It's very dynamic and highly competitive there. An increase in industrial capacity throughout the region has made market entry challenging and has also led to a shift in our business approach. For example, it may include some level of joint venture, co-production or technology transfer, as opposed to our historical sales as a sole source provider of systems.

Commando has been acquired by Colombia and Iraq. Image: Defence IQ

DIB: You've already been broadening your reach East in recent months – such as in providing vehicles, training, maintenance and repair services to forces in Iraq and Afghanistan. What prospects does Textron Systems see in exporting its solutions even further East?

JD: The prospects for exporting our solutions into the region are fair but can be successful with an adaptive strategy. The current challenge, as with the Asia-Pacific region, is market saturation. Many APC (Armoured Personnel Carrier) manufacturers around the world are aware of the increased requirement for APCs in the region and are all eager to provide nations with their solutions.

DIB: The key to success will surely be in fostering winning partnerships with new military end-users. Are you bringing a particular 'ethos' to the Asia market? Will the approach change much from other regional markets?

JD: Textron Systems holds partnerships with foreign military end-users to the same standards as our strong relationships with the U.S. military. In addition, we have demonstrated our ability to provide the full spectrum of service and support to international customers even in times armed conflict. We have successfully partnered with end-users to ensure that they can rapidly field and support the products they procure from Textron Systems. Our commitment to a quality product and unparalleled customer and partner support is the cornerstone of our regional engagement. The customer's requirement becomes our requirement and we work hard to bring forth the solution our partner desires.

The Briefing Room

How one company turned a £300 venture into a multi-million defence business

Hugh Griffiths has piloted the company into strong growth. Image: Inzpire

Hugh Griffiths is Chief Executive and one of the founders of Inzpire, a UK company providing mission systems and managed services – including COTS hardware such as the GECO advanced tablet systems, and a huge range of training and analytics solutions for the likes of aviation, intelligence and counter terrorism.

Born in India, Griffiths began his career a Royal Air Force fast-jet weapons systems specialist, clocking up around 3,000 flying hours throughout his service, became a front-line flight commander and participated in multinational air operations in the Balkans and the Persian Gulf. After retiring 22 years later at the rank of Wing Commander, Griffiths went on to complete an MBA at Warwick Business School and to establish Inzpire.

He talked with Richard de Silva of Defence Industry Bulletin about the company's rise and why he believes the industry needs an attitude change when it comes to engaging in business with military end-users…

Defence Industry Bulletin: Hugh, how long has Inzpire been operating?

Hugh Griffiths: The company was founded in 2005, with just three people and £300. Since then it's been quite a success story. That £300 has been turned into an annual turnover (this year) of somewhere around £10 million – depending on which projects come in this side of our year end. Likewise, three people have turned into over 100. The company's always made a profit, it's never made a loss, and it has no debt and it generates cash. So it's a very stable financial entity that simply started with three people having dinner, putting £100 on the table and forming a business.

DIB: And, it was originated as a provider of training solutions?

HG: Originally we were doing technical work for Typhoon and also training work – it's just grown from there really.

DIB: Can I ask to whom you're currently providing your services?

HG: At present, our main customer is the UK military. We consider ourselves to be part of the 'Whole Force' concept [an MOD business-focused approached], so our view is that while lots of companies think that they can contribute to the Whole Force – and many can – in terms of high-end operational training, in reality, very few can. That's what we're trying to provide. We also have export customers – such as the Royal Jordanian Air Force– and, we produce products as well as services in that regard. We make mission support systems, mission planning systems and standalone tablets and other bespoke software for military clients.

DIB: The company is big on promoting the idea that it is cost-effective. How does that manifest itself in the competitive flight training market?

HG: Mostly in the fact that we don't have huge overheads. We don't have a lot of debt to service. We don't spend lots of money on a lot of the paraphernalia of a big business. We employ mainly ex-military people – that also gives you the 'effective' part of 'cost-effective'. Because when most people say 'cost-effective', they tend to focus on just the cost aspect and not efficacy. Nor do we charge lots of money because it's not in our ethos to do so.

Obviously we have to make a profit and we have to pay everybody, but we're not greedy and we certainly come in on many projects much cheaper than many of the primes. That said, the effective side is where we tend to win because 80 per cent of our staff are former military people – and not just junior military, they're really high-end operational people. The very idea of the business is innovative; that you can have a defence business that is not actually run by traditional business people, but by pilots and soldiers. It means that we genuinely understand the customer very well.

For example, a lot of our staff are weapons and tactics instructors from the military. We have a number of attack helicopter weapons instructors, ➡

we have qualified flying instructors, we have electronic warfare instructors.

Due to that, we operate the business with very much a military ethos, which is also extremely unusual. However, the military really likes that as an approach.

DIB: Is there a risk that having too many ex-military staff could present a problem, in that you could end up lacking skills or experience from the commercial world, or having too many heads focused on just one end of the business?

HG: There's always a risk. We don't claim to get everything right. We're willing to admit that like most successful businesses, we've made lots of mistakes within our lifetime. But the thing is, if you're dealing with a military customer, or indeed any customer, you need to understand them at their level. I think therefore that the benefits massively outweigh the risks.

Let's not forget, the other 20 per cent of Inzpire is not former military. We employ fully-qualified accountants. We have professional HR. We have professional ISO9001. We have List X. We employ a very good legal team of three fully-qualified lawyers, which for a business of our size is quite a lot. So we have all the sort of things you would expect a business to have and that balances out the rest of the team.

DIB: When it comes to the flight training side of the business, what are you finding customers are asking – or demanding – from solution-providers in today's market?

HG: Certainly in the UK, they want the ability to outsource training that is not absolutely core – to give it to a supplier who will truly understand what needs to be delivered and has the ethos with which it needs to be delivered. They want to find out who will ideally do it cheaper than it would cost internally. Fundamentally, they want to invest in reliable solutions.

DIB: Is 'reliability' something you think this particular market has been missing for a long time?

HG: I think it has. Outsourcing in this field is something that's happened in the past but often, once the contract has been signed, the shape of it changes. What then tends to happen is that two or three years down the line, all of a sudden they're not getting what they want. People move on and other people step in to run things and suddenly the focus or relationship drops off. That's not a problem for Inzpire because we have next to no turnover in this business. People rarely ever leave! I think, in ten years, we've only had a few people leave, and that's normally for personal reasons, not because they don't like the business.

Our phrase is that we're trying to create a revolution in defence – a revolution of honour, integrity and trust. We do feel that, between the military and the defence industry, there has been a loss of those qualities in recent years. My impression is that there's now a lot of distrust between these two sides – a lot of suspicion, a lot of cost overruns, a lot of equipment not doing what those selling said it would do, a lot of misunderstandings – all of which has eroded a great deal of trust. We're just trying to bring that trust back, not with any particular, sparkling programmes but by simply being who we are.

DIB: Generally speaking, do you think most cost overruns and delays are down to the industry?

HG: There's probably issues on both sides of the fence. But this is where understanding the customer becomes so important. If you understand the philosophy of the customer and how they think, then it's quite easy to see problems that are going to happen and you can avoid them.

> "We trained the UK Army Air Corps to fly the Apache and we're now undertaking that work on a daily basis"

DIB: Going back to training specifically, Live, Virtual, Constructive [LVC] is of course becoming a major point of conversation. What does Inzpire see as being the challenges in this arena, how are you overcoming them and how are you helping the efforts towards true integration?

HG: The Virtual and the Constructive aspects are something we are doing every day through our work at the Air Battlespace Training Centre (ABTC), and through other simulation work that we're involved in. Industry partners provide the equipment – the likes of Boeing, Plexsys and QinetiQ – but we actually generate and run the training, alongside the military.

We trained 5,000 soldiers during the Afghan years. We also signed an MOU with Thales in July to help them with a project called AMTS – Air Mission Training System. I would say we are probably the best-placed company in the UK to understand the Virtual and the Constructive space on the evidence that we've been delivering LVC training for ten years.

The Briefing Room

Inzpire flight training solutions are being adopted worldwide. Image: Garry Ridsdale

We're now trying to break into the Live space, and we have had some recent successes there. We trained the UK Army Air Corps to fly the Apache with a contract we secured in 2012, and we're now undertaking that work on a daily basis. In fact, we've just won a contract to train the British Army to fly the Wildcat helicopter. We are also interested in the MOD's programme ASDOT (Air Support to Defence Operational Training) programme, which involves us working with other industry partners to deliver live flying.

Our presence in another contracts is benefiting that effort – the Air Warfare Centre contract – which means we're right at the heart of that now and we've managed to secure ourselves a pivotal position within the RAF's Prepare function: 'Prepare for Operations'. So, yes, we're running live exercises, we're running synthetic exercises, we're in tactics development and training, and we're in mission data in our work at Coningsby. The latter is providing critical support to Typhoon. In other words, we're covering all the bases.

DIB: I know that you did some research not long ago on the RAF's training capacities, particularly when it came to finding any inconsistencies across individual force elements...

HG: Yes. We were involved in a series of studies called MECS (Mission Essential Competency Studies). This has involved us going round to a number of forces and analysing their training using a proprietary methodology from the U.S. – we don't own it but we are licensed to use it. While changes can always be made, generally what we discovered was that RAF training was very good. I can speak from experience, having gone through it for 22 years. However what we were trying to identify were areas where they were perhaps training too much – resulting superfluous costs – or training too little. No matter how good you are, it's always good to get an external assessment. We approached that in a way that was totally connected with the military user.

DIB: Earlier, you briefly mentioned export partners. Is that the near-term goal, to broaden out your market outside the UK?

HG: It is. We've done very well in the UK. We've built a reference customer, with the UK MOD. What we want to do now is to move internationally. We have done this in some areas already, such as in our products area – our electronic flight bags and mission support systems have been exported to Jordan as a result of the success we've had at home. Off the back of Jordan, we expect to export some of our products to other countries in the Middle East and the Far East.

I think within the next six months, we'll see some significant training contracts being signed, particularly in the Far East, to provide things like helicopter training to other customers. We're also involved in counter-terrorism training, working with a partner company, and in UAV training, so we're about to start delivering that in South Africa for an export customer.

DIB: Is unmanned training in particularly great demand now?

HG: It's certainly exploding in the defence world, as you know better than me! But for us it's a relatively new area. We're not coming at this from the point of view of making UAVs. We're coming at this from the point of view of having really experienced people with backgrounds on Predator, Reaper, Watchkeeper, and so on – expert UAV operators – and having them provide training packages on how to use these platforms.

DIB: You've said Inzpire wants to inspire a kind of revolution. What's your call to action for the rest of the industry?

HG: From our perspective, we're finding ourselves in some unique positions now. We're happy to partner with anybody. But big business should start treating smaller companies, like Inzpire, with a bit more respect than they traditionally have. Although there's no doubt that the big primes have some amazing capabilities and some great people involved in them, but they simply cannot operate at the level of agility, speed and tacit knowledge that a company like Inzpire can.

To give you an example, even with about 100 people in this company, we have, together, around 1,000 years' cockpit time. And this is on every sort of fighter aircraft and helicopter you can imagine. My background's Tornado. My Head of Sales has flown F-18, F-3, Hawk. My Head of Rotary is a Chinook pilot. My Head of Managed Services is one of the most experienced Apache pilots in the country. In effect, we have a hugely in-depth tacit knowledge that the big primes tend not to have.

When primes employ military people, they tend to employ them in sales roles and they tend to employ the more senior people. That's all very good, well and proper, but we have something else we can offer them. It would be nice to be treated with a little bit of respect, rather than to simply be considered a subcontractor who will do the work without comment and be provided no freedom of input or experience.

The other thing is that we have a lot of penetration, as well. I was one of only two industry speakers at the recent RAF Air Power Conference at RUSI. The other was the CEO of Northrop Grumman. There, I talked about Inzpire's vision, which is to become, within 15 years, the most respected and admired defence company on the planet. We are not trying to be the biggest company – we'll never achieve that. Not in my lifetime anyway! And we're not trying to be the most profitable business. That's unrealistic. But we can be the most respected and admired. If you talk to the primes and to the military customers today, I think it we're well on the way towards that goal, at least within the UK. Yes, we've got to internationalise and move into Europe and the Far East, but we can generate a goodwill that, perhaps, the big primes find more difficult to do.

> "We're not trying to be the most profitable business. That's unrealistic. But we can be the most respected"

DIB: And on the subject of international trade, how has Inzpire received the Brexit decision?

HG: I don't think Brexit will hurt Inzpire at all. On reflection, I think it might actually help, even though I personally voted to remain because I thought it would be better for the UK as a whole. But from a company point of view, if the pound is weaker, that's definitely going to spur our export drive.

If there is a reduction in defence spending as a result of general adversity conditions brought on by Brexit, that, in itself, may also help us because, as the MOD becomes more and more price-sensitive, companies like Inzpire that can generally offer greater value for money, should move into a more front-running position. So, in many ways Brexit may actually turn out to be a good thing for Inzpire, although the inherent chaos and carnage of that decision may still cause us problems on the road. I'm quite prepared to be proved wrong on that, but that's my feeling.

Griffiths sees a huge benefit in staffing with ex-military personnel. Image: Inzpire

"Valor will last well into the 2030s – and beyond…"

An interview with Steve Mathias, Director, Advanced Tiltrotor Systems, Bell Helicopter

Steve Mathias (right) with DIB correspondent Georg Mader. Image: G.M

On 11 August 2014, the US Army informed the Bell-Lockheed and Sikorsky-Boeing teams that they had chosen their tiltrotor V-280 'Valor' and resp. coaxial SB-1 'DEFIANT' to continue the 'Joint Multi-Role' (JMR) demonstration programme. JMR is the precursor for the Army's 'Future Vertical Lift' (FVL) helicopter programme to take the service into the 2030s. Technology demonstrations are planned for 2017. As one of the two hard-trying FVL contenders, Steve Mathias, director of Advanced Tiltrotor System, Bell Helicopter, is responsible for the Valor's global business development. He explained the concept to DIB's Georg Mader next to an example to-scale model…

Defence Industry Bulletin: What will the Valor bring to the US Army?

Steve Mathias: The V-280 Valor is our response to the US Government's so-called Joint Multirole Tact-Demonstration. Two companies or consortiums were informed to proceed with risk-reduction for the upcoming FVL rotary programme. The concept behind it is to engineer a forward-looking, future aircraft able to reach airplane speeds and yet retain an ability to hover and manoeuvre like a helicopter. For that, the DoD has defined five categories, and among these, the V-280 is the response to capability set III. This is the medium spectrum – set I is very small and set VI is really big. So we're talking about a medium-sized design, something similar to the size of between a Black Hawk UH-1 and Apache. It's a joint-programme with the Marines and all other services involved, although the Army is leading the effort. And I must stress that all those services do a pretty good job in keeping the industry involved…

DIB: So it will be a replacement for all those types?

SM: Yes, the aim is to have the ability to come to a hover in challenging conditions and then, while at a hover, operate at low speeds with manoeuvring capability to roll and yaw. We want it to have the handling perspective to make the aircraft able to do what it is able to do. The goal is to build an aircraft that should give us enough of a leap ahead to replace all our medium-lift aircraft – for expeditionary roles, for new ways to fight, all future scenarios are demanding this replacement. And it will need to come as transport and weaponised versions.

DIB: What weapons you are talking about?

SM: Not about any particular one, or even an existing one. The attack variant is expected to use a modernised or next-generation version of existing Apache sensors and targeting systems, called the Modernized Target Acquisition Designation Sight/Pilot Night Vision Sensor (MTADS/PVS). However any armed attack version will have a gun, some kind of unguided or laser-guided folding-fin rockets, and some type of point-to-point missile. The missile could be Hellfire or some later-generation missile that would be laser- and/or IR-guided. We are being open-ended in that sense. We are not designing-in any specific requirement of weaponry.

DIB: Is the V-22 Osprey basically a Valor predecessor?

SM: The V-22 has been a great example of how Marines today can operate around the globe. It's shown how to we can get to places the Army can't normally go because of flexibility and mobility. In many ways it did give us the valuable experiences we've needed to be able to do this work.

DIB: But the tiltrotor is the concept you're offering to the service. The Army didn't actually ask for this as its preferred concept, right?

SM: That's right. No technical concept was asked for. They opened it up for everyone and every ➡

concept. Two of these are now selected to build the demonstrator. What were key-requirements were the need to exceed 230 knots and to self-deploy 2,100 nautical miles without refuelling – roughly the distance from San Francisco to Hawaii. Also it needed to hover in thin air at 6,000 feet and 95°F, or to achieve a combat radius of at least 434 kilometres. There are several ways to achieve that, and the tiltrotor is one of them. With that concept, we at Bell have had a lot of experience; around 40 years with all the lessons we've learned. We've applied all that to the V-280, from how to reduce costs to how to make the platform more agile and how to fly twice as far as and as fast as current helicopters.

DIB: Which also means quite a larger footprint…

SM: There's quite an extended area you can cover with an aircraft like this, which means fewer forward operating bases compared to the number we would need in Afghanistan for medevac intervals. Size-wise, however, the V-280 has no larger footprint than a Black Hawk.

DIB: And what's the current status of your development programme?

SM: The first demonstrator or prototype is in advanced stages of production – around 60 per cent complete – with the wing and fuselage mated in May and the tiltrotors slated to go on in November. Gear boxes and transmission will go in before we get those blades on. We plan to fly it in September 2017. There is a lot of new technology involved, but we also learned new things in how to develop and construct machinery. With all the current 3D- software involved today, that's really delivered new thinking.

DIB: That wing you recently mated – it looks like it will face enormous levels of stress under the current concept…

SM: That is indeed one long wing. We attach the middle of the wing to the fuselage, unlike with the V-22 in which the entire wing is one piece bolted to the fuselage of the aircraft. One wing covers both sides. It is attached with aircraft grade structural fasteners and there are enough fasteners to provide sufficient strength to hold the aircraft together.

DIB: How open is the architecture?

SM: That's a big subject! Bell engineers are of course building the Valor with an open architecture. Software and hardware are able to quickly integrate new technologies as they emerge. The concept is to construct a platform that is not intended to operate as most platforms do today but rather to advance technology well into the 2030s and beyond. Therefore, it will need to anticipate the weapons, sensors, computer processors and avionics that are likely to emerge by that time. This will likely draw upon semi-autonomous navigation technology. Bell developed the initial algorithms for this technology, which are also now on the Osprey.

DIB: I'm keen to hear more about the big differences with the V-22, such as the Valor's rotors swivelling while the engines remain fixed or straight.

SM: That approach gives the platform several advantages. Primarily it's about avoiding having to turn the hot exhaust gases towards the ground, as the V-22 does. That means fewer brown- or white-outs. Also you don't have to bend the fuel and lubricant lines. But of course you have one driveshaft in case you lose an engine. I also want to point out the large sliding doors for egressing troops, instead of using a rear ramp like the V-22. Door guns also have a free field of fire.

Image: Georg Mader

'Breaking a world record' with a fresh design: The Diamond turboprop trainer

Image: Georg Mader

From its first clicks in CAD to its first flight in less than a year. At Farnborough this past summer, Christian Dries, the CEO and owner of Diamond Aircraft, and his project director Clemens Knappert, briefed DIB's Georg Mader on their new DART 450 turboprop trainer. It is an undertaking few would expect from our correspondent's home country of Austria, but the company is one of the world leaders in flying composite-structures…

Defence Industry Bulletin: Mr. Dries, you've presented your latest design, the two-seater trainer DART 450. Why the name?

Christian Dries: We're very proud of our youngest child in the Diamond family. DART stands for Diamond Aircraft Reconnaissance Trainer. So it's not only a training aircraft with fully approved acrobatics but also a reconnaissance and sensor platform. The 450 stands for the chosen turboprop engine – the Ivchenko-Progress AI-450S by Motor-Sich.

DIB: We only heard of the project for the first time last year. It's moved forward very quickly since then, even to the point of a flying demonstration in England. When did the work actually begin?

Clements Knappert: We began development on exactly May 18, 2015. First flight was on May 17 this year, which is a world-record time of 364 days for a completely fresh design of a system with such innovation…

DIB: Such as?

CD: Well, like the world's first 100 per cent carbon-fibre construction of this type, F-16-like side-stick control elements, variable cockpit controls-handling for right- and left-handers, with – at the moment – mechanical transmission, and in the future via 'fly-by-wire'. All parts are newly produced except for the tripod-retractable landing gear.

DIB: What are the general stats of this aircraft?

CK: The engine's maximum power is 495 hp. The cell is designed for up to 1,000 hp. Top speed in level flight is at 430 km/h or 290 mph; in the dive 740 km/h, or almost 400 mph. Load limits are +7 and -4 G. For training and acrobatics the MTOW is at 2,000 kg; for sensor-operations currently at 2,300 kg…but we want to come up to 2,450 kg. The side-stick cockpit is fully designed to NATO standards. It is currently outfitted with GARMIN components but the design allows equipment according to customer preferences. In the future there will also be a de-icing system.

DIB: Where in the spectrum of trainers on the market is the DART 450 placed?

The Briefing Room

CK: In being designed as a civilian certified trainer but available to military customers, it was conceived not only as a basic-trainer but also as a systems-trainer – or from initial training to advanced levels. It's in the range of between the GROB-120 up to the PC-9, in some respects. The latter is not comparable in power output but there are many margins still inherent in our design. For basic flying today, the pilots can learn in five to ten hours, but it takes 200 or 300 hours to get proficient with the sensors and cameras while maintaining flight-safety. This is the issue. We are thus trying to mirror as much as possible in-system training in the stage below the jet-trainer – without attempting to replace a jet aircraft. Everything today is about the 'downloading' of training packages from expensive jet-hours into much more cost-effective platforms like ours.

DIB: Back to the engine – this is indeed from Ukraine. How did that work out?

CD: I am very proud to work with Ivchenko-Progress and Motor-Sich. We tested their engines in the DA-50, it was always very reliable. It is a reputable manufacturer with 28,000 employees, and in the past they produced powerplants for the majority of Russian helicopters and transporters, all the way up to the big Antonovs. But that's just the background. The true decider was the average fuel-consumption of 90 litres/hour! And with a max 830 litres in the tanks – 170 litres more than any competitor – this gives us a flight time of, for example, eight hours on a sensor-monitoring mission. That's between 15-20 per cent more than our competitors. With 350 litres, it is still at two and a half to three hours. Also impressive was a service-interval between overhauls of 3,000 hours, without any inspection of the so called 'hot section'. The engine especially protects this hot section against bird strikes or other FOD, which is essential as some customers will operate at low altitudes or above rainforests. Although the engine is FADEC-controlled electronically, it has a manual override. Start-up happens with just the touch of a button, and everything then comes on automatically. We wanted a platform that was as maintenance-free as possible and our selection of this superb engine is an important element in that.

DIB: The carbon fibre construction of the DART should – if one has in mind sensor/surveillance operations in government- or military-service – be quite useful in respect to the radar signature. Was that plan?

CD: Oh, yes. We started from the beginning with a very low radar-reflecting signature. Thanks to the carbon structure, I would also stress that it possesses 'stealth', despite that term often being overused. No, seriously! While it's not in any case comparable to those 'black' projects, the DART truly has a small return-signal…

DIB: Where exactly is that sensor equipment?

CD: We've provided a bay behind the rear seat, with the closeable opening facing down. This can ➡

Diamond CEO Christian Dries took the aircraft and a test pilot to demonstrate capabilities at Farnborough this year. Image: Georg Mader

accommodate various radar- or camera-gimbal equipment up to 15". It can be installed fixed or – if the customer so desires – stay retracted during cruise-flight and use a lift to extend the payload downward. But what sensors exactly will be integrated is up to the customer. There is already a huge range. So it's ultimately a question of weight. Thus the DART can be a trainer on which to learn sensors or – in certain lower-threat environments – how to do a surveillance-mission, or border patrols, or intercept slow-movers around summits, and so on…

> "We're currently building about one of the twin-engined DA-62s per week"

DIB: Are there provisions for external loads?

CD: Yes. In the centre line of the fuselage, there's a station to mount a pod of approximately 150 kg, and under each wing there's an auxiliary fuel tank, or room for other external loads. And before you ask – we do not provide or support any weaponry but what the customer ultimately uses the aircraft's capabilities for is up to them.

DIB: I might well have asked! Nevertheless I also have seen ejection seats in there…

CD: You're right. Here we have two solutions at hand. One is a lightweight seat by Martin-Baker with up to +30 G acceleration. The other – as is currently fitted – is the Russian Zvezda seat. The latter is also a renowned manufacturer that equips large fighter jets and who's K36 has saved many lives. At the moment it's not possible to certify ejection seats with rocket-propellant for use in civil aircraft – we still have civilian-built aircraft that will have EASA-certification because it should also be available to private customers. Nevertheless, the Zvezda seat works pneumatically at up to 26 G of acceleration.

DIB: This also means you still have to wait for EASA approval, right? When do you expect that?

CD: We've already submitted the appropriate registration documents for civil and military certification, so we expect the EASA certification within 18 months. Aircraft like this, that's an absolutely manageable thing with no big surprises expected.

CK: I want to add that in a number of countries, we actually don't need that at all because they undertake their own certification. It has generally become more complex – for example, with the FAA –especially in regards to single-engine jets or powerful turboprops.

DIB: What can you tell me about production capacity? If a large order comes in, how many DARTs can Diamond build on time, or simultaneously?

CD: Of course, we hope for that to happen, or at least have signs that are allowing us to expect for that to happen. Our factory just outside of Wiener Neustadt [50km south of Vienna] is large enough to accommodate. We're currently building about one of the twin-engined DA-62s per week. Half go to the U.S. We can safely manufacture 50 of these DARTs per year. In 2017, we'll initially do around 10 to 12. There is also possibly enough space for a second production site.

DIB: So where does the DART 450 fall on price?

CD: The design is positioned below a Pilatus PC-7. The basic PC-7 – developed about 40 years ago – today finds itself somewhere between USD$8m to $9m. Our brand new plane in the basic version, including the ejection seats, comes with a price of about $3.1m. Of course, there will be a number of options related to the equipment chosen.

CK: I want to add that, related to running- or life-cycle costs, we are significantly below the PC-7 class as there is no airframe maintenance due to the 100 per cent composite structure and no moving parts in the GARMIN-based cockpit instrumentation.

DIB: You've made several hints that future customers are more or less already fixed. Are they? And when will the first complete platforms be delivered?

CD: I can confirm that we have already sold some copies but I'm not yet in a position to name those buyers. A first customer-aircraft will be delivered this year and three more will also begin production this year. In general we're seeing strong interest from quite a number of countries and operators from all around the world. There's been an excellent market response.

DIB: Often a manufacturer benefits from his own 'home air force' as a launch customer. How have the Austrian AF responded to the DART? Their own PC-7s are, after all, over 30 years old.

CK: There's no current or foreseeable place for the DART yet. As far as we know, their PC-7s are now getting a limited NAVAID cockpit upgrade. But we do have a good relationship with them and even an official partnership with the BMLVS. We mutually give each other feedback and input. But as yet we have no acquisition negotiations in the pipeline.

The Briefing Room

"KC-390's current technologies will be relevant for a long time without an upgrade…"

Paulo Gastao Silva has been touring with the KC-390. Image: Georg Mader

The Brazilian designed and built twin-engine Embraer KC-390 multi-role transport held its European premiere this summer at Farnborough, albeit in a static display. The appearance was followed by a European/Middle-East sales tour. Paulo Gastao Silva, director of the KC-390 programme, gave DIB's Georg Mader a marketing and technical overview…

Defence Industry Bulletin: Sir, since flight-testing began in early 2015 – about a year behind schedule – one of your aircraft is finally here in Europe. Why have you made this journey to the UK? A long-range deployment test…?

Paulo Gastao Silva: For the most part. The aircraft out on the static is our initial flight-test prototype (PT-ZNF), which arrived at Farnborough on 7 July, following a stop-over at Alverca airbase in Portugal where it was presented to the Portuguese Air Force. I am sure you also know that, at the end of the day, no one wants to buy a plane that only exists on paper, promotional photos and artist paintings. Customers want to see it 'in the flesh', not imagine it somewhere on the other side of the globe. They also want to fly – and now they have the possibility to do it. We believe that after this outing we will target more detailed steps with some of the countries who are already talking to us.

DIB: Which are?

PGS: What I can say is that we've received visits from around 20 international delegations. A delegation from Sweden was among the nations who were given a tour. We had several who have requested visits or demonstrations in their own country. It's the right airplane for a range of nations but we will not name with whom we are exchanging details or who might be interested unless they authorise to the contrary…

DIB: Nevertheless, your presence here alone is a good marketing effort, as it is for everybody at Farnborough. What is your strategy to gain customers besides the Brazilian Air Force?

PGS: WLet me first underline that the Brazilian Air Force is responsible for the air-control of an area of 22 million km2. Only an aircraft with all the capabilities and requirements of the KC-390 will be able to accomplish such a mission. Thus we developed it with them involved and it will form the backbone of BAF-transport aviation. From the Amazon to Antarctica, this fleet of 28 aircraft will play a key role in the diversity of projects of the Brazilian State, from Scientific Research to the maintenance of sovereignty. Beyond those domestic roots…yes, we've embarked on what you could call a 'European tour'. Actually, it's also a North African and Middle Eastern tour. You may know that we have European suppliers who's parent countries hold sales options as well, such as in Portugal [OGMA company; six options] or the Czech Republic [AERO company; two options – see box]. That's where we go first, then to other potentially interested parties. It's true that since the launch of the aircraft's development in 2009, there are currently 'only' 28 firm orders for the Brazilian Air Force. However, there are 'intents to purchase' for roughly 30 additional aircraft*. Overall, our marketing specialists are quoting a potential of around 700 planes over the aircraft's programme life. ➡

The Briefing Room

Brazil has ordered 28 KC-390s to date. Image: Georg Mader

DIB: And overall, where is the whole programme today?

PGS: KC-390 is a middle-class twin-engined transport jet-aircraft, conceived to carry 23 tons or 57,000 pd of load to 1,520 nautical miles and while we at EMBRAER wanted to first meet the specifications of the Brazilian Air Force, this is a category similar to the C-130J. Today two prototypes are currently flying. These have accumulated over 350 hours. All test flights have been successful and the hours are increasing, as indicated by the aircraft's journey this year from Sao Jose dos Campos to the Farnborough Air Show. We expect to receive the certification for KC-390 by the end of 2017, with first deliveries of the aircraft scheduled for the first half of 2018.

DIB: It is clear and justified that you show extreme confidence in the plane's design, but why you are so confident the KC-390 can break into such a large market?

PGS: Because of four reasons. One: we are faster than the majority of prop-driven transports. Two: multirole capabilities – you can switch between any configuration, such as a cargo configuration to a medevac layout, in about three hours. Potential missions include SAR, special forces and paradrop-incursion [64 soldiers], cargo- and regular troop lift [80 soldiers] and fire suppression, all with a design that can land on unpaved strips or roads if needed. Three: the 'point in time' of the whole design. It was conceived between 2010 and 2012. Other cargo planes are much older from their moment of design — in some cases 40 years or more — and while those can be updated, the individual airframes themselves eventually need to be replaced. Five: subsequently its current technologies will be relevant for a long time without needing an upgrade. And along with that comes the experience from Embraer's 5,000-strong commercial fleet!

DIB: How big a role does the latter play in the KC-390?

PGS: It is important to understand the momentum of how off-the-shelf capabilities has been integrated into the design, cheaply and easily. We brought to this plane not only the best avionics, the best flight-control systems — fly-by-wire, by the way — and the best navigation system, but we also incorporated all our experience in commercial planes, of which we have many. All the experience in after-sales, all the care we have developed for commercial planes, we've transferred to this platform. And we've kept in mind that our customers want to have as much capability as possible with the least amount of problems as possible. When you tie all those things together, many services will find that the KC-390 is a cost-efficient solution for a wide audience, and that, in the end, may help the plane find customers. As you know, not all forces are swimming in endless funds.

DIB: You've mentioned a few suppliers, but didn't Embraer have the 'luxury' to strictly focus on designing the plane and not worry about the engines, the avionics, and so on?

PGS: Indeed. Back when we were a novice in the construction of military aircraft, Embraer [today 55th among the 'Top 100' global defence firms with USD$1.46 billion (or 23% military-share of overall business) in 2014] preferred to rely on experienced partners. Thus the KC-390 is equipped with two IAE V2500, the same that power some of the Airbus single-aisles. For the avionics part, we relied on the expertise of Rockwell Collins and its 'Pro Line Fusion' team that also equip the Legacy 450 and 500. Finally, the whole self defence part – including laser sensors, a missile-detector and radar-warning receiver – has been entrusted to a third party.

> "The KC-390 will be able to refuel the H225M 'Caracal' helicopter"

DIB: What missions and roles have been tested so far, and have there been any delays?

CD: The KC-390 currently suffers no delays. The actual capacity of the aircraft is on track. The certification phase has begun and our programme managers are confident about meeting deadlines since, according to them, all the prerequisites have been met or exceeded during the test phase. Several flight configurations have been tested, such as airdrops of paratroopers from the rear ramp and through the side doors at between 125 and 135 knots, drops of small loads, transport of vehicles and several configurations of refuelling baskets in-flight. We also can install additional fuel tanks in the cargo bay, either for flying further or delivering fuel to forward airbases. And we can carry one 'Black Hawk' or 'Caracal'-type helicopter.

DIB: On the subject of in-flight refuelling, a challenge – especially for jet-platforms – is always in providing the service to helicopters. How does the KC-390 deal with that?

PGS: I can confirm that the KC-390 will be able to refuel the H225M 'Caracal' helicopter of which Brazil has ordered 50 units. It will be possible at between 120 to 140 knots and up to 10,000 feet. This capability could also be a 'call' for other H225M customers who wish to have a tactical transport aircraft capable of refuelling their rotary capability.

DIB: What about a targeting-pod, LANTIRN [Low Altitude Navigation and Targeting Infrared for Night], or similar? Are there provisions in the KC-390's design?

PGS: Oh, yes. For LANTIRN, there is accommodation built into the overall design. It will be certified by 2018 and could be essential in SAR, as well as in cooperation with troops on the ground.

*Note: Six countries currently have commitments for 60 KC-390s: Argentina (6), Brazil (28), Chile (6), Colombia (12), the Czech Republic (2), and Portugal (6). Peru and Sweden are 'interested', while in Canada the KC-390 is one of three contenders for a new fixed-wing search and rescue (FWSAR) aircraft.

The KC-390's 'Czech factor'

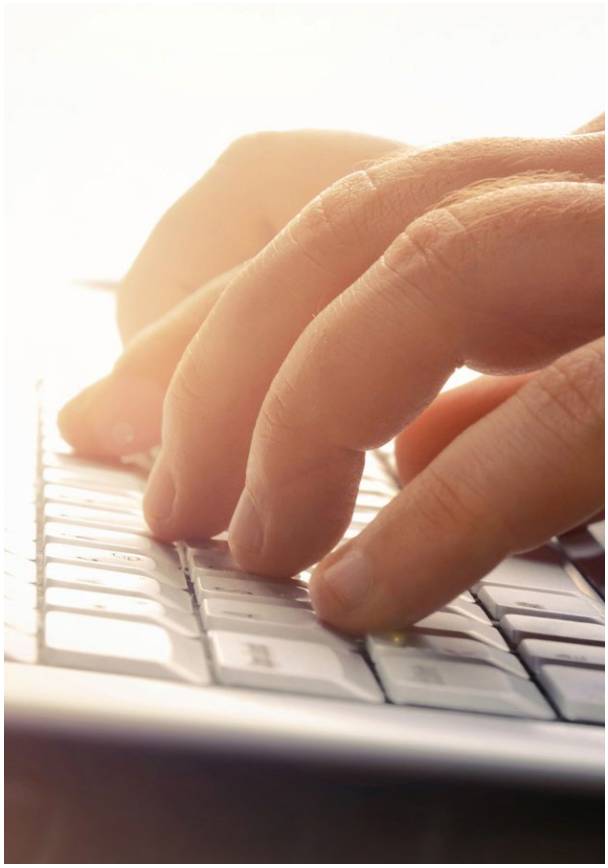
For AERO Vodochody AEROSPACE a.s. – well known for thousands of L-29 Delfin, L-39 Albatross, the current L-159 and the recently launched L-39NG – the KC-390 is its most important international cooperation programme. 150 technicians, including engineers and hundreds of workers of AERO, are involved in this project. With the dimensions of 6.5 x 4.5 metres, the rear ramp is the largest single aerostructure ever made in the Czech Republic. AERO signed a risk-sharing contract in 2011 at the LAAD Defense & Security exhibition in Rio de Janeiro, and it is responsible for design and manufacture of the wing's fixed leading edge, plus all of its cabin doors, the aforementioned cargo ramp and the 3.3 metre high rear fuselage of the aircraft. AERO's development role in the KC-390 is financed by the Czech export bank and insured by EGAP. Therefore, the second KC-390 arriving in Farnborough went through the Vodochody Airport on 16 July, where it performed two demonstration flights for representatives of the Czech Republic, including two deputy ministers of defence and the Deputy Minister of Foreign Affairs. The KC-390 prototype left AERO for the Middle East on 19 July at 10 am.

Defence Industry Bulletin

More Information

Editor:	Richard de Silva
Editorial contact:	haveyoursay@defenceiq.com
Correspondents:	Oliver Austin Victor M. S. Barreira Georg Mader T. Magill Eugenio Po Pola Zafra-Davis
Chief Designer:	Beau Merchant
Marketing Manager:	Sumit Dutta
Advertising Manager:	John Kearns john.kearns@iqpc.co.uk +44 (0) 20 7 368 9357
Subscriptions:	enquiry@defenceiq.com

IQPC, Floor 2, 129 Wilton Road, London, SW1V 1JX



Digital copies of Defence Industry Bulletin can be obtained each quarter by registering for Premium Membership via the interactive shop page at www.defenceiq.com. Defence IQ Premium Membership offers a number of perks, including an automatic annual subscription to Defence Industry Bulletin, all archived editions of the e-magazine, five free presentation a year from the Defence IQ B2B Shop, and the benefit of only ever paying the first Early Bird rate to attend a Defence IQ conference. The current rate is £350 p.a. Terms and conditions apply. Defence IQ reserves the right to change the rate and associated offers at any time.

We are unable to guarantee the bonafides of any of our advertisers. Readers are strongly recommended to take their own precautions before parting with any information or item of value, including, but not limited to, money, manuscripts, photographs or personal information in response to any advertisements within this publication.

The Editors are happy to receive original contributions to Defence Industry Bulletin. Please note that all material sent to the Editors is forwarded at the contributor's own risk. While every care is taken with material, the publishers cannot be held responsible for any loss or damage incurred. All material rates available on request.

Submitted material (especially illustrations) must be provided in digital format and must be provided with the contributor's name and contact details, including email address and telephone number. All rights to submitted material must be owned by the individual submitting. All items submitted for publication are subject to our terms and conditions, and may be amended to meet our editorial standards. For a full list of editorial guidelines, please contact the editors at the email address listed.

Defence IQ and IQPC accept no responsibility for the continued accuracy or use of the contents of Defence Industry Bulletin. All information is subject to change.